Anochrome Limited

Application To Vary an Environmental Permit Granted by The

Environment Agency

In Accordance with The

Pollution Prevention and Control (England and Wales) Regulations 2000

Permit Variation Application

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1. Introduction

Anochrome Limited specialises in the surface treatment of metal components and is located within a facility at Reservoir Place, Pleck, Walsall, West Midlands, WS2 9RZ. Anochrome Limited operates autonomously within the wider Kingsland Group and employs approximately 57 people at Reservoir Place where it has been situated since 1950.

The Reservoir Place site is located approximately 1.5 km southwest of Walsall town centre, in the Pleck area located northeast of the A4038 Darlaston Road and the Walsall Canal and within 0.5 km of the M6 located to the west. The total area of the site is approximately 8800 m^2; it is relatively flat with a slight slope, ranging in elevation of 136 m above ordnance datum (AOD) in the north to 135m AOD in the south.

The site is directly bordered by a mosque and educational centre to the north, with a residential area to the northeast beyond the road. A residential area lies directly adjacent to the eastern boundary and industrial units to the south, with the Walsall Canal located beyond. An historic copper works of approximately 18 Ha lies to the west which is currently being remediated and developed for future commercial use.

The site itself comprises four large buildings that house offices, factory facilities and warehouses. A small office block is situated to the south of the main offices in the centre of the site. Industrial surface treatment of metals takes place within the main site buildings in the north and east of the site. Bay 3 is located along the southern boundary and occupies an area of approximately 900 m^2. The location plan is shown in Figure 1.

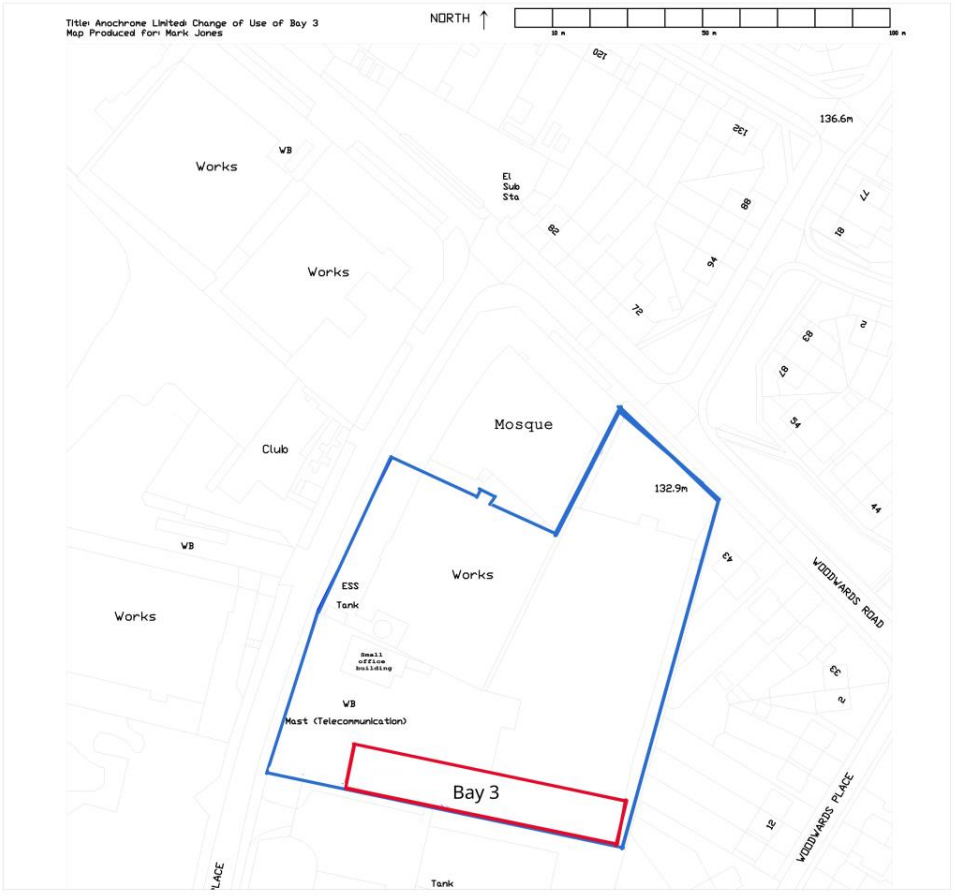

Figure 1: Location Plan

1.1 Permitted Activities

The 'installation' at Reservoir Place is operated in accordance with environmental Permit ref: EPR/BN0112IN (the Permit) which was issued in 2004 under the Pollution Prevention and Control (England and Wales) Regulations 2000 (PPC Regulations) as amended; the Permit was subsequently varied in 2010.

The Permit allows Anochrome Limited to carry out activities at the site described in Section 2.3 Part A(1)(a) in Part 1 to Schedule 1 of the Environmental Permitting Regulations 2016 (EPR) as '*surface treating metals and plastic materials using an electrolytic or chemical process where the aggregated volume of the treatment vats is more than 30 m^3'*

The current permitted activities are summarised below in Table 1:

Activity listed in Schedule 1 of the EPR/Associated Activity	Description of specified activity	Limits of specified activity
Section 2.3 A(1)(a): Surface treatment of metals or plastics	Electroplating including zinc plating, zinc phosphating, zinc nickel and hexavalent chromium conversion coatings.	Receipt of raw materials to despatch of finished product and storage/transfer of wastes off-site or to effluent treatment plant
Associated Activities: Storage and handling of raw materials products and intermediates	Storage of solid and liquid materials in bulk storage tanks, drums, IBC's, bags and other containers	Receipt and storage of raw materials and intermediates to transfer to processing areas or offsite
Associated Activities: Chemical/mechanical preparation	Activities directly associated with surface treatment processes	Receipt of raw materials to despatch of finished product
Associated Activities: rinsing, drying, post treatment	Activities directly associated with surface treatment processes	Receipt of raw materials to despatch of finished product
Associated Activities: fume extraction and abatement	Activities directly associated with surface treatment processes	Receipt of raw materials to despatch of finished product
Associated Activities: Effluent treatment plant,	Activities directly associated with surface treatment processes	Receipt of wastes from production plant to transfer of effluent to sewer or of wastes off-site
Associated Activities: Waste storage	Effluent treatment plant, Filter cake and spent treatment chemicals etc	Receipt of wastes from production plant. Disposal of effluent to foul sewer or storage of waste for off-site disposal.
Associated Activities: Cathodic electrophoretic painting	Activities directly associated with the surface treatment processes	Receipt of raw materials to dispatch of finished product

Table 1: List of Permitted Activities

The installation contains process tanks for chemical and electrolytic surface treatment activities along with directly associated activities which have a technical connection with the surface treatment activities, and which therefore may have an effect on emissions and pollution.

The surface treatment process lines on site at this time are as follows:

1. Automatic Barrel Line 1 (barrel cyanide zinc plating)
2. Automatic Barrel Line 2 (barrel cyanide zinc plating)
3. Automatic Vat Line (rack cyanide zinc plating)
4. Automatic Phosphate Line (barrel zinc phosphating)
5. Alkaline Zinc Nickel Plating Line
6. Electrophoretic Painting Line
7. Powder coating

Associated with these process lines are the following activities:

1. Hydrogen Embrittlement Relief
2. Storage of Process Materials
3. Effluent Treatment
4. Quality Assurance of Processed Parts
5. Storage of Waste Materials
6. Abatement of Hydrogen Chloride Emissions
7. Planned Preventative Maintenance
8. Training of Personnel

The current activities are performed for a range of customers who serve the automotive, wind energy, construction and engineering sectors.

The company is certified to IATF 16949

1.2 Scope of Permit Variation

Anochrome Limited is now seeking permission to vary the Permit in accordance with Section 20 of the EPR (as amended) to support a number of development proposals in relation to the operations and activities undertaken at the Reservoir Place site.

The site development proposals are outlined below:

a) Extension of the permitted area and boundary to include additional existing site buildings and land
b) Installation of a new Automatic VAT line to operate on more favourable less environmentally hazardous technology (acid zinc) in an existing building (Bay 3) located within the proposed extended Permit area with accompanying requirements for:
    i. Design and installation of associated chemical supply, storage and containment facilities
    ii. Design and installation of a new emission point to air
    iii. Enhanced surface protection of the underlying impermeable floor in selected areas
c) Decommissioning and removal of the existing Automatic VAT line which operates on less favourable more environmentally hazardous technology (cyanide zinc)
d) Decommissioning and removal of the emission point to air (denoted A1 in the Permit) associated with the existing Automatic VAT line

If permission is granted, then the environmental Permit will be required to be updated to remove all references to:

i. The existing Automatic Vat Line currently using cyanide zinc technology which will be decommissioned and removed from site
ii. Emission point A1 which will be decommissioned and removed from site

It also requested that the environmental Permit be updated to reflect changes that have occurred since the Permit was originally granted in 2004, namely removal of reference to:

i. Walsall Platers 1 as this nomenclature is no longer applicable to Anochrome Limited
ii. Hexavalent chromium conversion coatings as this technology was successfully replaced by trivalent chromium conversion coatings several years ago

The cessation of hexavalent chromium was made after appropriate liaison with the Environment Agency (EA).

All relevant location, site and activity plans and layouts which illustrate the development proposals are included in a separate document (Refer to: Plans and Drawings July 2024) which accompanies this application. A selection of the aforementioned location, site and activity plans and layouts are also reproduced within this main application document to aid explanation when deemed necessary.

A full description of the treatment processes, workflow and line configurations proposed for the new Automatic VAT line has been deemed confidential for the purposes of public consultation.

1.3 Permit Boundary

An extension to the current Permit boundary and area is required to incorporate the development proposals outlined in this variation application.

The installation of the new Automatic Vat line using acid zinc technology is planned to be located in Bay 3 which is situated on the southern boundary and occupies an area of approximately 900 m^2. Anochrome Limited is therefore requesting that the Permit boundary and area be extended to include:

a) Bay 3 and the land it occupies
b) The remainder of the non-permitted site area including all exterior site yard areas, thoroughfares and buildings and underlying surfaces except for the small office building situated to the south of the main offices

The aforementioned small office building is currently awaiting imminent demolition. Anochrome Limited therefore kindly requests that the small office block building be excluded from the Permit but that the land it occupies be included in the extended Permit boundary and area. After demolition, this land will be backfilled with high quality aggregate and made good. The demolition will be completed prior to the determination of this Permit variation application but not before submission of the application.

The proposed updated Permit boundary and area is outlined in Figure 2:

Figure 2: Permit Boundary and Area (Current and Proposed)

As a consequence of the proposed extension of the Permit boundary and area, an updated Site Condition Report has been prepared to accompany the application.

1.4 Pre-Application Advice and Consultation

Anochrome Limited submitted a request for pre-application advice (Ref. EPR/BN0112IN/P001). The proposed variation has also been discussed with the local EA Senior Regulatory Officer responsible for regulating and inspecting the site activities.

1.5 Technical Standards

The variation application has been produced in accordance with the EA and Department for Environment, Food & Rural Affairs (Defra) current guidance. Anochrome Limited has applied the following Appropriate Measures as representing Best Available Techniques (BAT) for the sector and the proposed activities:

a) UK Government (2023): Guidance A1 installations: environmental Permits
b) UK Government (2023): Develop a management system: environmental Permits
c) UK Government (2013): Environmental Permitting: H5 Site condition report
d) UK Government (2023): Risk assessments for your environmental Permit
e) BAT Reference Document for Surface Treatment of Metals and Plastics, August 2006 (BREF)
f) The Surface Treatment of Metals and Plastics by Electrolytic and Chemical Processes (EPR 2.07), March 2009
g) Process Guidance Note 6/23(11) Statutory guidance for coating of metal and plastic processes, June 2014

1.6 Application Package

The application package includes completed application forms that are cross-referenced to various technical documents, which are intended to address all the areas required by the variation application. The various documents included with this application package are outlined within Table 2 below:

Application Forms	Anochrome Limited Application Environmental Permit Variation Part A July 2024 Anochrome Limited Application Environmental Permit Variation Part C2 July 2024 Anochrome Limited Application Environmental Permit Variation Part C3 July 2024 Anochrome Limited Application Environmental Permit Variation Part F1 July 2024
Supplementary Technical Documents	VarApp July 2024 Update Non Technical Summary July 2024 SEA CCLA Dec 2023 RM Usage and SDS July 2024 Point Source Emissions July 2024 Plans Drawings July 2024 Update EMS Summary July 2024 Pre-Application Advice July 2024 Directly Associated Activities July 2024 Anochrome Ltd Director Details July 2024 Site Condition Report July 2024 Environmental Monitoring July 2024 Confidentiality Request July 2024 Not Duly Made Responses

Table 2: List of Application Package Documents

Anochrome Limited is fully committed to providing any further information or further details as may be required by the EA as it goes through the process of determining this application and will attend to any supplemental information requests forthwith. Anochrome Limited wishes to ensure the EA that it will endeavour to cooperate with the Agency during the determination period for this application and subsequent to any variation being approved.

2. Existing Operating Conditions

It is foreseen that the existing management systems and techniques at Anochrome Limited as defined by EPR/BN0112IN and currently practiced at the Reservoir Place site will be extended to cover the proposed installation and operation of the new Automatic VAT line and accompanying decommission of the existing Automatic VAT line and associated emission point A1.

2.1 Management Techniques

Anochrome Limited has implemented an Environmental Management System (EMS) which has been designed to meet the requirements of ISO14001:2015 standards; however, it is not currently certified by an external third party.

The EMS embraces all indicative BAT requirements for an effective management system as explained below.

2.2 Management Structure and Allocated Environmental Responsibilities

Anochrome Limited has a multi-disciplinary environmental management team comprising the General Manager/Director, Technical Manager, Quality Manager, Operations Manager and Engineering Department; these personnel are supported by the Group Health, Safety and Environmental Manager.

Anochrome Limited Management Structure

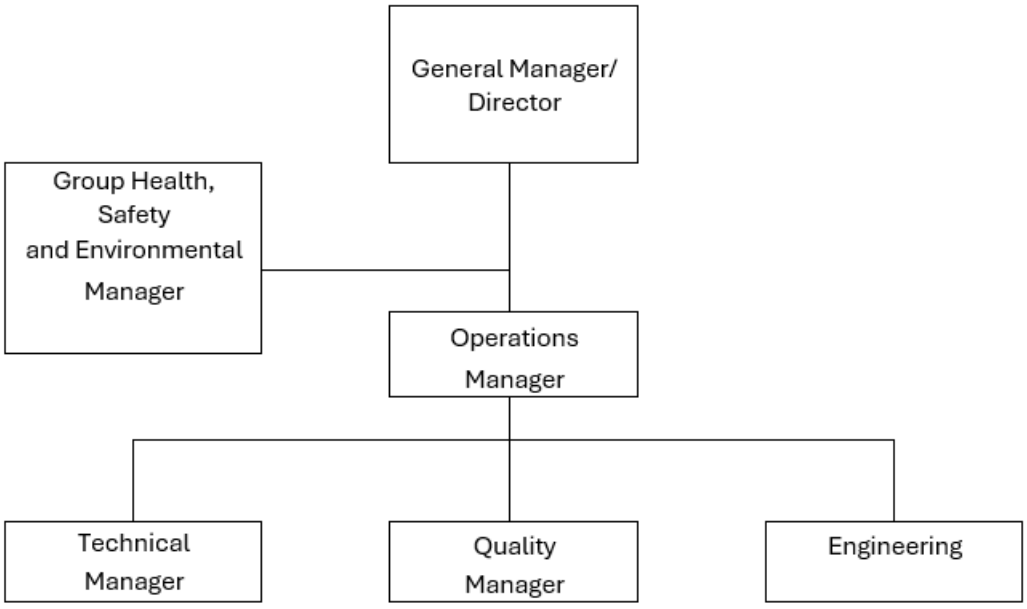

Figure 3: Anochrome Limited Management Structure

The General Manager/Director has the responsibility for maintaining the environmental policy, analysing the environmental impacts of the site, monitoring environmental compliance and chairing the annual management review. They also have responsibility for ensuring that Permit reporting requirements are met and that all personnel are adequately trained on aspects of the current Permit relevant to their roles.

The Technical Manager is responsible for the effluent treatment plant and any other environmental emissions from the site and also for monitoring waste generation, handling, recycling and disposal.

The Engineering Manager is responsible for monitoring water consumption, energy consumption and implementing energy and water reduction programmes.

The Group Health, Safety and Environmental Manager is responsible for any external monitoring of the site's environmental impact.

The collective environmental management team has the responsibility of ensuring compliance with the conditions of the Permit.

2.3 Environmental Policy

Anochrome Limited has an environmental policy which is communicated to all employees, customers and suppliers, and is additionally freely available to the public. The policy is reproduced below:

Environmental Policy

The Anochrome Group fully adopts the disciplines of environmental, quality, health & safety management, as they are an integral part of our management system.

As policy our business will:

- Comply with all applicable laws and regulations regarding our field and strive to exceed them.
- Keep up to date with environmental information and our risk-based thinking.
- Follow the route of continuous improvement and best use of our resource in our environmental management to achieve waste reduction and energy savings.
- Communicate our environmental objectives and performance against these objectives throughout the group and to any interested parties on request.
- Ensure that activities are safe for employees, associates, customers, suppliers, and others who encounter our work by reducing the use of harmful substances wherever practicable.
- Work closely with our customers and suppliers to establish the highest environmental standards.
- Adopt a forward-looking view on future business decisions, which may have an impact on the environment.
- Train our staff in the needs and responsibilities of environment management with defined roles.
- We attend our Trade Association meetings to discuss legal and environmental implications.
- Develop our environmental system responsibilities with regular internal and external reviews.
- We aim to ensure that all Anochrome Group employees have a understanding of all quality and environmental management systems, thus ensuring compliance to ISO14001 requirements.

Signed:

Mark Jones
Managing Director **8th December 2023**

Figure 4: Environmental Policy

The company is aware that the activities carried out on site have various impacts on the environment and is committed to reducing the effect of these impacts in a number of ways.

These include:

- Complying with the requirements of environmental legislation and approved codes of practice
- Assessing the impacts of all current and likely future operations
- Continually aiming to improve environmental performance
- Reducing, so far as is reasonably practicable, the use of energy, water, process materials and effluent reagents.
- Reducing, so far as is reasonably practicable, the environmental impacts of pollutants, and waste streams
- Raising awareness, encourage participation and train all employees in environmental matters
- Assisting customers in the use of products and services in an environmentally sensitive way
- Expecting similar environmental standards from suppliers and contractors
- Being sensitive to the observations and comments of individuals resident in the immediate community

The commitments in this policy are managed and delivered through the EMS. Compliance with these commitments is verified at the annual management review meeting.

The General Manager/Director reports directly to the Group Managing Director who has overall control of the company strategy.

2.4 Environmental Targets

Anochrome Limited's environmental policy provides the framework for setting objectives and targets to prevent pollution, meet legal requirements and continually improve environmental performance.

2.5 Preventative Maintenance Programmes

Anochrome Limited operates an extensive maintenance management system, including weekly (minimum three times per month) visual inspections of:

- All bunded areas and drainage channels to detect any signs of deterioration, leaks, spillages or blockage; any corrective action being reported and auctioned at management meetings

- Assessment in all process areas to identify equipment wear and tear which may need to be addressed as part of the company's planned/predictive maintenance (PPM) programme with particular attention paid to tanks, pipework, supports, motors, ducting, filters and pumps and compressed air

There will be no substantive difference between the maintenance regime implemented for the new Automatic VAT line if permission was granted for its installation and the regime that is currently implemented for the existing process lines.

Any significant signs of equipment deterioration is required to be either repaired immediately, scheduled in the weekly maintenance period, or if necessary, a specialist contractor is arranged.

The results of the weekly inspections of drainage channels, bunded areas and equipment is recorded and any issues arising reviewed at management meetings.

The bunded areas and submerged tanks are annually tested for leaks and the integrity of the drainage channels are also inspected. This is normally be completed during the annual shutdown period when this work can be completed safely.

Any corrective action that is required is reported to the General Manager/Director and implemented.

All the results are recorded and reviewed at the annual management review meeting.

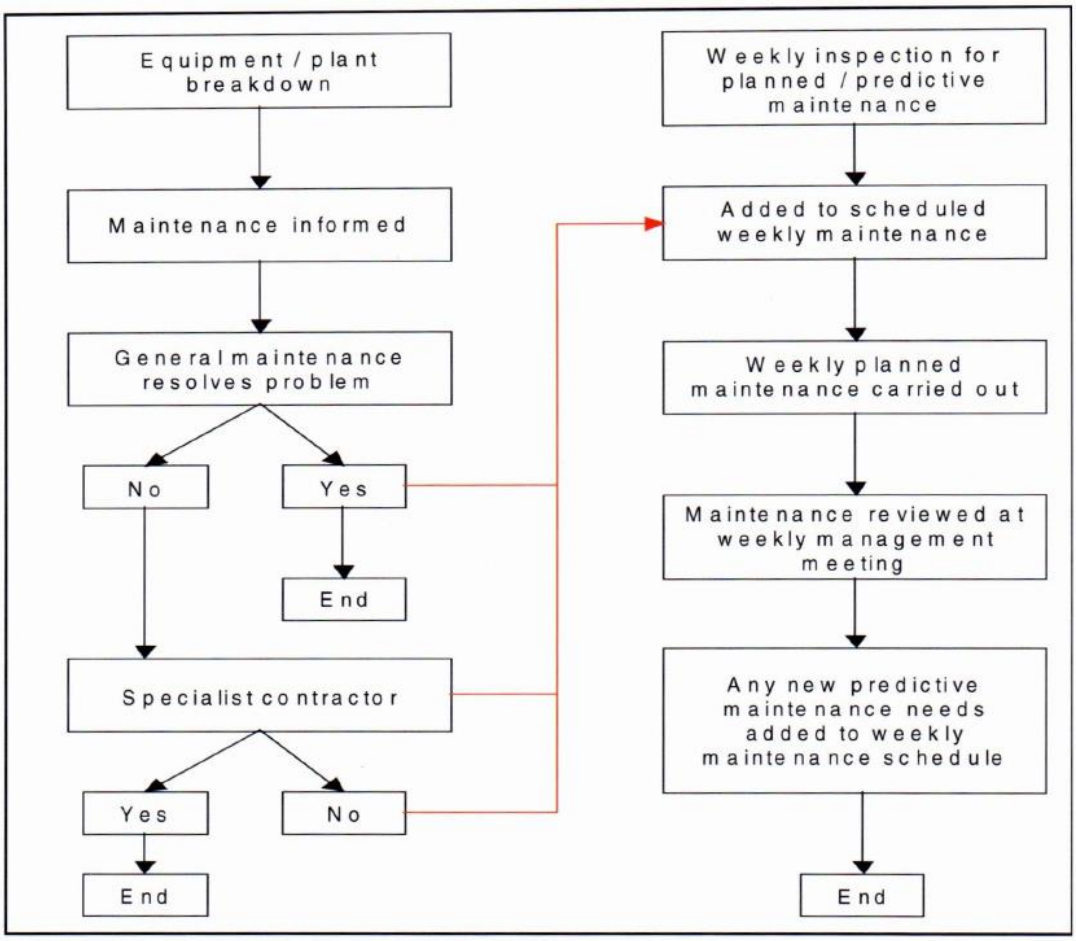

Figure 5: Anochrome Limited Maintenance Management System

2.6 Emergency Planning and Accident Prevention

Anochrome Limited has a documented system for identifying, assessing and minimising the environmental risks of accidents and their consequences; an emergency plan also exists which will be updated to take account of the proposed developments if the variation is granted.

2.7 Monitoring and Measuring Performance

Anochrome Limited has identified the following key indicators of environmental performance and maintains a programme to measure and monitor these indicators to enable review and improvement of performance.

1) Percentage of anode metal that is plated onto product

This is calculated for each anode metal and chemical salt by carrying out a mass balance of total quantity of anode metal/chemical salt brought into the company to the quantity of anode metal/chemical salt that is dragged-out into a static drag-out rinse immediately after the process tank for a period of three hours.

The current reject rate at Anochrome is low (about 0.2%) and few components require re-work (i.e. stripping and re-plating). The treatment of stripped metal in the effluent stream, if carried out on a significant scale will cause the plating efficiency to appear worse than it actually is.

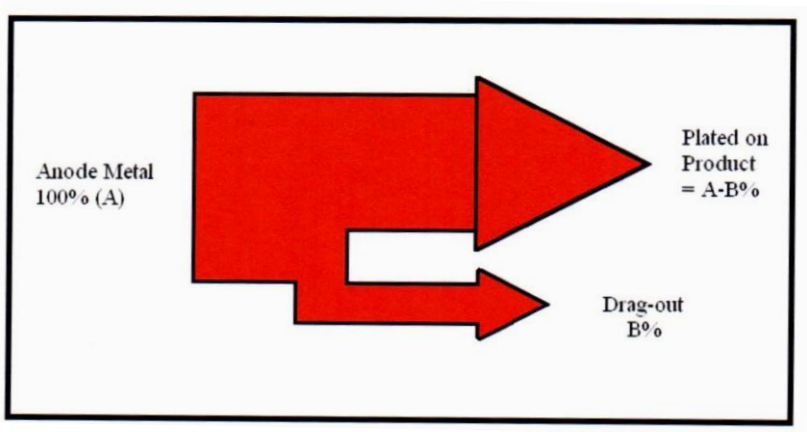

Figure 6: Mass Balance Structure

2) Consumption of Utilities

The following consumptions are determined weekly and related to site outputs to ensure that none becomes excessively higher than it has been on a historical basis:

- Mains water
- Electricity
- Gas
- Effluent final discharge

3) Production of Wastes

Wastes arising from daily site operations are segregated for separate collection and disposal. Data on the quantities of waste generated is collected and quarterly reports are submitted to the management committee to assess performance and identify areas for improvement:

- Hazardous waste – Filter cake, hydrochloric acid, occasional spent solutions
- General waste
- Scrap metal

2.8 Monitor and Control Systems

Anochrome Limited has established monitoring and control systems for releases to the environment and for process variables to:

- Ensure that the installation functions as intended
- Rapidly detect abnormalities, identify the cause and correct them in a timely manner

2.9 Training

All employees are trained to carry out their job functions and facets of their training are recorded on a real-time training matrix facilitating automated tracking of due dates for refresher training.

Facets of the training matrices are concerned with environmental matters, including awareness of correct process temperatures, rinse water volumes and setting of correct process parameters. All new employees are given an environmental briefing as part of their induction process.

All of the management team are given a presentation on environmental legislation and how these affect the company's activities.

At least one person from the site will be formally trained in environmental auditing and be able to conduct audits in an effective manner, supported by Group personnel.

2.10 Communication

Anochrome Limited's EMS includes a procedure for reporting all incidents, including compliance breaches and complaints. If an incident results in any environmental pollution the EA and any other relevant bodies (i.e. water company, local authority) will be notified as soon as possible.

Complaints will be notified to the EA as part of the annual Permit report on environmental performance. Incident reports and complaints are reviewed by the General Manager/Director and at management review meetings to decide whether changes to operations are required.

2.11 Auditing

Personnel from other group sites audit the EMS at least once per year.

2.12 Corrective Action

Any non-conformances identified are documented and action taken to investigate any impacts caused and for initiating and completing corrective and preventative action (i.e. increased maintenance). Any corrective or preventative actions to eliminate the causes of non-conformances are recorded.

2.13 Environmental Performance Review

A management review meeting is held annually to monitor environmental performance and the effectiveness of the EMS in meeting the company's environmental policy and objectives. The management review meeting is chaired by the General Manager/Director and is attended by the Technical Manager, Quality Manager, Operations Manager, Engineering Department and any other relevant employees as required. The management review meeting also considers how

environmental issues are incorporated in all other relevant aspects of the business, insofar as they are required by the Permit conditions, in particular:

- Process change control (management of change)
- Design and review of new facilities, engineering and other capital projects
- Resource allocation
- Planning and scheduling
- Incorporation of environmental aspects into normal operating procedures
- Purchasing policy

Based on the findings of the management review meeting, Anochrome Limited will provide an annual report on environmental performance to the EA covering:

- Information required by the Environment Agency as part of the Permit
- Effectiveness of the EMS in delivering objectives and targets, and planned future improvements

3. Material Inputs

If the Permit variation is granted then the intended installation of the new Automatic VAT line operating on more favourable less environmentally hazardous technology (acid zinc) will result in the storage and use of a small number of chemicals that would be new additions to the site.

Conversely, the proposed decommissioning and removal of the existing Automatic VAT line operating on less favourable more environmentally hazardous technology (cyanide zinc) would lead to a site reduction in the use of:

a) Sodium cyanide
b) Rinse water (due to the use of more efficient rinsing sequences than currently utilised by the existing automatic VAT line)

Although the above intended changes will lead to an increase in the aggregate volume of the treatment tanks on site from approximately 70m^3 to approximately 95m^3, the use of acid zinc technology in preference to cyanide zinc technology incorporates the adoption and use of BAT.

As outlined earlier, Anochrome Limited calculates the percentage of each anode metal or chemical salt which is plated onto a component part by carrying out a mass balance of the total quantity of anode metal/chemical salt bought into the company to the quantity of anode metal/chemical salt that is dragged out into a static drag-out rinse immediately after the process tank for a period of three hours. This is routinely compared to the 2006 BREF benchmark figures as illustrated in Table 3 below:

Plating Technology	BREF Benchmark Efficiency (%)	Anochrome Efficiency (%)	Comparison
Zinc Plating (cyanide)	70-90	97	Good
Zinc Plating (acid)	70 -90	98*	Good
Phosphating	Not available	99	Good
Electrophoretic Painting	98	98	Good

Table 3: Comparison of Material Efficiencies

The figures above show that the current material efficiencies at Anochrome Limited compare favourably with the benchmark efficiencies provided in the 2006 BREF. The efficiency for acid zinc was determined at Wolverhampton Electro Plating (WEP), another organisation within the Kingsland Group, where the process is used on a consistent basis. It is expected that the use of acid zinc technology on the new Automatic VAT line at Anochrome Limited would have similar material efficiency.

Anochrome Limited will continue to monitor material efficiencies and seek to increase these where possible.

3.1 Raw Material Selection

The selection of raw materials is made after considering a number of criteria, including product performance, environmental impact and customer specification requirements.

Customer Specification Requirements

Enquiries to Anochrome Limited from potential customers describe the type of surface finish that they require. Customers from some industry sectors, i.e. automotive, have stringent specifications on the type of surface finish to be used. Customers from other sectors are less restrictive and allow Anochrome Limited some flexibility in the processes that are used to obtain the surface finish.

Product Performance

Raw materials are sourced from a wide range of suppliers, but in each case only after they have satisfied Anochrome Limited of their ability to supply products to an approved quality assurance standard, in a timely manner. A list of approved suppliers is maintained as part of the Anochrome Limited Quality Management System.

New process chemicals are evaluated for their performance before they are used. Evaluations may be carried out on suppliers' premises or using laboratory facilities on site or at local universities dependent on the work required.

Environmental impact

The Anochrome Limited Technical Manager maintains a full inventory of the raw materials and principle auxiliary materials used on site. This inventory is updated in real time.

All major changes to process chemistry are considered under a control of change procedure. At this stage an Environmental Impact Assessment is made and where possible products with low environmental impacts are used.

Under these constraints Anochrome Limited has attempted to identify and use materials that are less environmentally harmful or sustainable, where an alternative exists. This is subject to product performance and customer specifications.

The raw materials and principle auxiliary materials used by Anochrome Limited for the various surface treatment activities on site are detailed below. The following sections list:

- Chemical composition of the materials
- Purpose of the materials
- Quantities used
- Fate of the material in terms of approximate percentages to each media and to the product

3.2 Aqueous Pretreatment Chemicals

Environmental Impact

All alkaline waste is neutralised in the effluent treatment plant after which the effluent is discharged to the public sewer and the filter cake is disposed of to landfill. Fume extraction is employed over the process tanks to remove water vapour and alkali fume generated due to the operating temperature of the solutions (50 to 80°C). Spillage and leakage of alkalis can contaminate soils so particular care is taken to avoid this at Anochrome Limited.

Raw Material Alternatives

Alternative cleaning systems are available, such as biological cleaning, but the performance of these is unsatisfactory due to the variety of component parts processed by Anochrome Limited and the major plant modifications that would have to be made. The same is true for solvent degreasing which also has a greater negative environmental impact.

3.3 Pickling Chemicals

Environmental Impact

The activating acid used on site is hydrochloric acid. Hydrochloric acid will be used on the new Automatic VAT line as well as on all current process lines as a pre-treatment to electroplating and/or phosphating.

All hydrochloric acid process tanks are designed to have fume extraction to remove generated aerosols and hydrogen chloride gas. Most of the waste acid is reused as a reagent for the neutralisation of alkalis, about 5% is sent for off-site disposal using a registered waste contractor Anochrome Limited is aware that spillage and leakage of hydrochloric acid can contaminate soils so particular care is taken at to avoid this.

Raw Material Alternatives

No suitable raw material alternatives have been identified; although sulphuric acid is very effective for pickling, it has to be used at an elevated temperature in order for it to de-rust and descale in a timely manner. Concentrated sulphuric acid is considerably more hazardous than concentrated hydrochloric acid so despite gaseous emissions being associated with hydrochloric acid it is preferred for use at Anochrome Limited.

3.4 Principal Coating Systems and Effluent Treatment

Environmental Impact

The site continues to use cyanide based technology in a number of processes. Metal cyanide salts are hazardous substances which can also generate cyanide gas in acidic conditions. One of the principal reasons for this Permit variation application is to allow Anochrome Limited to install an Automatic VAT line using acid zinc based plating technology which will enable the decommission and removal of the existing Automatic VAT line operating on cyanide zinc plating technology. In the short term, this would reduce the company's use of sodium cyanide and is seen as an important first step in a committed strategy to eliminate the use of cyanide based plating solutions on site.

Although cyanides can cause problems in effluent treatment by strongly complexing some metals e.g. nickel, performance during the last ten years has demonstrated that the effluent plant at Anochrome Limited has been able to break down these complexes sufficiently for trade effluent discharge concentrations of metals to be considerably below Consent to Discharge limits. The reduction in use of sodium cyanide should facilitate the meeting of consent limits.

The proposed adoption of acid zinc technology in preference to cyanide zinc technology would result in a number of additional significant advantages:

1) Acid zinc solutions are typically 98 – 100% efficient with the generation of hydrogen at the cathode (work piece) stations being virtually reduced to zero; cyanide zinc plating solutions are typically 65 – 70% efficient with the remainder of the electrical power being conducted through the plating solution leading resulting in the evolution of hydrogen gas which can lead to a small amount of cyanide continuing aerosol being propelled into the atmosphere.

2) Using acid zinc solutions would result in almost no heat being generated within the plating solutions, so the amount of cooling water needed to control solution temperature would be negligible compared with the volume needed for cooling cyanide zinc solutions. It is anticipated that chillers would not be necessary to cool water for the temperature control of acid zinc solutions.

4) The amount of electrical power required to deposit a given weight of zinc would be at least 30% lower for acid zinc technology in comparison to cyanide zinc technology.

Fume extraction is also currently used on the Automatic VAT zinc cyanide based process tank to remove the aerosols generated in the plating process to ensure that substance concentrations are significantly below workplace exposure limits

Zinc Phosphate

Zinc phosphate is used by Anochrome Limited to provide a corrosion resistant finish for storage purposes. Effluents from the zinc phosphate line require pH control with the zinc and other trace metals being dealt with in the effluent treatment plant.

Sodium Hydroxide

Anochrome Limited ensures that all sodium hydroxide purchased has a very low mercury content; the amount of mercury present is verified annually and declared in the annual declarations for the Environment Agency

Raw Material Alternatives

No suitable raw material alternatives for the processes under discussion have been identified.

4. Waste Minimisation

Waste refers to the inefficient use of raw materials and other substances. As part of the EMS, Anochrome Limited operates a waste minimisation programme which has provided economic and environmental benefits. The waste minimisation programme includes:

- The ongoing identification and implementation of waste prevention opportunities
- The active participation and commitment of staff at all levels
- Monitoring of materials usage and reporting against key performance indicators

Anochrome Limited operates a register of wastes detailing:

a) waste streams and quantities being produced
b) environmental effects
c) disposal method

This register is revised and updated annually.

A large cause of wasted materials is by drag-out of chemicals from process tanks, which must then be rinsed from the work prior to the next process tank. The contaminated rinse waters containing the dragged-out chemicals are disposed of through the effluent treatment plant where the dragged-out chemicals are either neutralised or precipitated into a metal hydroxide sludge, which is then disposed of to landfill.

4.1 Waste Minimisation Initiatives

A number of waste minimisation initiatives that have taken place at Anochrome Limited including:

1. Waste Minimisation Training for all Operators

Waste minimisation training has been provided to all operators to highlight the cost and environmental benefits of following minimisation procedures, particularly in relation to water usage, energy consumption and drag-out of chemicals from process tanks.

2. Jig Design to Avoid Entrapment

Jigging of work is designed to reduce entrapment and therefore minimise drag-out. For example, operators are trained how to improve the positioning of the work piece to avoid trapping process solution in hollow areas.

3. Solution Analysis and Maintenance to Maximise Working Life

All solutions on site are maintained at their optimum operating performance by regular on-site laboratory analysis, and adjustments and additions to chemistry as required. This enables Anochrome Limited to obtain maximum useful working life out of each process tank. The electroplating solutions are maintained indefinitely and post treatment process tanks are maintained for a period of several months. When disposal of a process tank is required, the spent chemicals are usually disposed of through the effluent treatment plant. A licensed waste contractor for disposal collects some waste solutions, for example waste hydrochloric-pickling acid, as special wastes.

4. Re-Use of Spent Zinc Ovals

The zinc ovals from the automatic vat line, when they can no longer remain attached to anode rails are broken down and re-used as zinc bullets in cages on the plant.

5. Reuse of Waste Packaging

Where possible Anochrome Limited will continue to preferentially select chemical suppliers who are able to offer returnable chemical containers, so that waste packaging materials can be returned to suppliers for reuse.

6. Recycling of Metal

Anochrome Limited collects scrap steel from the site. This is sent to a registered merchant for recycling.

Proposed Waste Minimisation Improvements

Should the EA grant this Permit variation request, Anochrome Limited has identified a number of waste minimisation improvements which it would like to introduce on the new Automatic VAT line to be operated on BAT acid zinc technology:

1. Adopting treble rinsing of component parts after each process step to considerably reduce the amount of water needed compared with the double rinsing after each process step which is practiced on the existing cyanide zinc Automatic VAT line.

2. Sufficient provision of transporters to allow output rates to be maintained whilst achieving sufficient drainage time over each process before workpieces enter subsequent rinse tanks, minimising drag-out.

3. Opportunity will be taken to trial low temperature cleaners that operate in the temperature range 40- 50°C compared to the existing cleaners that are used in the temperature range 60 - 70°C.

4.2 Water Usage

The vast majority of water used at Anochrome Limited is for rinsing purposes. Adequate rinsing between process stages is essential in achieving a high-quality surface finish and prevent significant contamination of solutions from previous process steps. However, water is also used for making-up new process fluids, topping-up tanks as a result of evaporative losses and balancing drag-in/drag-out volumes. Water is also used in the abatement scrubbers which process the fumes extracted within the facility and for make-up of solutions in the effluent.

Types and Quantities of Water Used

Anochrome Limited uses mains/recirculated water mix for nearly all applications on site. The exception is on the electrophoretic painting line where demineralised water is used in the rinse immediately preceding the paint tank and to maintain the optimum volume of solution in the paint tank and in the subsequent rinses. A small quantity of demineralised water, approximately 100 litres per week is used for laboratory purposes.

Although Anochrome Limited has a permit to abstract water from a borehole, granted by the EA, this is not presently used due to high iron and manganese levels.

Work is currently ongoing with the supplier of the borehole treatment equipment, and it is expected that the borehole water will be rendered suitable for use in the future. Provided this is accomplished, the amount of mains water needed will reduce by at least 95%. For reliability reasons, it has been decided that mains water will continue to be used to supply the demineralisation plant. The use of borehole water in a demineralisation unit can lead to uneven loading on ion exchange columns thereby reducing their service life considerably compared to the use of mains water.

Mains water usage is monitored daily and reviewed weekly. Average weekly and annual mains water consumption for the whole site is detailed below in Table 4. The quantity of recirculated water is not measured directly, but since the recirculation system was installed there has been a 50% reduction in the amount of mains water used on the site.

Water Type	**Average Weekly Water Use (m^3)**	**Water Use, Jan, Feb, Mar 2024 (m^3)**
Mains Water	2488	32349
Treated Effluent Discharge	1801	23412

Table 4: Water Usage

The recirculated water header tank is supplied by water syphoned from the Dortmund settlement tower.

Counter-flow Rinsing

Where possible, Anochrome Limited has adopted two stage counter-flow rinsing. In terms of water efficiency, two-stage counter-flow rinsing reduces water consumption compared with single rinsing. Ideally, Anochrome Limited would have implemented this technique on all process lines but lack of space and the associated costs of modifying some older equipment have been an historical constraint.

Anochrome Limited ensured that the new process lines installed in 2010 (alkaline zinc nickel plating and electrophoretic painting) adopted three rinses following the main processes.

The proposed new Automatic VAT line on acid zinc technology has been designed to incorporate three stage counter-flow rinses which will result in reduced rinse water usage compared to the existing Automatic VAT line and the following accompanying benefits:

a) The volume loading on the sewerage treatment plant will be lowered

b) Having a reduced volume of solutions flowing through the on-site effluent treatment facility would lead to increased dwell times in reaction tanks, much reducing the likelihood of exceedances of Consent to Discharge concentration limits

4.3 Water Minimisation

Anochrome Limited has historically operated and will continue to operate a water minimisation programme as part of its EMS.

This programme includes:

- Introduction of counter-flowed rinses and appropriate drag in/drag out stations on new process lines
- Active participation and commitment of staff at all levels
- Monitoring of water usage and reporting
- Annual reviews of performance against objectives and targets to reduce water consumption as part of the submissions sent to the EA

Anochrome Limited has already implemented several water minimisation improvements including:

1. Monitoring and Targeting Process Water Consumption

Anochrome Limited monitors water consumption into the facility and effluent volume out of the facility. The readings from the meters are recorded each working day. Any abnormal increases in water consumption are addressed at management meetings.

2. Reuse of Recirculated Water from the Effluent Treatment Plant

Anochrome Limited has a recirculated water system. This uses the treated water from the effluent treatment plant which is fed to specific rinse tanks. The fitment of the recirculated water system initiated a 40% reduction in mains water usage.

3. Fitting Solenoid Valves on Process Lines

Automatic zinc barrel lines 1 and 2 have been fitted with solenoid valves on the water feed. These are linked into the plant control panels. When the plant is switched from automatic mode the solenoid valves cut off the water supply. The fitting of these solenoid valves has shown a saving in daily water consumption of up to 1.5 m^3.

4. Recycling Cooling Water

The cooling water that is required by the heat exchangers used on site is not disposed straight to sewer as waste. The water is returned to the header tank after passing through the heat exchangers and reused in the process line rinses. This results in there being no net loss of water on the site, excepting the evaporation from process tanks at a rate of about 30%.

5. Installation of 'V' Notch Flow Meter

Anochrome Limited has installed an ultrasonic transducer on the 'V' notch final discharge tank in the effluent treatment plant to monitor the volume of water discharged to sewer as trade effluent. The discharge rate is cross referenced with the incoming water volumes; this would allow the presence of a leak to be rapidly detected. The discharge meter is serviced and calibrated annually, so if there were a significant discrepancy in the volume discharged percentage of the incoming water volume, the cause could easily be determined, and any problems rectified.

4.4 Proposed Water Reduction Initiatives

There are a number of initiatives that are under consideration or are planned to be adopted on the proposed new Automatic VAT line that could reduce water usage:

1. Fitting Solenoid Valves on Process Lines

An extension of the programme currently in operation on the two existing barrel and zinc nickel lines in which the supply of water is automatically turned off when the lines are not running.

2. Fitting Flow Restriction Valves

To guard against any possible fall in water pressure, the flow rate of water running into the plants is often set higher than it needs to be to provide a safety margin. Anochrome Limited plans to tackle this by fitting flow restriction valves to water supplies on the new Automatic VAT line thereby controlling water consumption.

3. Installing Water Meters on Process Lines

Anochrome Limited plans to use water meters to measure and optimise the flow rates on the new Automatic VAT line and to track water consumption whilst still maintaining adequate rinse ratios.

4. Investigation into the Possibility of Treating the Borehole Water

As previously discussed, Anochrome Limited will reinvestigate the possibility of treating the borehole water if economically and technically feasible for use in some of the least critical rinsing operations as an alternative to the use of mains water.

5. Main Activities and Abatement

The main activities at Anochrome Limited comprise:

- Storage of effluent plant reagents, process chemicals and anode materials
- Water treatment
- Surface preparation
- Surface treatment processes
- Rinsing
- Drying and curing

These activities are sequentially outlined below along with additional information concerning point source and fugitive emissions to air, surface water and sewer.

5.1 Storage of Effluent Plant Reagents, Process Chemicals and Anode Materials

Effluent Plant Reagents

Anochrome limited has dedicated areas within in its site for the bulk storage of hydrochloric acid, sodium hydroxide liquor and sodium hypochlorite in independently bunded tanks. The hydrochloric acid tank has a capacity of 13,000 litres, the sodium hydroxide tank has a capacity of 6,000 litres and the sodium hypochlorite tank has a capacity of 4,000 litres.

The sodium hydroxide and sodium hypochlorite tanks are continually vented to the atmosphere to relieve pressure changes. The hydrochloric acid tank is vented *via* a scrubber shared with the zinc nickel line thus minimising the fuming to atmosphere during transfer of solution and whilst the concentrated acid is in storage.

A pipe leads from the hydrochloric acid bulk storage to a dedicated connector, above ground level, which is used to refill the tanks on each process line. The connectors for the hydrochloric acid and sodium hydroxide are kept padlocked at all times to prevent the incorrect delivery of hydrochloric acid to the sodium hydroxide tank. The sodium hypochlorite connector is also locked and is of a different size and style to the other bulk storage facilities to physically prevent any possibility of incorrect delivery.

Batch metering is used to prevent overfilling the bulk sodium hydroxide and hydrochloric acid storage tanks. The tanks are fitted with overspill pipes, which lead into the bund around each tank. The bund around the sodium hypochlorite tank has an approximate volume of 4,700 litres, which represents 117% of the tank's storage capacity. The bunds around the two hydrochloric acid storage tanks have a volume of 15,500 litres each, 119% of the 13,000 litre storage capacities. The waste acid storage tank has a capacity of 20,000 litres and the associated bund can accommodate 22,000 litres. The liquid sodium hydroxide tank has a capacity of 6000 litres and the bund for this has a volume of 8,000 litres. These meet the Environment Agency's requirements for bund capacity. The bunds are inspected every week to detect any signs of deterioration, leaks or spillage.

Probes in the bulk storage tank enable a continuous display of reagent volumes to be consulted.

Process Chemicals and Anode Metals

Anochrome Limited has dedicated storage areas, for process materials, anodes, and for sodium cyanide. The sodium cyanide store is located next to the general store within the site bunded area. All sodium cyanide used on site is stored in solid form.

Chemicals are stored at various locations; when materials are in 1000 litre intermediate bulk containers these are individually bunded.

1000 litre containers are kept close to the process tanks which their contents support; this facilitates automatic dosing via metered pumps where practicable. When additions have to be made by hand, close proximity of the containers minimises the distance chemicals have to be taken in open containers thereby reducing the likelihood of a spillage occurring.

Most of the chemicals are constituents for plating solutions, including liquid brighteners, solid chemicals and anode metals. The stores for 25 litre containers and 25kg bags has racking to ensure easy access and good stock rotation.

The stores are inspected by different members of the management team to ensure that incompatible materials are not stored together or incorrectly and that solids are not located below containers of liquids. Both of the storage areas for smaller containers are kept locked at all times.

Anochrome Limited recognises that there is no proper secondary containment of the chemical drums within the stores, apart from the site bunded area, however, no incidents of spillages of liquid materials have been recorded from 25 litre containers for at least 15 years.

Spill kits are readily available, and staff are trained so that any spillage that may occur could be dealt with quickly and correctly.

5.2 Water Treatment

Section 5.9 of this Permit variation application discusses Anochrome Limited's water treatment activities in the effluent treatment plant.

5.3 Surface Preparation: Aqueous Alkaline Cleaning and Acid Pickling

A clean surface is essential for satisfactory surface treatment operations. Anochrome Limited use hot alkaline soak and electrolytic cleaners as a first stage chemical preparation to remove soils (e.g. fine metallic particles, swarf and dirt) and oils and grease resulting from the manufacturing process of machining, stamping, pressing etc. This is followed by acid pickling to remove any residual oxides and heat treatment scale.

Anochrome Limited does not utilise any organic solvents for cleaning purposes.

Hot alkaline cleaning processes at Anochrome Limited consist of one, two, or three stages, depending on the finishing process that follows.

a) Hot, Alkaline Oil Emulsifying Soak, 60-80°C

This stage is to remove loosely adherent greases and oils. In the case of band-processed pieces, barrels are rotated during the cleaning stage. This helps the cleaning process due to the mechanical action of components passing over one another; and also ensures full exposure of them to the cleaner solution and allows flat parts to be cleaned in an even manner. Soak cleaning typically takes 4-7 minutes, but this time is extended to a minimum of 10 minutes in the phosphating process, where this is the only alkaline cleaner required to obtain an even, corrosion resistant, zinc phosphate coating.

b) Hot, Alkaline Anodic Electrolytic Cleaning, 60-80°C

This cleaning stage is to remove more stubborn greases and oil residues. The production of oxygen gas bubbles on the surface of the metal substrate gives a mechanical as well as an ionic action to the cleaning process.

An electrolytic alkaline cleaning stage is always employed for components that are to be electroplated.

c) Hot, Alkaline, Periodic-reverse, Electrolytic, 50-80°C

Periodic reverse (PR) cleaning is carried out on barrel-processed components after acid pickling. This final cleaning stage is needed for heat-treated steels, since it removes scales that may have been loosened in the acid pickling operation, yet not completely removed.

In this process, the polarity of the rectifier supplying the cleaning tank is reversed several times whilst the pieces are being cleaned. The evolution of different sized gas bubbles (hydrogen and oxygen) is particularly useful as a means of particulate removal. It is essential that the components have been through an anodic stage immediately prior to removal from the cleaning tank, and for this reason, automatic lines are programmed to ensure that this is always the case. If the work pieces leave this process after a cathodic phase, they will be rendered passive and will not easily be electroplated.

PR cleaning is not employed on rack plating lines, since very few components that are large enough to be rack plated are heat treated. It is also possible to electro clean and electro plate components on jigs at a higher current density than is the case for components cleaned in a barrel. Using higher current density improves both cleaning and coating adhesion, so the need for periodic reverse cleaning is far less pronounced. Occasionally, if components that need to be rack plated require extra cleaning, they can either be double cleaned before the plating operation, or pre-cleaned prior to being jigged.

Cleaner Maintenance and Disposal

Drag-out and evaporative losses are replaced by topping up the cleaner tanks with mains/recirculated water mix.

Cleaner solutions are analysed by the in-house laboratory on a routine basis (under normal operating conditions) to maintain their concentrations at optimum levels. This ensures an efficient cleaning operation yet prevents cleaners from being maintained at too high a concentration that would result in unnecessary drag-out and environmental impact when the products need to be discarded.

Cleaners used on barrel lines that are run 24 hours per day, five or six days per week, are normally discarded every two weeks. This ensures optimum cleaner efficiency, without having to maintain concentrations at elevated levels to compensate for contaminants within the cleaners.

When cleaners are discarded, they are pumped to a holding tank. From here they are drip fed into the effluent treatment plant where they assist in the neutralisation of acidic waste streams. If cleaners were to be disposed of rapidly through the effluent treatment facility, surfactants would inhibit settlement of precipitated metal hydroxide sludge's and jeopardise discharge consent limits.

If this Permit variation application is granted, it is intended to include the installation of a waste cleaner tank from which spent alkaline material from the new lines may be removed from site by a licenced waste carrier. This change will further improve the consistency of effluent outfall.

Acid Pickling

Anochrome Limited uses hydrochloric acid for all pickling operations. This is found to be effective at removing rust and scale from mild steel components. Pickling is carried out at ambient temperature, eliminating heat input and helping to conserve the acid by reduced loss of hydrogen chloride to atmosphere compared to that which would occur if the acid were heated. Acid pickling time is varied, dependent on the plant being used. Drag-out and evaporative losses are replaced by topping up with recirculated water mix.

Pickling solutions are analysed by the in-house laboratory on a routine basis and, either periodic additions of fresh acid are made to maintain solutions at optimum levels, or acids are discarded during plant maintenance. Build-up of iron and other contaminants reduce the effect of acid pickling, and to keep a plant performing effectively, discarding acids is sometimes necessary.

Dumped acid solutions, along with spent passivate solutions are stored in a purpose-built, bunded tank. A licensed waste contractor empties these tanks, removes the liquid from site, neutralises it with alkaline wastes and other alkaline materials, this produces sludge, which is principally iron hydroxide, which can then be landfilled.

5.4 Surface Treatment Processes

Anochrome Limited carries out electroplating, electrophoretic painting, powder coating and zinc phosphating as well as associated post treatments. These are described in detail below.

The operation of the solutions is dependent on the type of coating that is to be applied. All electroplating and electrolytic cleaning processes are carried out using low voltage, direct current: electrophoretic painting requires a relatively high voltage. Some processes require heating, and this is principally achieved by using a gas-fired boiler to heat thermal fluid oil, which is passed through pipe work which services the tanks concerned. The solutions that require heating on the electrophoretic coating line have direct fired gas burners installed within the tanks.

One electric immersion heater is available which is occasionally used to warm the electrophoretic paint in its storage tank prior to it being transferred to the process tank, ready for use. This solution does not require warming when in use, the electrical power passing through it is sufficient to maintain an operating temperature of about 33°C.

Zinc and zinc-nickel solutions require cooling, and this is achieved by using heat exchangers and chillers. Water for the heat exchangers is drawn from a header tank that is fed from the site's mains water supply.

The passage of water through the heat exchangers is controlled thermostatically, the solution being pumped continuously through the heat exchanger(s), the water being turned on and off as cooling is required. After passing through heat exchangers the water is returned to the header tank. This is considered BAT since the only energy requirement comes from that which is needed to run transfer pumps, and, since the water is returned to a header tank from which it can then supply process rinses; there is no net wastage of water.

All process solutions are monitored and analysed by the in-house laboratory, to a predetermined timetable, and when necessary, external suppliers' laboratories are used for solution control. Drag-out and evaporative losses are replaced by topping up solutions with mains water.

In order to maintain solutions at optimum levels periodic additions of chemicals are made to them. These additions are requested, in writing by the laboratory. Electroplating solutions can often be maintained in this way for periods of twenty years, or longer. If contamination occurs, or if a solution has to be changed for another reason, the Technical Manager will decide the correct disposal route. If solutions cannot be safely dealt with through the company's effluent plant, a licensed waste disposal contractor will be employed.

5.5 Rinsing

Where appropriate, Anochrome Limited has applied best-practice rinse ratios to process lines as recommended by the 2006 BREF and outlined in Table 5 below:

Process Type	Rinse Ratio
Post-alkaline cleaning; all types	2000
Post-acid pickle; before cyanide processes	5000
Post-zinc plating (alkaline)	2000
Post-zinc plating (acid)	3000
Post-passivation processes	5000

Table 5: Best Practice Rinse Ratios

Anochrome Limited seeks to use minimum rinse ratios that will ensure adequate rinsing for the particular process concerned. It is also important to balance water flow throughout the factory site.

5.6 Drying and Curing

Components that have been processed through wet chemistry treatment tanks need to be dried to prevent corrosion and contamination of packing materials.

Anochrome Limited uses the following methods for drying:

- Rack plated zinc parts are dried before un-jigging in a thermal fluid oil heated, air circulated well oven that forms part of the process sequence

- Rack plated zinc nickel work pieces are dried in a well oven, directly heated by gas with air circulation
- Electrophoretically painted components are dried and cured in an oven in which hot air is circulated from an overhead gas burner
- Components from one zinc plating and phosphated work pieces are unloaded onto mesh belts, which then pass through direct gas fired drying units
- The second barrel line's output is dried using electrically heated spin driers; this is because components are much smaller than parts processed on other lines, and centrifugal force assists in the water removal, and work handling is facilitated by using baskets rather than a perforated conveyor belt
- Powder coated parts are cured using gas fired radiant heat panels, the parts are then allowed to cool before inspection and packing

5.7 Control of Point Source Emissions to Air

The only point sources of gaseous contaminants to air from Anochrome Limited are five exhaust stacks from the five local exhaust ventilation systems. If the Permit variation is granted, then a sixth local exhaust ventilation system along with a sixth emission point is proposed. This additional emission point will be associated with the proposed installation of the new Automatic VAT line using acid zinc technology in Bay 3. It has been proposed that the sixth emission point be denoted as A6 aligning with the current Permit nomenclature. Once the sixth emission point becomes operational, emission point A1 associated with the existing Automatic VAT line will be decommissioned and removed. The location of all existing emission points including discharge to sewer is illustrated in Figure 7 below:

Figure 7: Location of Emission Points

All of the plating lines at Anochrome Limited are fitted with their own individual scrubber units as will the proposed new Automatic VAT line. All hot cleaners have local exhaust ventilation to prevent steam condensing on the metal roofing and other building structural supports, thereby preventing corrosion problems. Pickling acid tanks, the zinc phosphate tank and the Automatic vat zinc line plating solution tank and the vat zinc nickel line are similarly equipped, both to prevent corrosion and to keep the level of hydrogen chloride gas in the atmosphere within occupational exposure standards.

The mixing of these exhausts in the same ventilation units helps to neutralise the acidic emissions, fume scrubbers are incorporated into the extraction ducting to ensure minimal levels of hydrochloric acid are emitted from the building.

The extraction units at Anochrome Limited are not used for the extraction of passivate solutions. This is because no gaseous emissions are generated during the passivation process, therefore it is not necessary to employ extraction on these process tanks. This statement was tested at Wolverhampton Electro Plating Limited in which the chromium level in the atmosphere was determined with the extraction switched on and with the extraction turned off.

All scrubbing units have pH probes located within the sodium hydroxide solution used to remove the hydrochloric acid mists from the exhaust streams. These probes are serviced and calibrated on a three monthly basis and the weekly environmental audit includes a check to ensure that the scrubbing solution is alkaline.

Emission concentrations for all existing exhaust ducting are annually determined and the latest results for 2023 are included below in Table 6:

Scrubber Reference Number	Plant	Fan Rating (m^3h)	Concentration (mg/m^3)	Emission Rate (mg/h)
A1	Rack (Vat) Zinc	8340	7	58380
A2	Barrel Zinc 1	5390	1.6	8624
A3	Barrel Zinc 2	5370	6.1	8592
A4	Barrel Phosphate	9840	0.36	3542
A5	Rack Zinc Nickel	22100	7.56	167076
Total Emissions per hour				246 g
Total Emissions per day				5,907 g

Table 6: 2023 Hydrogen Chloride Emissions

In order to assess the impact of the proposed installation of the new Automatic VAT line, an Air Quality Screening Assessment was commissioned with an external consultancy. The assessment utilised the EA's screening methodology which is conservative and designed to screen out insignificant releases to air or identify if further detailed assessment is required.

The commissioned assessment modelled the ground level HCl concentration associated with:

a) the existing air emissions from emission points A1 to A5
b) the potential future air emissions from emission points A2 to A6

The H1 tool (v9.2) was used to calculate the potential impact from emission point A6 using data supplied from the manufacturer of the new Automatic VAT line in respect of scrubber efficiency, maximum HCl emission concentration and proposed stack height. The applicable Environmental Assessment Level (EAL) for HCl of 750 µg/m^3 as a 1-hour mean, as specified by the EA's Risk Assessment Guidance, was used in the assessment.

The calculated Stage 1 Process Contribution (PC) for each operational scenario were as follows:

a) 35.2% of EAL for the existing air emissions from emission points A1 to A5
b) 38.5% of EAL for the potential future air emissions from emission points A2 to A6

From the results, it can be seen that the PC for both the existing and proposed operational scenarios is less than 40% of the EAL and that the change in the PC between the existing and proposed scenarios is 24 µg/m^3 equating to 3.3% of the EAL. In accordance with the applicable guidance, it was concluded that the impact of the new proposed emission point A6 would not be significant and that Stage 2 screening or detailed modelling would not be required.

The Air Quality Screening Assessment report is reproduced in full in Appendix C.

5.8 Workplace Exposure Monitoring and Control

The 2002 Control of Substances Hazardous to Health Regulations (COSHH) require the company to manage the quality of air to ensure that it does not exceed the Workplace Exposure Levels (WEL) specified in EH40 for substances that may be contained in the atmosphere above various process tanks.

Workplace exposures have been determined in a number of locations around the site as well as by asking personnel to wear sampling pumps for protracted periods of time.

The company conducts workplace exposure monitoring every five years. If, however, a new workplace exposure limit is introduced, or if new equipment is installed, the frequency of the testing is augmented, as required.

Table 7 provides the January 2022 measured workplace exposures:

Sample	Hydrogen Chloride 2mg/m3 (8 hr WEL)	Sodium Hydroxide 2 mg/m3 (STEL)	Hydrogen Cyanide 1 mg/m3 (8 hr WEL)	Cobalt 0.1 mg/m3 (8 hr WEL)	Nickel 0.1 mg/m3 (8 hr WEL)	Zinc 0.1 mg/m3 (8 hr WEL)
Operator 1	<0.16	<0.16	<0.16	<0.0003	<0.0031	<0.0125
Operator 2	<0.16	<0.16	<0.16	<0.0003	<0.0031	<0.0125
Operator 3	<0.16	<0.16	<0.16	<0.0003	<0.0031	<0.0125
Phosphate	<0.16	<0.16	<0.16	<0.0003	<0.0031	<0.0125
Barrel Zinc 2	<0.16	<0.16	<0.16	<0.0003	<0.0031	<0.0125
Vat Zinc	<0.10	<0.16	<0.16	<0.0002	<0.0021	<0.0083
E-Cote	<0.10	<0.16	<0.10	<0.0002	<0.0021	<0.0083
Zinc Nickel	<0.10	<0.16	<0.10	<0,0002	<0.0021	<0.0083

Table 7: 2022 Workplace Exposure Monitoring

Anochrome Limited aims to minimise emissions of fumes from process tanks so far as is reasonably practicable using four main approaches:

1. Use of local exhaust ventilation where appropriate.

2. Thermostatically controlled heating on process tanks.

3. Use of pumped circulation agitation where appropriate; this technique results in less evaporation than occurs when using air blowers or compressed air; use of pumped circulation also minimises heat loss.

4. Personnel are not located close to the process lines, and plant operators usually only need to closely approach the solutions during maintenance periods when solutions are not heated, and no aerosols are being generated.

As well as conducting emission measurements on local exhaust ventilation stacks, two other control mechanisms have been in place for at least 30 years.

1. Weekly (minimum three times per month) audits are carried out to ensure that local exhaust ventilation is in good condition, that it has not been damaged, and that it is not blocked. Different members of the management team on a rota basis, carry out these surveys.

2. A BOHS certified individual carries out annual velocity measurements on all local exhaust ventilation throughout the Group. Results are compared with the previous year's figures and results are compared with extraction rates required for processes at different temperatures. The minimum extraction rate in m^3 per second can be calculated by multiplying the exposed surface area by a factor depending on the tank temperature and toxicity of the chemistry, as follows.

    a) Surface area x 0.2 to give m^3/second extraction rate for solutions operated at ambient temperatures
    b) Surface area x 0.3 to give m^3/second extraction rates for solutions operated at 25 -45°C
    c) Surface area x 0.4 to give m^3/second extraction rates for solutions operated at 45-95°C

In the event of a fire occurring in the vicinity of processing tanks using electricity and equipped with local exhaust ventilation, heat sensors within the ducting will automatically switch off extraction systems. Furthermore, a shutter is automatically inserted to prevent an updraft from fanning flames and aiding the spread of a conflagration.

Automatic program logic controllers manage the lowering and raising of work pieces to and from the majority of process solutions. Care is taken, during programming, to ensure that solution is not sufficiently disturbed to cause spillages or undue fuming.

5.9 Point Source Emissions to Surface Water and Sewer

The layout of the foul and surface water drainage systems are shown in Figure 8 below; the effluent treatment plant and sewer emission is shown in Figure 7. The surface water drainage system carries surface runoff from roofs and external areas of the site. Internal drains for roof runoff water are bunded to ensure spillages from processes cannot enter surface water drains.

All storage containers for treatment chemicals are bunded; with reaction vessels for treatment to take place located below floor level. The area in which road tankers are loaded and unloaded is bordered by drainage channels, which will return any spillages to the effluent treatment plant.

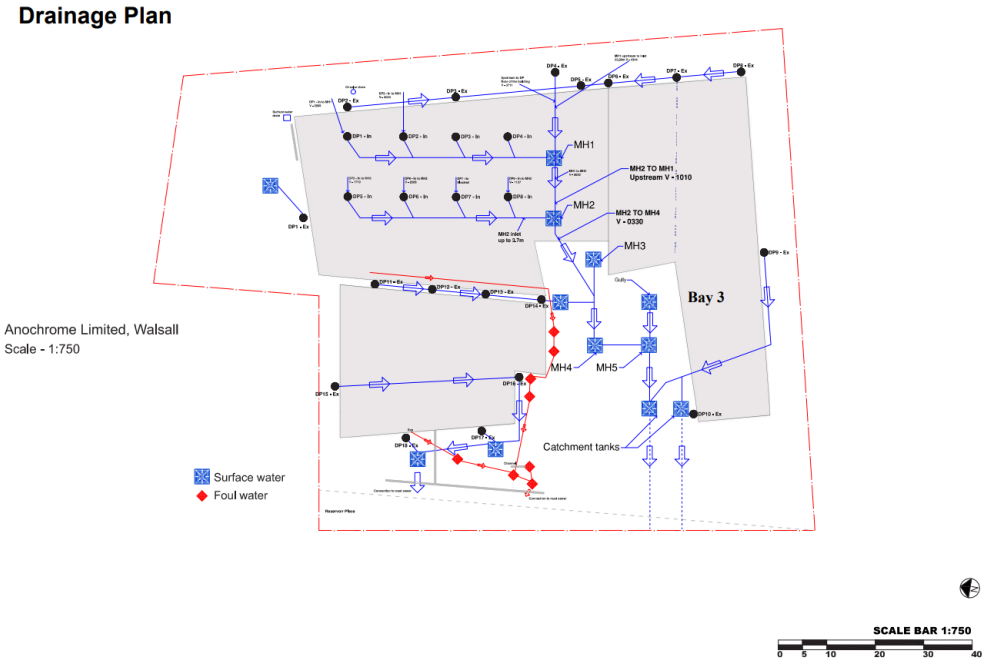

Figure 8: Site Drainage Plan

5.10 Trade Effluent Discharge to Sewer

Trade effluent from all processes within the factory is directed into one of two effluent streams:

· Alkali/cyanide
· Acid/passivates

These streams flow to a dedicated effluent treatment plant, which destroys cyanides by oxidation, followed by precipitation of metal hydroxides using pH adjustment and flocculation.

Effluent Treatment Plant

Anochrome Limited has a site effluent treatment facility which involves a precipitation process that undergoes several stages.

Anochrome Limited considers that it is compliant with BAT requirements for effluent by using counter-flowed rinses wherever possible and an on-site effluent treatment plant to control the effluent stream thereby remove contaminants before discharge to sewer. Within the effluent treatment system operated by Severn Trent, further removal of contaminants will occur alongside massive dilution before these effluent waters are released into the environment.

1. Cyanide Oxidation

The rinse waters from alkaline cleaners, cyanide zinc and alkaline zinc nickel are directed into a reaction pit. The pH of this solution is continuously monitored, and, if it falls below a set point,

sodium hydroxide liquor is added, via an automatically controlled solenoid valve, under gravity. Once the pH set point is reached, the flow of sodium hydroxide will cease. Although sodium hydroxide liquor is stored in a large 8,000 litre tank, it is manually dosed from here to a smaller header tank.

Using the header tank serves two purposes:

a) It allows a controlled dilution of the sodium hydroxide to take place, and, secondly, if the solenoid valve should stick in the open position, only a small amount of sodium hydroxide will be over-dosed.
b) Limiting the disturbance to the effluent treatment process to ensure enough sodium hydroxide liquor is conserved for ongoing treatment.

Addition of sodium hydroxide is necessary, since the destruction of sodium cyanide is significantly more rapid at a pH in excess of about 10.5, rather than below it. The dosing limits for reagents are not quoted within this application since slight adjustments have to be made from time to time depending on local conditions.

A second probe within the reaction pit continuously monitors the conductivity of this solution, and if it falls below a set point, sodium hypochlorite is dosed from a header tank, which is fed by a bulk storage vessel. The addition of sodium hypochlorite causes the conductivity of the solution to rise, and when a set point is reached the sodium hypochlorite solenoid valve is closed.

As the sodium hypochlorite is consumed during oxidation of the cyanide that is present, the conductivity will again fall, and, at the appropriate point, trigger the addition of new sodium hypochlorite.

In order to keep the concentration of the solution being treated as consistent as possible, an electrically driven propeller stirrer is constantly in use. Alarm legends on the effluent control panel indicate the failure of stirrers.

If the pH is too high, or the conductivity too low for a prolonged, predetermined time an alarm is sounded and the Technical Manager or nominated deputy will attend to the problem. The Technical Manager can monitor the status of the effluent plant off site via remote access.

As part of the site improvement plan, automatic cut-off of the water supply is being considered in the event of an effluent incident.

2. Neutralisation

After oxidation of cyanide the alkaline effluent stream is mixed with the acidic effluent stream from acid and passivation rinses. The two effluent streams are mixed under gravity and then flow into a neutralisation tank in which the pH of the effluent stream is adjusted to the optimum level at which zinc and other amphoteric metals will be precipitated. A probe in this tank controls addition of sodium hydroxide solution, or diluted hydrochloric acid to ensure that the optimum pH is obtained. In most cases the effluent stream is acidic, so sodium hydroxide needs to be added to obtain the correct pH. As with other meters in the effluent control system, an alarm is sounded if the pH is not within the predetermined range for longer than six minutes.

In all cases in which effluent plant dosing can be automatically controlled, it is possible to override the system and to dose the reagents manually.

3. Settlement

After neutralisation to the desired pH, the effluent stream is pumped into a Dortmund settlement tower. As the effluent stream is transferred, polyelectrolyte dissolved in water is proportionally added via a metering pump and a smaller header tank on top of the Dortmund settlement tower. Experience has shown that separate addition of the polyelectrolyte under gravity causes less damage to the long chain molecules than that which occurs when the effluent and polyelectrolyte are pumped together. The polyelectrolyte enhances settlement of precipitated solids by chelating them and increasing their weight.

In the Dortmund Settler, the effluent is pumped into an inner tube where it falls rapidly to the cone at the bottom of the settlement tower. As the water rises up the side of the inner tube, kinetic energy is lost, and solids congregate within the cone. The water without the precipitated solids then rises along the outside wall of the tower and, after reaching the top of the tower flows into a circumferential trough from which it is gravity fed in to a "V" notch tank prior to final discharge.

4. Final Discharge

A pH probe within the "V" notch monitors the alkalinity of the final outfall and, via a meter, actuates an alarm if predetermined limits are breached.

The discharge, which is subject to a Consent granted by Severn Trent Water then joins other industrial and domestic waste streams, and passes through Minworth Sewage Treatment Works, prior to final release into the River Tame.

5. Settled Sludge

The sludge, which collects at the base of the Dortmund Settler, is pumped to a sludge consolidation tower where it is able to settle for a few hours, this helps to achieve a relatively consistent liquor with a solid content of, typically 2.5 – 3.5%. This is subsequently pumped from the base of the consolidation tower, which has a cone at the base, to a plate filter unit in which the solid content is increased to, typically, 20%. The solids are collected into a skip, which is suitable for road transportation and subsequent landfill at a licensed disposal facility.

The water that is removed during the filtration process is returned to the effluent treatment plant for final discharge.

Trade Effluent Discharge Consent

Anochrome Limited is permitted to discharge up to 750m3 per day of effluent to the sewerage system at the discharge sample point denoted as S1 shown in Figure 7 under a consent to discharge trade effluent letter issued by Severn Trent Water (Consent No: 001651V, Direction 0004, issued June 2010). The consent conditions allow certain concentrations of metals and other substances to be discharged as shown below in Table 8:

Emission Data Determined by Severn Trent under Consent No. 001651V				
Emission point reference	**Source**	**Parameter**	**Quantity**	**Unit**
S1	Effluent treatment plant	Suspended solids	400	mg/l
S1	Effluent treatment plant	Chromium, total	5	mg/l
S1	Effluent treatment plant	Copper, total	2	mg/l
S1	Effluent treatment plant	Nickel, total	5	mg/l
S1	Effluent treatment plant	Zinc, total	10	mg/l
S1	Effluent treatment plant	Phosphorous, total	25	mg/l
S1	Effluent treatment plant	Cyanide, excluding iron cyanide	10	mg/l
S1	Effluent treatment plant	Chemical Oxygen Demand (COD), 1 hr settled	600	mg/l
S1	Effluent treatment plant	pH	6 to 12	pH unit

Table 8: Discharge Consent Limits

A log sheet is completed to record the condition of the effluent treatment plant, and samples of the discharge are checked for chromium, cyanide, and zinc concentrations using test strips; if the zinc concentration is determined to be close to the consent limit, concentration is verified using a spectrophotometer and specifically designed test cuvettes. Nickel concentration is verified using a spectrophotometer on a weekly basis. The concentration of nickel in the process tank concerned renders the level of this metal to be extremely low in the effluent resulting from rinse waters.

These routine tests give a rapid warning if discharge consents are being exceeded, and, should problems arise, the Technical Manager or nominated deputy will immediately investigate the cause, and where necessary, stop the flow of discharge and inform Severn Trent Water.

Effluent monitoring probes are calibrated once per week and a record of this activity is also kept on the effluent log sheet.

The intention is to use the existing effluent treatment plant to handle wastes from the proposed new Automatic VAT line. Since this line is intended to replace the existing Automatic VAT line, there are no concerns with respect to the capacity of the effluent plant and its ability to support ongoing compliance with the existing discharge consent limits.

During the previous 10 years, no major breaches of the Consent to Discharge have occurred.

5.11 Fugitive Emissions to Air

The activities at Anochrome Limited present a minimal potential source of fugitive emissions, since only hydrochloric acid has a potential to affect the atmosphere.

The company receives its hydrochloric acid deliveries via road tankers. This is then pumped directly into bunded storage tank within the effluent plant.

The storage tank has to be vented to prevent a dangerous concentration of fumes building up within them. To minimise hydrogen chloride gas escapes into the atmosphere, the vent passes fumes through a scrubbing system shared with the zinc nickel line.

Within the factory, hydrochloric acid is distributed via a rigid, rubber lined steel piped system. The valve from the storage tanks to the pipe distribution system is only opened when process tanks are being replenished, and warning lights flash during the time the acid valve is open. This

ensures that any leakage within the distribution system will be readily detected, since the pipes are clearly visible, and, by shutting off the pipe work when it is not in use, any residual leakage would only be from the remnants of acid in the distribution system.

Process tanks which contain hydrochloric acid are equipped with local exhaust ventilation. To minimise the evolution of hydrochloric acid fumes, the acid pickle tanks are operated at ambient temperature.

Cleaner tanks and phosphating tanks only evolve steam, which may have a trace of airborne alkalis or phosphoric acid. Any alkaline emissions will help to neutralise acidic fumes, which pass through the same scrubbing system and any phosphoric acid will be neutralised by the scrubbers. The vat zinc and vat zinc nickel plating tanks are extracted in order to keep the concentrations of contaminants in the atmosphere below workplace exposure limits. Since the units are monitored continuously using pH probes and meters, routine audits would reveal any imbalances found within the exhaust treatment system.

The majority of the process tanks within the factory do not require extraction. These all operate at ambient temperature and comprise: rinses, some plating solutions, passivation solutions and sealants. Rinsing, passivation and sealant application do not create any airborne vapours. None of the plating processes are 100% efficient; some of the electrical energy that flows through the process solutions results in the formation of heat, oxygen at the anodes, and hydrogen on the work pieces.

Temperatures are maintained at optimum levels by the use of heat exchangers through which plating solutions are pumped continually. Temperatures are controlled by thermostats that tum the cooling water supply on and off, as required. Allowing the solution to continually circulate minimises the possibility of build-up of deposits in angles within pipe work, which would lead to system blockage.

The volume of solution spray that is created is kept to a minimum by temperature control and also by keeping concentrations of salts and additive systems at an optimum level to obtain the correct efficiency for the type of plating solution concerned.

5.12 Fugitive Emissions to Surface Water, Sewer and Groundwater

Surface Water

The layout of the foul and surface water drainage systems are illustrated in the site drainage plan (Figure 8).

Rain water collected on the roofs of buildings drains beyond the site boundaries with the buildings themselves being protected by brick walls. Surface water drains for rainwater within the factory are bunded to protect them from ingress of process solutions or other contaminated waste streams. Possible sources of fugitive emissions within the factory have been identified as follows:

- Accidental spillage during the delivery of chemicals or the removal of wastes.
- Accidental spillage during the transfer of chemicals and wastes around the site
- Spillages from failures of bunded areas
- Spillages from process lines or failures of process tanks

The risk of releases to surface water drains from these sources has been eliminated by reason of their location and the fact that those within the factory are bunded.

Foul Sewer

In addition to the factory trade effluent being discharged, the foul sewer is used for sanitary purposes. The potential for fugitive discharges into the foul sewerage system is considered low. In the event of an unsatisfactory discharge entering the foul water system, Severn Trent Water would be notified immediately. Within the treatment works that serves Anochrome Limited at Minworth, large capacity diversion storage tanks are available into which an effluent stream may be directed in the event of an emergency.

Groundwater

Anochrome Limited operates a comprehensive maintenance system which includes visual inspection of:

- All bunded areas and drainage channels to check for signs of deterioration, leaks, spillages or blockage; any corrective action required is reported to, and implemented by, the Technical Manager or Maintenance Manager.

- A planned preventative maintenance programme is in place to ensure all that plant and equipment is kept in sound condition; the programme includes pipe work, process tanks, and ducting, electric motors, pumps, filters, heat exchangers and compressed air systems.

Annual testing of bunded areas, sumps and drainage channels is carried out. This includes leak testing of all bunded areas and sumps, and detailed inspection of the integrity of all drainage channels.

Process Tanks and Pipe Work

Tanks and linings used for different process solutions are summarised in Table 9. Tanks and linings are constructed from materials that are recommended by plant and equipment suppliers or suppliers of proprietary metal finishing processes.

Process	Tank construction - Lining
Rinse	Mild steel – plastic lined where acidic
Alkaline plating solutions	Mild steel – plastic lined
Acidic plating solutions	Plastic in metal frame
Acids	Mild steel – fibre glass
Passivates	Mild steel - plastic

Table 9: Tanks and Linings

The process tanks on the existing Automatic vat line are partially submerged below ground level by approximately 800mm. These tanks are inspected as part of the PPM and the weekly environmental audit to ensure that there are no signs of leakage or damage. If any signs of leakage are found on any process tank, whether submerged or above ground, this is immediately reported to the Maintenance Manager. If a repair is required immediately the plant in question is shut down and the relevant external specialist contractor is contacted to initiate an immediate repair.

Virtually all pipe work used for transfer of spent process solutions and rinse waters is of rigid plastic construction. It is clearly visible so that any deterioration or leakages can be readily detected and dealt with. Some process tanks are emptied with flexible hose piping and mobile pumps, but this system is only used for small volume solutions which require occasional maintenance, or when trials are being carried out. In the latter case, for example, flexible piping may be used to remove a valuable solution from a process tank to temporary storage, whilst a new system is being trailed. This ensures that the original material may then be returned to the process tank in question.

Some sections of the pipe work from the processing lines are submerged below ground level and gravity fed to the effluent treatment plant. All external pipe work is inspected weekly as part of the PPM and the environmental audit, any faults are reported to the Maintenance team and repaired as required. All submerged pipe work is integrity tested every year.

Surfacing

The entire site including internal building floors and external roadways, throughfares and car parks are sealed with impervious concrete or tarmac.

Although the whole site is not bunded, any spillages from process tanks would be contained within the concrete or tarmac areas. All process lines are bordered by drainage channels, which are connected to the effluent treatment plant, so that spillages would be contained and could not enter the general environment. Any corrective action required to the surfacing is reported to, and implemented by, the General Manager/Director.

Bunds

All bunding presently at Anochrome Limited has been designed to comply with industry and regulatory requirements. In particular the bunding has been designed so that:

- It is impermeable and resistant to the stored materials
- it does not have an outlet
- it has a capacity of at least 110% of the largest storage container's capacity, or 25% of the aggregate storage volume, whichever is the greater

These standards are to be employed in the design of new chemical supply, storage and containment facilities to accompany the new proposed Automatic VAT line that is hoped to be installed in Bay 3.

5.13 Odour

There is only one significant source of odour emissions from the activities at Anochrome Limited, namely hydrogen chloride releases from local exhaust ventilation ducting serving acid pickling process tanks.

Although there are a number of driers, a hydrogen embrittlement relief oven, and a curing oven on the premises, since none of the processes uses organic solvents, there are no strong or unpleasant odours from these facilities, either inside or outside the factory.

The hydrogen chloride emissions are neutralised using scrubbers and there are no detectable odours from the exhaust ducting.

The proposed location of the exhaust stack that would accompany the installation of the new proposed Automatic VAT in Bay 3 would be at a greater distance from the residential property located to the east of the site than the current nearest exhaust stack which serves an existing line. It is envisaged that installation of the new Automatic VAT line would therefore not increase the likelihood of offensive odours being present.

Part of Anochrome Limited's EMS includes a complaints procedure such that, if any odour complaints were to be received from members of the public, neighbours or the regulatory authorities, the company will immediately investigate the cause. Should the complaint be substantiated, effective measures will be implemented as soon as practicable. All such responses will be recorded as part of the EMS.

Walsall Metropolitan Borough Council has been consulted as to whether any complaints have been received, either from residents or neighbouring businesses during the previous five years. No concerns have been noted as can be seen by the statement in Figure 9 below:

Good afternoon,

I'm well thanks, hope the same for yourself.

In the last 5 years I'm advised this council has received no complaints in respect of road/footway obstructions in respect of your company and we have received no environmental complaints during the same period.

regards

Ian Rathbone

Principal Environmental Protection Officer – Place & Environment

Walsall Council

01922-654381 (Mob 07507837678)

www.walsall.gov.uk

Walsall Council PROUD OF OUR PAST, OUR PRESENT AND FOR OUR FUTURE

Figure 9: Walsall Council Statement

5.14 Emissions to Groundwater

There are no direct or indirect discharges of wastewater or chemicals to groundwater at the site. All of the bulk storage tanks on the site are bunded with regular inspections to check their integrity. Materials contained within the chemical stores are stored in 25 litre drums, spill kits are available to contain any spillages that may occur. In the event of a spillage during transfer to or from a road tanker, drain interceptors in the area concerned would divert spillages to the site effluent treatment plant. This effectively provides a third line of defence if spillages occur. Consequently, any analysis of these issues is not considered relevant to this application.

6. Waste Handling

Anochrome Limited's activities generate both solid and liquid controlled wastes, some of which are hazardous. The quantities of these wastes and their source and fate are summarised in Table 10 below:

Waste Stream	Annual Quantity (2023) (MT)	Storage	Designation	Fate	Justification
Metal hydroxide filter cake from Effluent Treatment	151	Protected skip on site in bunded area	Hazardous	Off-site landfilled	Waste from effluent treatment plant-minimised by use of filter press
Waste acid	10	Bunded tank	Hazardous	Reagent for effluent treatment; some acid removed from site and neutralised	Best environmental option
Waste alkaline cleaning solution	350	Bunded tank	Hazardous	Controlled discharge to effluent	Effluent treatment is satisfactory
Waste passivate solutions	13	Within waste acid tank solution	Hazardous	Reagent for effluent treatment; some acid removed from site and neutralised	Preferred use is for effluent treatment; however, quantity produced is slightly more than required for effluent
Scrap metal	21	Steel skip	Non-hazardous	Recycling	Best environmental option
General waste	10	Protected skips	Non-hazardous	Refuse derived fuel	Office waste; packaging materials
Empty containers	Variable	Designated locations	Non-hazardous	Returned to supplier/ melted and reduced in size	Best environmental option
Wooden pallets	Variable	Designated location	Non-hazardous	Re-use or repair	Best environmental option

Table 10: Waste Streams

Metal Hydroxide Filter Cake

The effluent treatment plant at Anochrome Limited enables on-site treatment of most of the waste process solutions and waste rinse waters produced. The filter press used to dewater the metal hydroxide sludge operates between 5 and 10 bar. This is sufficient pressure to increase the solids content of the filter cake to about 20%, the remainder being water.

The waste is stored in a metal skip, within the effluent treatment plant, which is located within the site permitted area. The maximum quantity of the waste stored on site at any one time does not exceed 8 metric tonnes (MT).

Waste Acid

The waste acid is transferred from site by a licensed waste contractor for off-site effluent treatment and disposal of the precipitate to landfill and waste liquor to sewer. The high iron content of the waste acid causes problems with settlement in the effluent treatment plant at Anochrome Limited, and if the quantities used were to be treated, Anochrome Limited's outfall would exceed its Consent to Discharge limits.

Spent acid solutions are pumped out of the process tanks and stored in a bunded bulk storage tank within the permitted area prior to collection for disposal. Some small quantities of the waste acid are used in the effluent treatment plant for pH neutralisation of the effluent waste. This is regarded as BAT.

Waste Alkaline Cleaning Solution

Waste alkaline cleaner solutions are pumped from the process tanks and stored in the effluent treatment plant storage tank before being discharged slowly to effluent. If this Permit variation application were to be granted, Anochrome Limited would install a cleaner storage tank from which alkaline cleaner waste could be removed via road tanker, which would reduce the loading on the site effluent treatment facility. This technique has been adopted at another Group Company, Wolverhampton Electro Plating, which has resulted in improved consistency of the effluent discharge concentrations.

Waste Passivates

Since Anochrome limited has ceased the use of hexavalent chromium systems, it has succeeded in maintaining passivate solutions for very long periods; only occasional disposal is required. When passivates need to be changed, spent material is stored in the waste hydrochloric acid tank and consequently conveyed off site for disposal.

Scrap Metal

Scrap metals are collected in an open skip located within the site boundary. They are then sent for recycling by a local metal recycling company. This is regarded as BAT.

Very little scrap metal occurs, since in nearly all situations, if customer parts are treated incorrectly, surface coatings can be removed and the components can be reprocessed to meet customer requirements.

Empty Containers, Wooden Pallets and General Waste

Depending on their size and most recent contents, empty containers are either:

- Returned to the supplier and washed to be refilled
- Washed and returned to the supplier
- Washed and re-used by Anochrome Limited
- Washed, compacted and disposed of in the general waste skip

Wooden pallets are collected on-site and collected by a contractor, customer or re-used by Anochrome Limited.

The remaining general waste is stored in partially enclosed skips located within the site boundary prior to disposal as refuse derived fuel.

6.1 Waste Management

Anochrome Limited's EMS includes waste management procedures and training to ensure that all staff are aware of the correct arrangements for the safe handling, on-site storage and off-site disposal of wastes. In particular, all staff have a clear understanding of which wastes cannot be placed in certain areas or receptacles.

The EMS includes:

- A system for recording the quantity of waste produced and its nature, origin, frequency of collection and disposal routes for each different waste type
- Designated responsibilities for the Technical Manager to manage the storage, handling and disposal of all wastes generated on site
- Provision of training to all staff on their individual responsibilities to comply with waste storage and disposal procedures
- A written procedure and audit programme of regular, documented inspections of waste storage areas to ensure that appropriate wastes are being stored in the respective areas and that quantities of waste stored are kept to a practical minimum

Duty of Care

Anochrome Limited complies with the Duty of Care requirements of the Environmental Protection Act 1990. All waste materials produced at Anochrome Limited are properly handled, stored and managed, so as to prevent their release into the environment, until such time as they are collected by a registered or exempted waste carrier for treatment or disposal at correctly licensed or exempted waste facilities. Responsibility for adequate waste management, including documentation and disposal arrangements, rests firmly with Anochrome Limited and is not deferred or delegated to waste contractors.

In particular, the following are adhered to:

- All wastes, whether regular arisings or one-offs, are identified and characterised to ensure that they can be disposed of appropriately and adequately described for waste transfer purposes
- All wastes are handled, contained and stored in such a manner that they cannot 'escape from the control' of the company or other parties involved in the disposal chain (i.e. drums are sealed, skips are covered where necessary and in a good state of repair so that materials cannot be washed out by rainwater, etc)
- Anochrome Limited ensures that all contractors used to dispose of waste are registered with the Environment Agency as waste carriers, or are legally exempt
- A properly completed Duty of Care Controlled Waste Transfer Note, or in the case of hazardous waste , an appropriate transfer note is produced for each waste consignment or series of consignments and a copy of this is kept by Anochrome Limited for a minimum of two years for Duty of Care Controlled Waste Transfer Notes and three years for hazardous wastes

As part of the EMS waste management, Duty of Care awareness training and instruction is given to all relevant employees.

When selecting any new waste contractor, Anochrome Limited does not make its decision based on the price of the contractors bid alone, but also examines the contractors understanding and compliance with Duty of Care and the relevant legislation.

Hazardous Waste Management and Disposal

Hazardous wastes at Anochrome Limited comprise waste acid stored in a bulk storage tank and ancillary hazardous waste stored 205-litre drums which are checked to ensure that they are in good condition and not subject to corrosion and wear.

Waste acid is stored within a purpose-built 20,000-litre bulk storage tank within the current permitted area. The tank has an integral bund which is checked at a minimum frequency of three times per month for signs of deterioration, leaks and spillage and the bund is leak tested every year. The volume of the bund is 22,000 litres which is compliant with Environment Agency requirements.

When characterising waste materials, Anochrome Limited ensures that a full description is provided, including relevant hazard and European Waste Catalogue codes.

Anochrome Limited recognises that uncertainties can arise when attempting to define whether any new types of wastes are to be classed as hazardous or non-hazardous. In these instances, the classification will be agreed with the licensed waste carrier or the Environment Agency following appropriate characterisation.

Packaging Waste

The main packaging used at Anochrome Limited are rolls of paper, pallet wrap and packing tape. The Producer Responsibility Obligations (Packaging Waste) Regulations 2007 do not apply to Anochrome Limited at present because the company handles less than 50 tonnes of obligated packing material per annum as shown in Table 11 below:

Item	Quantity purchased 2023 (kg/year)
Brown paper	8,100
Pallet wrap	560
Packing tape	42
Plastic containers (process material-non returnable)	1,300
Cardboard (boxes for process materials)	1,800

Table 11: 2023 Obligated Packaging Materials

6.2 Waste Recycling, Recovery and Disposal

As hazardous waste disposal costs have increased, techniques to recycle and recover these wastes have become more economically attractive.

Metal Hydroxide Filter Cake

Electrolytic metal recovery makes good economic sense for precious metals. However, the main metals in the effluent are iron and zinc, there is little commercial value in recovered zinc and even less in iron. Therefore, it would be uneconomic to install electrolytic metal recovery at

Anochrome Limited at this time, especially following price increases in electricity even though this would reduce the quantity of metal hydroxide filter cake disposed to landfill. However, new techniques are being developed and will increasingly become more economically attractive, particularly as disposal costs increase. Anochrome Limited will continue to keep these emerging recycling techniques under close review.

Waste Alkaline Cleaning Solutions

Although this waste stream is currently treated on-site in the effluent treatment plant, it has been recognised that off-site transfer and disposal will significantly decrease loadings on the effluent treatment facility. At the present time, the nominated waste treatment company would use a disposal site less than 10 kilometres from Anochrome Limited, so the environmental impact arising from road transport would be relatively low. It is proposed that this newer approach would be adopted if the Permit variation application is granted thereby leading to a reduction in environmental impact.

Waste Acid

Large quantities of waste hydrochloric pickling acid cannot be disposed of through the effluent treatment plant without significantly disrupting settlement of metals. This would lead to exceedances in Anochrome Limited's Consent to Discharge limits unless the acid were treated very slowly using large quantities of sodium hydroxide for neutralisation. A waste treatment facility will use alkaline waste arisings from other industries to neutralise the waste acid, rather than large quantities of sodium hydroxide or other alkaline materials, this is considered BAT in this industry sector.

Disposal of Spent Process Solutions

By careful control of process solutions through routine analyses and employee training, the need to remove 'non-routine' wastes from Anochrome Limited is extremely low, typically about 3 tonnes per year is transferred from site.

Scrap Metal and Waste Oil

Specialist recycling companies collects these waste streams for off-site recovery.

Empty Containers, Wooden Pallets and General Waste

Empty containers and wooden pallets are collected on-site and returned to the supplier or re-used by Anochrome Limited. Recovery of general waste is not economically viable.

7. Energy

The main uses of energy at Anochrome Limited are for:

- Electrical rectification and transformation to provide direct current (DC) supply to electrochemical processes
- Heating and cooling of process tanks
- Process air extraction and ventilation systems
- Compressed air for low-pressure air agitation in some process tanks and for use in the effluent treatment plant
- Motors and pumps
- Lighting

The usage of energy and associated losses that occur at Anochrome Limited are complex. Energy is lost when electricity is transformed down from high voltage alternating current to provide low voltage direct current outputs. The electrical power consumption in the electrochemical reaction to deposit zinc, zinc nickel or paint per unit area of surface treated in the process varies according to the process in use. Some processes are more efficient than others; for example, the proposed use of acid zinc technology will be more power efficient than cyanide zinc technology where energy is used to decomplex the zinc from cyanide and render it available for deposition.

Energy is also consumed in raising the temperature of some process baths, in drying components some space heating, and curing of powder coating and electrophoretic paint. Losses occur from evaporation and as radiant heat from equipment. Cooling of some process tanks consumes a small amount of electricity in pumps.

The 2006 BREF document provides estimates for different uses at an acid zinc plating shop which are illustrated in Table 12. These are expected to be broadly in line with the energy consumption at Anochrome Limited.

Use	Percentage Energy Consumption
DC for pre-treatment and zinc plating	20 — 40%
Process heating for pre-treatment and zinc plating	20 — 40%
Process cooling for zinc plating	0 — 17%
Fume extraction	5 — 13%
Drive motors, drying, space heating, lighting	13 — 40%

Table 12: Typical Proportion of Energy Consumptions

Anochrome Limited is a member of the Surface Engineering Association (SEA) Climate Change Levy Agreement (CCLA); a copy of the latest signed agreement accompanies this Permit variation application. Power consumption is measured in relation to sales.

Annual energy consumption at Anochrome Limited in 2023 is summarised in Table 13 below:

Energy Source	Energy Usage		CO2 equivalent produced (MT)
	Quantity (MWh)	Primary Energy (MWh)	
Electricity*	2727	6204	1197
Natural Gas	6493	6493	1189
Total			
		12,697	2387

Table 13: 2023 Energy Consumption

* Converted to primary energy

The EMS requires readings to be taken from the gas and electricity meters each working day to establish usage rates.

A number of improvements have been made to date including:

- The fitting of gas magnets to the burners on barrel lines 1 and 2 and the phosphate plant; this has resulted in an annual saving of between 8 and 30% in gas consumption, depending on the age of the burners.

- All thermal fluid pipes within the site have been re-lagged to ensure good health and safety practice and heat retention. This has resulted in an annual saving of 4% on the annual energy usage compared with the time when the thermal fluid pipes were not adequately lagged.

- LED lighting has been installed in specific areas of the factory to improve the ability to check for defects in surface coating when component parts are unloaded after processing. This has reduced the site electricity consumption by approximately 7%.

If this Permit variation application is granted, then the following additional improvements would be realised by the installation of new Automatic VAT line based on acid zinc technology:

1. Use of acid zinc instead of cyanide zinc solution would increase solution efficiency by at least 30%

2. Because zinc would be deposited more rapidly from acid zinc compared with cyanide zinc, the time components are within a plating tank would reduce, hence the energy requirements for the line, process heating and local exhaust ventilation for example, will be lower per unit output.

3. Direct fired gas burners installed in burner tubes located in tanks for solutions that require heating are almost 100% efficient. The present system in which thermal fluid is pumped to the tanks containing solutions that require heating inevitably results in transmission losses. In order to combat this loss, the thermal fluid, at present, is typically heated to 180°C. If new tanks were to be installed, burners could be turned down as soon as the solutions' operating temperatures were attained.

4. If the new Automatic VAT line was installed the opportunity would be taken to trial cleaners that operate at lower temperatures than the operating temperatures of the cleaners currently in use.

5. The new Automatic VAT line would allow for triple rinsing stages to be used. This would lead to a considerable reduction in the volume of water needed for rinsing, so the loading on transfer pumps within the effluent treatment facility would be lower than is the case at the present time.

8. Risk Assessment

The major risks to the environment from hazardous materials used by Anochrome Limited are:

- Hazardous liquid spillages and entry into groundwater or surface water during the delivery of chemicals, storage or movement of chemicals around the site
- Escape of hazardous waste materials to groundwater or surface water during storage or collection for off-site disposal
- Release of hydrogen chloride fumes to air as a consequence of a failure of scrubber systems.
- Release of hazardous materials to sewer above trade effluent consent resulting from a failure of the effluent treatment plant to deal with the inflows into it
- Exothermic reactions caused by mixing of incompatible chemicals
- Vandalism
- Fire

The first two risks are minimised by the location of the chemical stores, bunding around bulk storage tanks and bunding below 1000 litre intermediate bulk containers located at various points within the permitted areas. Bulk deliveries of chemicals and collections of wastes are carried out within an area where drainage channels conduct potential spillages in to the effluent treatment plant. Procedures are in place to ensure that deliveries and collections are supervised, so that should a leak occur, valves can be closed quickly, thus minimising the volume of material that could be lost.

Appendix A lists risk assessments based on the Failure Mode and Effects Analysis techniques. These risk assessments are reviewed at a minimum frequency of once every three years, at a meeting chaired by the General Manager/Director.

A Risk Priority Number (RPN) is obtained, and this is simply the product of the risk factors given to severity, likelihood and detection, based on the following criteria:

Risk/Severity Posed by A Particular Event

1. Slight impact, for example contamination of process impairing performance.

2. Direct environmental impact, for example, small spillage of hazardous material.

3. Moderate direct environmental impact, for example, leakage of process solution or contaminated waste, contained within the site boundary.

4. Severe environmental impact, for example leakage of hazardous materials beyond the site boundary, including entry into surface water drains.

5. Very severe environmental impact, affecting health of persons in the vicinity, for example, serious fire, gaseous emission or explosion.

Likelihood of a Particular Event Occurring

1. Will not occur.

2. Slight risk of occurrence.

3. Moderate risk of occurrence.

4. Very likely to occur.

5. Almost certain to occur frequently.

Ease of Detection of a Particular Event Occurring

1. Control bound to detect problem immediately, visual, automatic alarm.

2. Detection almost certain, for example, audits.

3. Detection likely, but not immediate, for example routine analysis.

4. Detection possible, for example integrity checks.

5. Detection almost impossible, for this score, control methods would need to be implemented as far as is reasonably practicable.

On the whole, Anochrome Limited considers that its activities pose minimal risk of long-term environmental impact.

The Site Condition Report gives an assessment of the environmental sensitivity of the site and surrounding area and of the availability of pathways. This indicates that the potential for substantial environmental impact associated with any abnormal or emergency condition on the site is low. Notwithstanding this, Anochrome Limited has emergency procedures and a Disaster Recovery Plan and the requirements of this has been communicated to all management with supplementary and more detailed training, where required. This is discussed in more detail below.

8.1 Risk Reduction

Anochrome Limited operates within industry practices for handling and managing potentially polluting materials and the preventative measures, (including bunding, containment and regular inspections) are described elsewhere within this document. The following paragraphs focus upon the site emergency response provisions.

The General Manager/Director and the Technical Manager are responsible for dealing with emergency or non-standard operating conditions, which have been identified as possibly having a detrimental effect on the environment, such as spillages or effluent plant equipment failure. A team of competent personnel, including the Technical Manager, Engineering Manager and Operations Manager, supports the General Manager/Director.

All necessary information describing actions to be taken in the event of a major incident is contained in the Disaster Recovery Manual. A copy of this is located in Reception and further copies are lodged on the Group server and with the company's insurance brokers. By keeping copies off-site, this obviously facilitates access, if the building cannot be entered, or if the site copy is damaged.

The Disaster Recovery Plan contains:

- Contact details for key personnel and other interested parties, for example, Severn Trent Water
- A factory plan which details shut-off points for electricity, gas and water
- Schematic diagrams of each of the process lines and solution volumes with solution concentrations
- An inventory of chemicals present, or likely to be present, on the site
- Other relevant information

The Disaster Recovery Manual is reviewed every twelve months and all pages are dated to show the latest revisions. This review is the responsibility of the Group Conformance Manager.

As part of its Health and Safety Management System a number of personnel are trained in fire-fighting techniques and the list of such personnel is reviewed annually to ensure a sufficient number of trained personnel are available, under normal operating conditions for both the day and the night shifts.

All areas where potentially polluting materials are stored or handled are regularly inspected as part of the EMS, and these inspections are documented.

Emergency Response Actions

The emergency response actions for the site are as follows:

- The General Manager/Director, or in absence, a senior member of staff, will be notified and will decide upon the action that needs to be taken. The General Manager/Director or nominated deputy will notify the Authorities as appropriate. Where necessary, Group Directors and Managers from other Group Companies could be drafted in to assist.

- All spillages within the factory will be directed towards the effluent treatment plant where practicable. Sufficient personal protective equipment is available to assure the safety of people dealing with spillages under most circumstances. In the unlikely occurrence of toxic gases being evolved, the building would be evacuated, and the Fire Service would be summoned. The Fire Service is kept informed of the chemicals kept on-site and their properties in case any incidents occur and has a digital copy of the site layout. Anochrome Limited does not maintain breathing apparatus.

- While significant spillages were being directed to the effluent treatment plant, all processes would be turned off, so that no additional contamination or water was being treated, since this could further compromise the ability of the effluent plant to deal with the emergency. The Technical Manager would then arrange for the spillage to be treated through the effluent plant if possible.

- When adequate treatment on site is not feasible, a licensed waste disposal contractor will be called upon to provide road tankers, and where necessary, expertise, to facilitate off-site disposal.

- There is sufficient freeboard within the effluent treatment pits to accommodate all the contents from the largest solution tank on the site. If several tanks were damaged at once (for example through aerial impact), outside assistance would be needed to deal with process solution spillages.

- In the event of a leak, further leakages will be stopped, and split substances prevented from reaching other drainage channels, as far as is reasonably practicable. Spilled materials will in all but catastrophic circumstances be retained within the site boundary.

- All significant spillage incidents are documented, including preventative actions taken and any detrimental consequences that may occur. Incidents will be reviewed at weekly Operations Meetings.

Any process materials, work pieces or other items that became contaminated during an incident of leakage or spillage would be handled carefully and properly cleaned down or disposed of in accordance with safety data sheet recommendations and the Duty of Care Regulations. Wastes will normally be collected in plastic- containers, liquids being first absorbed in to socks and pads contained in spill kits. Specific disposal instructions are included in material safety data sheets which are retained on the site server which is remotely accessible.

The company would welcome advice from the EA about its emergency procedures and hopes that such discussions will take place during the time that this Permit variation application is being determined.

Incident Reporting Procedure

Depending on the specific circumstances of the incident, a number of the emergency and regulatory authorities would be contacted. Three levels are considered for the reporting of incidents.

Level 1: Life and Property Threatening Incidents:

The first level of reporting will be concerned with personal safety as the first priority and significant property damage as the second. Those parties to be informed will be involved in dealing with injured persons and the prevention of fire and explosions, i.e. emergency services.

Level 2: Potentially Polluting Incidents:

As soon as the site has been made safe in terms of an immediate fire or explosion risk, the General Manager/Director will initiate the second level of reporting, concerned with informing those parties whose responsibilities are to protect the environment from the impact of released materials which have the potential to pollute, i.e. the EA, Severn Trent Water, Local Authority as well as group personnel.

Level 3: Minor Incidents:

If the incident has been contained within the confines of the factory and has not resulted in any health and safety issues, external reporting will not be necessary under the conditions imposed by the Permit currently in force. The majority of minor spillages and leaks will fall into this category.

The incident, however, will still be dealt with, investigated and reported internally as required by Anochrome Limited's Environmental Management System.

Summary

Anochrome Limited has recognised the potential for accidents to occur and that these can have an adverse environmental impact, especially in relation to acids, alkalis and other process materials. Due to this fact, the primary focus has been to locate all large containers in bunded areas and to ensure that drainage channelling is arranged to prevent the passage of chemicals into the environment.

Delivery of chemicals and collection of hazardous wastes are carried out in a controlled area of the factory with a sealed concrete surface and drainage into the effluent treatment facility.

The provision of padlocks and clear labelling of tanker delivery points reduces the risk of mixtures of incompatible materials as far as is reasonably practicable.

Bulk chemical storage areas are also protected by separate bunds. All chemical and effluent pipe work (excepting road tanker connection points) is located within the site bunded area. Suitable containers are used to transport smaller quantities of chemicals within the site and a qualified examiner, who is a full-time employee within the Anochrome Group, tests all forklift drivers for competence at five yearly intervals.

In terms of emergency response provision, the company has a site wide emergency response programme, which includes details of response actions and reporting levels for various incidents. All incidents or "near misses" will be investigated and documented.

There has been only one major or significant incident at Anochrome Limited during the previous 40 years, which occurred in 1992. This involved a large fire, when a spark travelled down the extraction unit on the automatic vat line, igniting paper below, no injuries resulted from the incident, but the factory roof required rebuilding. Since this time, all extraction ducts have been fitted with heat sensors. If there is a significant rise in temperature, the sensors in the extraction automatically shut down the units to prevent the fire from spreading. These sensors are tested as part of the Planned Preventative Maintenance.

Anochrome Limited does not, in the management team's opinion, pose a significant threat to the environment under either normal, or abnormal, operating conditions.

9. Noise and Vibration

Installations to be operated in such a way that 'all the appropriate preventative measures are taken against pollution, in particular through the application of BAT'. The definition of pollution includes 'emissions which may be harmful to human health or the quality of the environment. BAT is therefore similar, in practice, to the requirements of the statutory nuisance legislation, which requires the use of 'best practicable means' to prevent or minimise noise emissions.

In the case of noise, 'offence to any human senses' can normally be judged by the likelihood of complaints, but in some cases, it may be possible to reduce noise emissions still further at reasonable costs and this may exceptionally therefore be BAT for noise emissions.

The main sources of external noise at Anochrome Limited are: -

- Local exhaust ventilation and roof ventilation fans.
- The use of fork-lift trucks for loading and unloading lorries outside the factory.

The company operates 24 hours per day, seven days per week, but movement of fork-lift trucks outside the factory during the evening period occurs only in exceptional circumstances.

The location of the factory close to residential property, renders a noise nuisance being possible, however, no complaints have been received, either by the company, or by Walsall Metropolitan Borough Council in recent years as outlined in Figure 9. This document demonstrates that since the noise levels within the company are relatively low, there is little likelihood of complaints from beyond its confines.

The company recognises however, that the potential for reasonable cause for annoyance would need to be reviewed if there were to be any changes to site operations or local noise receptors, including:

a) Installation of equipment with the potential to create a high degree of noise
b) Change in use of the surrounding premises currently used for manufacture, storage and as a temple

Part of the company's Environmental Management System includes a complaints procedure such that, should any noise complaints be received from members of the public, neighbours or regulatory authorities, Anochrome Limited will treat this as a non-conformance with the EMS. The company will immediately investigate the cause of the concern and apply effective remedies. All such responses will be recorded and managed as part of the EMS.

It is reasonable to conclude that there is currently no potential for reasonable cause for annoyance from noise emissions. However, Anochrome Limited will review the potential for reasonable annoyance from noise if there are any significant changes to site operations or local noise receptors.

10. Emission Monitoring

Monitoring shall be carried out on releases to the environment and of process variables.

Monitoring and Reporting of Emissions to Sewer

The trade effluent discharge to sewer from the effluent treatment plant is monitored and is also tested regularly to demonstrate compliance with the conditions in the trade effluent discharge consent issued by Severn Trent Water. The frequency of monitoring and reporting is summarised in Tables 24 and 25 below:

Anochrome Limited — EFFLUENT CHECK LIST — Date:

	7:00 AM	10:00AM	1.00 PM	4.00 PM	7:00PM	10:00 PM	1:00 AM	4:00 AM
Is discharge clear?								
Final pH? (7 -12)								
Neutralisation pH? (7.5 - 11)								
Acid side pH?								
Alkaline side pH?								
Alkaline side EH?								
Dosing tanks half full (minimum) ?								
Sodium hydroxide								
Sodium hypochlorite								
Hydrochloric acid								
Flocculant								
Probes cleaned - daily ?								
Filter press scraped - daily ?								
"V" notch cleaned - once per week, minimum?								

Effluent quality - once per shift, minimum?				
Time				Limits
Zinc				<10
Cyanide				<10
Chromium				<5
Checked by				

Table 14: Effluent Check List

			Concentration in mg/l				
	Limits:	10	10	5	25	06-Dec	
Date	Time	Zinc	Cyanide	Chromate	Phosphate	pH	Comments
02/01/2024	11:45	1.14	0	0	0	11.84	Start up
03/01/2024	10:00	2.88	0	0	0	10.99	
04/01/2024	08:00	3.64	0	0	0	11.44	Severn Trent Sample.
05/01/2024	14:30	1.86	0	0	0	10.26	
08/01/2024	12:45	3.74	0	0	0	11.88	
09/01/2024	10:00	5.8	0	0	0	12	
10/01/2024	09:00	7.88	0	0	0	11.39	
11/01/2024	14:00	8.26	< 1	0	0	8.14	
12/01/2024	12:30	6.4	0	0	0	9.99	
15/01/2024	11:30	1.39	0	0	0	10.86	
16/01/2024	14:00	2.63	0	0	0	10.93	
17/01/2024	12:30	2.88	0	0	0	11.5	
18/01/2024	09:00	3.55	0	0	0	11.4	
19/01/2024	11:00	3.76	0	0	0	10.29	

Table 15: Typical Effluent Discharge Analyses

Monitoring and Reporting of Emissions to Air

Measurements have been taken of the concentration and mass emissions of hydrogen chloride, annually since 2004; this monitoring has been discussed earlier in the Permit variation application.

Monitoring and Reporting of Waste Management

A summary of annual waste generated is provided in Table 10.

Data concerning the quantities of waste collected is grouped into a number of classifications and recorded as part of the site's EMS record keeping:

· Hazardous waste
· Scrap metal
· Plastic containers
· General and office wastes

Duty of care transfer notes and hazardous waste consignment notes are completed, and copies are retained on site for all wastes sent off-site for disposal.

Environmental Monitoring Beyond the Installation

No environmental monitoring beyond the installation is thought to be necessary with regard to the emissions arising from Anochrome Limited.

Measurements of the amount of hydrogen chloride show that the emission levels to be well below the concentrations which need to be acted upon in accordance with the Permit conditions.

It is therefore concluded that there is no necessity to measure or monitor the effects of gaseous emissions beyond the site boundary.

On the whole, it is considered highly unlikely that the emissions and discharges from the installation will have any significant impact on the environment of the surrounding area. Given this and the nature and the scale of operations of Anochrome Limited, it is felt that there is no necessity for off- site monitoring and sampling to take place.

11. Decommissioning

At the time of this Permit variation application, there are no plans to close the Reservoir Place site however if the application is successful then Anochrome Limited will decommission the existing Automatic VAT line and the accompanying emission point A1. In order to address the implications associated with decommissioning of the site, the company has prepared a site closure plan which fulfils the requirements of current guidance, and which would also act as a template for the decommissioning of substantial process equipment.

Introduction

The information set out in this section represents the methodology and techniques by which Anochrome Limited would decommission its permitted installation and then close the site. The procedures will be reviewed from time to time in the event of significant changes to the installation and this section will thus form part of the company's environmental management system. The site closure plan will be a live document.

The site closure plan addresses the cessation of the activities described in the main application document, the decommissioning of the equipment and the clean-up of any contamination that may have occurred during the lifetime of the permitted operation.

The principal objectives of the site closure plan are:

- Removal of all potentially polluting materials from the site
- Re-assessment of the site condition and identification of any remediation requirements that are associated with the permitted operation
- Towards the cessation of activities all material stocks will be managed down to minimise the quantities of unused process materials and effluent treatment chemicals
- Defining a drain down and clean in place, where practicable, strategy focusing on environmentally acceptable practices
- Defining a removal and reinstatement strategy, taking in to account the former condition of the site
- Hand over of a clean building to a new owner or occupier
- On surrender of the site, the Anochrome Group shall retain all environmental information pertaining to the business
- Anochrome Limited is fully committed to complying with all relevant legislative instruments and regulatory guidance documents that may be in force when site closure occurs

Plant Decommissioning

On cessation of activities associated with the installation or substantial process equipment, Anochrome Limited will ensure that all potentially contaminating materials are removed from the site. An audit of the site buildings and external areas will be undertaken to identify potentially polluting materials and likely wastes or contaminated infrastructure that will need to be dealt with.

Building Infrastructure

Anochrome Limited will examine all areas where the permitted activities have taken place to evaluate whether there was a risk that the surrounding building infrastructure is contaminated. If

potential areas of concern are identified, samples shall be taken to identify the type of contamination and the levels of contamination that are present.

Where contamination levels are found to be of concern, the company will ensure that all waste materials are disposed of appropriately and in accordance with the applicable legislation.

Plant and Equipment

Anochrome Limited will endeavour to efficiently use plant and equipment and thus operate and manage it such that the life cycle of plant and equipment is optimised, therefore they are maintained in a good state of repair and operational capability. Should operations ever cease on the site, it is anticipated that some of the plant will be saleable and useable by other companies engaged in similar metal finishing activities, or, possibly, within another company in the Anochrome Group. The plant would be thoroughly cleaned down before it was removed from site.

Waste Containers and Materials

Anochrome Limited will ensure that all waste materials and empty drums and other chemical containers will be removed prior to vacating the site. The company will also clean down any areas where chemicals have been stores or used or where spillages may have occurred. All effluent produced during these clean down operations will be treated, either in the site effluent plant, or after removal by a specialised waste contractor. No discharges will occur to surface water drains and no untreated effluent will be allowed to enter the foul water drainage systems. The company shall ensure that all waste materials have been disposed of in the correct manner and in accordance with applicable legislation.

Use of Third-party Contractors

If the site clearance is assigned to contractors, they will be supervised by a representative of the company and, as part of the contract be made fully aware, in writing, of their obligations and their responsibilities with respect to the Duty of Care and other relevant environmental information such as discharges to drainage systems.

Site Condition

As part of the Permit variation application a new Site Condition Report was commissioned. It is intended, on cessation of activities on the site, to examine areas where potentially polluting materials may have been stored, poured or used, to determine whether any subsequent contamination is likely to have occurred.

If contamination has occurred as a result of the activities of Anochrome Limited, this will be remediated to the extent that the chemical conditions of the soil and groundwater will be similar to those that are described in the Site Condition Report at the time the original Permit came into effect. At present the level of contamination from previous workings is not known.

It is Anochrome Limited's intention that the site will be operated and controlled in such a manner that no escape of potentially polluting materials to either groundwater or soil should occur.

Furthermore, if such incidents do occur, any resulting contamination will be dealt with as part of the initial response to the incident. It is extremely unlikely that a need for soil or groundwater remediation will occur on cessation of activities on the site.

Anochrome Limited will conduct a careful investigation to check prevailing site conditions and if necessary, an intrusive site survey will be instigated, to ascertain whether remediation work needs to be completed.

If any contamination has occurred of soil or groundwater a number of remediation techniques will be available to Anochrome Limited and the contractors who could be employed to assist with the remediation. It is not feasible however, within the scope of this application, to speculate on the remediation measures that may be required. Such measures will be set out in a remediation plan which would be constructed to deal with the actual identified contaminants on a site-specific risk assessment following the site closure, should the need arise.

The closure investigation and any remedial actions required will be agreed with the EAbefore commencement. It must be stressed, however, that given the management and operational controls, and the fact that all materials which may cause ground contamination will be stored and used within bunded areas, or in areas with sealed concrete flooring and drainage directed towards the effluent treatment plant, it is extremely unlikely that any ground or groundwater contamination will occur during the operating life of the site.

Site closure

If on closure, Anochrome Limited satisfies the Environmental Agency that they have removed any pollution risks and restored the site to a satisfactory state, the Environment Agency shall accept the surrender and give the company notice of its determination. The Permit shall then cease to have effect on the date specified in the notice of determination. If the Environment Agency is not satisfied, it shall give notice of its determination stating why the application has been refused.

12. Emission Benchmark

Releases to Air

Emissions to air are routinely measured with the 2023 figures being provided in Table 6.

The only emissions to atmosphere, during normal operational periods are of hydrogen chloride and carbon dioxide from gas burners.

The amount of hydrogen chloride released to atmosphere is far below the benchmark set in the current BREF for the industry sector and limit value imposed in the Permit.

The conclusion of the air quality screening assessment is that the proposed installation of the new Automatic VAT line would not have a significant impact on air quality.

Releases to Water

Anochrome Limited is permitted to discharge up to 750 m^3 per day of trade effluent to the foul sewer, under the Consent to Discharge trade effluent granted by Severn Trent Water. The consent also prescribes the maximum level of metals that may be within the trade effluent, as well as certain other conditions.

At the time of this Permit variation application, Anochrome Limited is not subject to any other authorisation or permitting requirements with regard to its effluent discharges.

Table 16 compares the average composition of Anochrome Limited trade effluent with both the consent discharge limits and the benchmark values for release to sewer contained in EPR 2.07, Surface Treatment of Metal or Plastic by Chemical or Electrolytic Means (March 2009).

Parameter	Average Composition (mg/l)	Trade Effluent Discharge Consent Limit (mg/l)	Benchmark Release Limit to Sewer (mg/l)
Chromium	0.55	5	1
Zinc	3.3	10	2
Nickel	0.14	5	1
Free Cyanide	1.49	10	0.2
Suspended Solids	8.2	400	-

Table 16: Effluent Discharge Comparison

In all instances, the trade effluent discharge consent limits are higher than the benchmark values for releases to sewer in EPR 2.07.

The average zinc concentration does slightly exceed the benchmark release levels in effluent; nevertheless, it is lower than the Severn Trent Water Consent to Discharge Concentration. Although it is technically difficult to decrease the concentration of zinc in the discharge, it is relatively straightforward to recycle a proportion of the water that is presently being discharged to sewer, thus reducing the overall environmental impact of all of the constituents when considered against the consented volume of 750 cubic metres per day.

Waste Releases

Metal hydroxide filter cake from the effluent treatment plant comprises the largest source of pollution on site, although acid and passivate wastes neutralised off site also need to be considered. However, the drag-out minimisation practices and other BATs operated by Anochrome Limited ensure that the process efficiencies with respect to input materials compare very favourably with the benchmark figures presented in EPR 2.07:

Plating Technology	Benchmark Efficiency (%)	Anochrome Efficiency (%)	Comparison
Zinc Plating (cyanide)	90	97	Good
Zinc Plating (acid)	90	98*	Good
Phosphating	90	99	Good

Table 17: Benchmark Material Efficiencies

The drag out for the acid zinc was determined at Wolverhampton Electro Plating which operates the same type of process that it is envisaged will be used at Anochrome Limited. If the Permit variation is granted, a similar exercise would be undertaken at Anochrome Limited to determine this value on the new Automatic VAT line.

12.1 Environmental Impact of Emissions

This section of the technical submission provides a detailed account of the environmental setting of the site, including physical conditions and environmental sensitivity.

Environmental Setting

The Site Condition Report, which is included as part of this application gives a more detailed account of the environmental setting of the site, including physical conditions, environmental sensitivity and also historical land use.

The Anochrome Limited site is located on Reservoir Place, approximately 1.5 km southwest of Walsall town centre, in the Pleck area located northeast of the A4038 Darlaston Road and the Walsall Canal and within 0.5 km of the M6 located to the west. The total area of the site is approximately 8800 m2; it is relatively flat with a slight slope, ranging in elevation of 136 m AOD in the north to 135 m AOD in the south.

The site is directly bordered by a mosque and educational centre to the north, with a residential area to the northeast beyond the road. A residential area lies directly adjacent to the eastern boundary and industrial units to the south, with the Walsall Canal located beyond. An historic copper works of approximately 18 Ha lies to the west which is currently being remediated and developed for future commercial use.

The site itself comprises four large buildings that house offices, factory facilities and warehouses. A small office block is situated to the south of the main offices in the centre of the site. Industrial surface treatment of metals takes place within the main site buildings in the north and east of the site. Bay 3, which is due to house new Automatic VAT line, is located along the southern boundary and occupies an area of approximately 900 m2.

Nearby Environmentally Sensitive Sites

There are no ecological designations such as Sites of Special Scientific interest (SSSI), Ramsar sites, Special protection areas (SPA), National Nature Reserves (NNR), Local Nature Reserves (LNR), Designated ancient woodlands or biosphere reserves within 2 km of the site.

The site does, however, lie within a SSSI impact risk zone which are zones 'developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.' It is considered unlikely that the proposed development at Anochrome Limited falls into a development category that requires consultation.

Two records of priority habitats lie within 250 m of the site and include two areas of deciduous woodland to the northwest. One area of open mosaic habitat is recorded within 250 m. 'Sites verified as Open Mosaic Habitat…are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.' This particular site is located 12 m to the west of Anochrome.

Visual and cultural designations include world heritage sites, areas of outstanding natural beauty, national parks, listed buildings, conservation areas, scheduled ancient monuments and registered parks and gardens. None are listed within 250 m of the site.

The nearest watercourse to the site is the Walsall Canal located approximately 100 m to the south at its closest point. The River Tame and Sneyd Brook lie within 1 km of the site to the west. The River Tame flows roughly north to south to the west of the site before flowing in a south-easterly direction. Based on information from the Gov.uk planning services, the site lies within Flood Zone 1 which is described as having a low probability of flooding from rivers and the sea

The site sits within the Water Framework Directive surface water body catchment for the River Tame (W/ton Arm).

Impact of Emissions on the Environment

The impact of air emissions from the installation has been discussed previously and it was concluded that there were no significant emissions.

Releases of trade effluent to sewer have previously been compared with Severn Trent Water's trade effluent discharge consent limits and benchmark releases to sewer in EPR 2.07. For all substances, the highest measured composition of Anochrome Limited's effluent has been below the trade effluent discharge consent limit.

Material input efficiencies compare very favourably with the benchmark figures presented in the 2006 BREF and EPR 2.07.

There are no licensable or exempt waste management activities undertaken at Anochrome Limited.

Habitats Regulations

The Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.magic.gov.uk) was consulted in order to identify any sites within a 10km radius of the site. The Joint Nature Conservation Committee (JNCC) website (www.jncc.gov.uk) was then consulted to provide any information on any sites that were identified.

The search revealed the following European site:

Legislation	Designation
Site Name	Cannock Extension Canal
Site Code	UK0012672
Site Type	Special Area of Conservation (SAC)
Location	Grid Ref: SK020058
Area (ha)	5.47
Reason of Recommendation	Cannock Extension Canal in central England is an example of anthropogenic, lowland habitat supporting floating water-plantain Luronium natans at the eastern limit of the plant's natural distribution in England. A very large population of the species occurs in the Canal, which has a diverse aquatic flora and rich dragonfly fauna, indicative of good water quality. The low volume of boat traffic on this terminal branch of the Wyrley and Essington Canal has allowed open-water plants including floating water-plantain, to flourish, while depressing the growth of emergents.

Table 18: Cannock Extension Canal

Cannock Extension Canal is Special Areas of Conservation (SAC); Anochrome Limited lies approximately 7km to the south west of the Cannock Extension Canal, at its closest point.

There are no Special Protection Areas within a 10km radius. In addition to these sites there are 8 Sites of Special Scientific Interest (SSSI) within a 10km radius. These are:

· Wren's Nest, Dudley - palaeontological importance
· Clayhanger, Walsall - various flora
· Hay Head Quarry, Walsall - palaeontological importance
· Jockey Fields, Walsall - various flora and fauna
· Swan Pool, Walsall - various flora and fauna
· Stubber's Green Bog, Walsall - various flora
· Daw End Cutting, Walsall - palaeontological importance
· Sutton Park, Sutton Coldfield - various flora and fauna
. Gospel End Road Cutting – palaeontological importance

There are also a number Local Wildlife Sites (LWS) within a 2km radius:

Walsall Canal
Bradley Locks
Basin Sidings
Ward's Pool
Moorcroft Wood
Bentley Mill Lane
Wolverhampton
James Bridge Gasworks
Anson Branch Canal
Ford Brook
Axletree way, Tame Valley
Bescot Triangle
Moorside Gardens
Anson Road
Poul Hill Quarry
Land East of Poplar Avenue
Poplar Avenue Pond
Walsall Power Station Pool

These are illustrated in Figure 10 below:

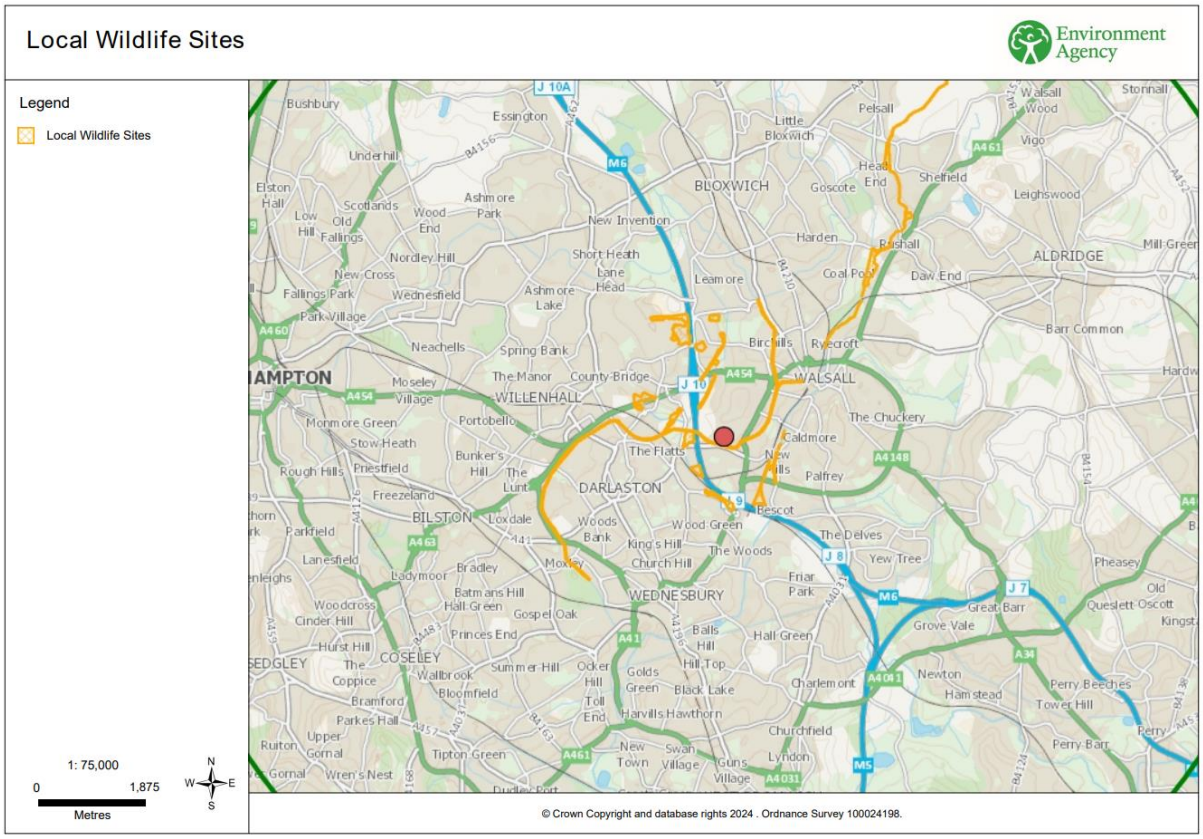

Figure 10: Local Wildlife Sites

There is no hydraulic continuity between Anochrome Limited and any of these conservation sites. Anochrome Limited believes that since its emission concentrations are all below 75% of the emission limit value quoted in the 2006 BREF, these emissions cannot have an effect on any of these conservation sites.

13. Climate Change Adaptation

In accordance with the Climate Change Adaptation (CCA) letter supplied by the EA dated October 9th 2023, it is a requirement of the existing Permit that Anochrome Limited considers climate change impacts on the business and incorporates the resultant assessment in its EMS.

Anochrome Limited has therefore completed the online EPR climate change adaption questionnaire in October 2023 and created a climate change risk assessment as per advice given in the forementioned CCA letter above.

The climate change risk assessment is provided in Appendix B.

14. Summary of Environmental Benefits and Improvements

The present Permit variation application seeks permission to vary the Permit in order to support the following site development proposals:

a) Extension of the permitted area and boundary to include additional existing site buildings and land
b) Installation of a new Automatic VAT line to operate on more favourable less environmentally hazardous technology (acid zinc) in an existing building located within the proposed extended Permit area with accompanying requirements for:
    i. Design and installation of associated chemical supply, storage and containment facilities
    ii. Design and installation of a new emission point to air
    iii. Enhanced surface protection of the underlying impermeable floor in selected areas
c) Decommissioning and removal of the existing Automatic VAT line which operates on less favourable more environmentally hazardous technology (cyanide zinc)
d) Decommissioning and removal of the emission point to air (denoted A1 in the Permit) associated with the existing Automatic VAT line

If permission is granted, Anochrome Limited believes that the aforementioned development proposals will deliver a number of environmental benefits and improvements to the site:

- Adoption of the use of acid zinc technology in preference to cyanide zinc technology incorporates the adoption and use of BAT and reduces the likelihood of incompatible leaks
- Decreased storage and use of sodium cyanide will reduce the likelihood of a spillage of sodium cyanide or its involvement in a fire situation
- Acid zinc solutions have lower surface tensions than cyanide-based counterparts thereby reducing the drag out of solution per unit surface area which, in turn, would decrease waste outputs; at this stage it is not practicable to quantify this figure
- The new Automatic VAT line will incorporate triple rinse stations after each process which will reduce consumption of rinse water by up to 40%
- Fitting solenoid valves on the new Automatic VAT line will further reduce water consumption
- Water metres are to be read every working day thereby allowing any significant variations in water consumption to be discussed during management meetings
- Further investigation will be undertaken to resolve the current impasse preventing borehole water from being used on process lines; if successful, this would reduce the consumption of mains water
- Anochrome Limited will consider the fitment of an automatic cut-off valve on the incoming water supply to the site
- Installation of the new Automatic VAT line based on acid zinc technology would reduce the electricity demand per unit output by at least 30% in comparison to that needed for the existing Automatic VAT line on cyanide zinc technology
- Opportunity will be taken to install cleaners that operate at lower temperatures than those used on the present process lines and monitor their performance; if there were no diminution in cleaning performance, the quantity of gas needed by Anochrome Limited would be reduced accordingly

Appendix A: Environmental Impacts Risk Analysis

Task/ Activity : **Uncontrolled Fire** Date Created: **21/06/2024**

Author: **Richard Chater** Position: **Group HSE & Technical Support Manager**

Aspect	Potential Release mode	Receptor	Control Measure	Likelihood	Severity	Detection	RPN	Comments / Actions.
Fire	Fire	Atmosphere, land, water courses	Number of inflammable gas cylinders controlled. Separate locked cylinder cage. Bunded caged, locked store. Waste skips located 5m from buildings. Fire safety and fire awareness training Extinguisher provision. Fire Service furnished with site plan. Majority of building structures and equipment is non-flammable. Fire risk assessments. Fire suppressant systems on local exhaust ventilation. Premises secured when not in use. External fire risk assessments carried out.	1	4	2	8	None

Reviewed by: Richard Chater **Review date: 21/06/2024** **Next Review date: Jun-25**

Task/Activity: **Effluent Treatment plant** Date Created: **21/06/2024**

Author: **Richard Chater** Position: **Group HSE & Technical Support Manager**

Aspect	Potential Release mode	Receptor	Control Measure	Likelihood	Severity	Detection	RPN	Comments / Actions.
Oxidation of chelatants to precipitate zinc and nickel	Dissolved metals pass through effluent treatment plant	Canal, Rivers	Conductivity probe to dose hypochlorite Routine calibration Analysis of zinc and nickel. Alarm systems for out of ontrol conditions.	1	3	1	3	None
Neutralisation and precipitation of metals from waste streams	Dissolved metals pass through effluent treatment plant	Canal, Rivers	pH probe to dose sodium hydroxide or hydrochloric acid Routine calibration Analysis of zinc, nickel. Alarm systems for out of control conditions.	2	3	1	6	None
Flocculation of precipitate	Metals in suspension pass through effluent treatment plant	Canal, Rivers	Flow proportional dosing of flocculants Visual Analysis of zinc & nickel.	2	2	2	8	None
Settlement	Sludge does not get retained by filter press	Canal, Rivers	Planned preventative maintenance Effluent plant design Visual Analysis of zinc & nickel.	2	3	2	12	BAT applied. No incidents recorded.
Final discharge	Contaminants above consent to discharge levels	Canal, Rivers	Analysis of zinc and nickel.	2	3	2	12	BAT applied. No incidents recorded.

Reviewed by: Richard Chater **Review date: 21/06/2024** **Next Review date: Jun-25**

Task/Activity: **Uncontrolled release of gases** Date Created: **21/06/2024**

Author: **Richard Chater** Position: **Group HSE & Technical Support Manager**

Aspect	Potential Release mode	Receptor	Control Measure	Likelihood	Severity	Detection	RPN	Comments / Actions.
Oxidation of chelates using sodium hypochlorite	Mixing of sodium hypochlorite with acids or passivates generating chlorine gas	Atmosphere, local neighbourhood	IBC bunded and kept on hard standing away from acidic materials, hypochlorite transferred to 25 litre containers for transport around site	1	4	2	8	
Effluent treatment	Mixing of bulk stored hydrochloric acid and sodium hydroxide liquor	Atmosphere, local neighbourhood	Tanks are of inert material construction and contained within bunding. Bulk storage inlets are individually locked; delivery procedure. Training and awareness of operators.	1	3	2	6	
Effluent treatment	Accidental release of Hydrogen Cyanide by mixing Cyanide with acid (HCl)	Atmosphere, local neighbourhood	Chemicals are stored in separate areas with bunding and locked gages. Alarms in effluent to control pH. Training of operators. Separated bunds on all plants.	1	4	2	8	

Reviewed by: Richard Chater **Review date:** **21/06/2024** **Next Review date:** **Jun-25**

Task/Activity: **Off-site waste transfer** Date Created: **21/06/2024**

Author: **Richard Chater** Position: **Group HSE & Technical Support Manager**

Aspect	Potential Release mode	Receptor	Control Measure	Likelihood	Severity	Detection	RPN	Comments / Actions.
General waste	Materials spilt from skip	Ground, water scources	Reputable waste contractor used. Copy of current licence retained. Weekly site walk over. Monthly reporting on waste removed from site.	2	1	2	4	Duty of care complete
Filter cake for landfill	Material spilt from skip. Leachate enters ground water after landfill.	Ground, water scources	Reputable waste contractor used. Daily checks on volume in skip. Monthly reporting on waste removed from site. Duty of Care Audit completed at landfill site. Annual analyses of filter cake to establish material is correctly described.	1	3	2	6	Analysis completed annually
Spent Alkaline solutions	Leak from tanker	Ground, water scources	Tanker loading procedure. Control of contractors' procedure. Reputable waste carrier	2	3	1	6	Duty of care complete
Spent hydrochloric acid	Leak from tanker	Ground, water scources	Tanker loading procedure. Control of contractors' procedure. Reputable waste carrier	2	3	1	6	Duty of care complete

Reviewed by: Richard Chater **Review date:** **21/06/2024** **Next Review date:** **Jun-25**

Task/Activity: **Electrophoretic plant** Date Created: **21/06/2024**

Author: **Richard Chater** Position: **Group HSE & Technical Support Manager**

Aspect	Potential Release mode	Receptor	Control Measure	Likelihood	Severity	Detection	RPN	Comments / Actions.
Electrophoretic painting	Spillage	Effluent plant	Plant design Planned preventative maintenance Training Material has very mild effect on the environment	1	1	2	2	None
Application of sealant	Spillage	Effluent plant	Plant design Planned preventative maintenance Training Material has very mild effect on the environment	1	1	2	2	None
Drying and curing	Temperature too high – wasted energy	Environment	Thermostat PLC Continuous temperature display Training Planned	1	1	2	2	None
	Components overcured - rejects	Environment Effluent plant	Thermostat PLC Continuous temperature display Training Planned	1	1	2	2	None

Reviewed by: Richard Chater **Review date:** **21/06/2024** **Next Review date:** **Jun-25**

Task/ Activity: **Flood** Date Created: **21/06/2024**

Author: **Richard Chater** Position: **Group HSE & Technical Support Manager**

Aspect	Potential Release mode	Receptor	Control Measure	Likelihood	Severity	Detection	RPN	Comments / Actions.
Flood	Overflow of tanks	Ground, water courses	On site effluent treatment plant. Plants are bunded with access to spill kits and portable pumps	1	4	2	8	None
Flood	Local flooding from sudden down pour etc	Ground, water courses	On site effluent treatment plant. Plants are bunded with access to spill kits and portable pumps. Location of plant is good distance from rivers or other flood plain risks.	1	4	2	8	None

Reviewed by: Richard Chater **Review date:** **21/06/2024** **Next Review date:** **Jun-25**

Task/Activity: **Zinc and Zinc Nickel plants** Date Created: **21/06/2024**

Author: **Richard Chater** Position: **Group HSE & Technical Support Manager**

Aspect	Potential Release mode	Receptor	Control Measure	Likelihood	Severity	Detection	RPN	Comments / Actions.
Alkaline Soak Cleaning	Tanks overfilled	Effluent plant	Training	2	2	2	8	None
	Leak in Tank	Effluent plant	Lined tanks Planned preventative maintenance Visual Solution analysis Effluent monitoring	1	2	2	4	None
Electro Clean	Tanks overfilled	Effluent plant	Training	2	2	2	8	None
	Leak in Tank	Effluent plant	Lined tanks Planned preventative maintenance Visual Solution analysis Effluent monitoring	1	2	2	4	None
Acid Pickling	Tanks overfilled	Effluent plant	Training	2	2	2	8	None
	Leak in Tank	Effluent plant	Lined tanks Planned preventative maintenance Visual Solution analysis Effluent monitoring	1	2	2	4	None
Rinsing	Rinse over-flowing	Effluent plant	Visual checks, weir system	1	1	2	2	None
	Rinse flowing too quickly (wasting water)	Effluent plant	Weekly meter reading cross checks	2	1	2	4	None
Electroplating	Leak in tank or when transferring to and from storage tank	Effluent plant	Lined tanks, pipework. Planned preventative maintenance Training Visual Solution analysis Effluent monitoring	2	3	2	12	BAT applied. Regular maintenance on pumps and pipework.
	Drain pause too short to allow sufficient drainage	Effluent plant	Automatic programs - fixed time.	1	2	2	4	None
Passivation & topcoats	Tanks overfilled	Effluent plant	Training	2	2	2	8	None
	Leak in Tank	Effluent plant	Lined tanks Planned preventative maintenance Visual Solution analysis Effluent monitoring	1	2	2	4	None
Drying	Components over heated	Environment – wasted energy	Thermostat Plant plc Continuous digital displays Standard operating procedures Plant audits	1	2	2	4	None

Reviewed by: Richard Chater **Review date:** **21/06/2024** **Next Review date:** **Jun-25**

Task/ ~~Activity~~ : **Zinc Phosphating Plant** Date Created: **21/06/2024**

Author: **Richard Chater** Position: **Group HSE & Technical Support Manager**

Aspect	Potential Release mode	Receptor	Control Measure	Likelihood	Severity	Detection	RPN	Comments / Actions.
Alkaline Soak Cleaning	Tanks overfilled	Effluent plant	Training	2	2	2	8	None
	Leak in Tank	Effluent plant	Lined tanks Planned preventative maintenance Visual Solution analysis Effluent monitoring	1	2	2	4	None
Acid Pickling	Tanks overfilled	Effluent plant	Training	2	2	2	8	
	Leak in Tank	Effluent plant	Lined tanks Planned preventative maintenance Visual Solution analysis Effluent monitoring	1	2	2	4	
Rinsing	Rinse overflowing	Effluent plant	Visual checks, weir system	1	1	2	2	
	Rinse flowing too quickly (wasting water)	Effluent plant	Weekly meter reading cross checks	2	1	2	4	
Pre-warming	Temperature too high	Environment-wasted energy	Thermostat	2	1	2	4	
Phosphating	Leak in tank or when transferring to and from storage tank	Effluent plant	Lined tanks, pipework. Planned preventative maintenance Training Visual Solution ~~analysis~~ Effluent monitoring	2	3	2	12	BAT applied. Regular maintenance on pumps and pipework.
	Drain pause too short to allow sufficient drainage	Effluent plant	Automatic programs - fixed time.	1	2	2	4	
Drying	Components over heated	Environment – wasted energy	Thermostat Plant plc Continuous digital displays Standard operating procedures Plant audits	1	2	2	4	

Reviewed by: Richard Chater **Review date:** **21/06/2024** **Next Review date:** **Jun-25**

Task/Activity : **Low Risk Aspects** Date Created: **21/06/2024**

Author: **Richard Chater** Position: **Group HSE & Technical Support Manager**

Aspect	Potential Release mode	Receptor	Control Measure	Likelihood	Severity	Detection	RPN	Comments / Actions.
Asbestos	Crumbling or impact damage	Atmosphere	Full asbestos survey carried out Procedure available if work required on asbestos containing roof panels. ** include in Ano H&S Manual ** Asbestos resurveyed 2023	2	2	2	8	None
Heating of water for domestic use	Excessive energy useage	Atmosphere (CO2)	Except for central heating all other water is warmed on demand in small quantities.	1	2	1	2	None
Electricity for processing	Excessive energy used	Atmosphere (CO2)	Regular reviews on energy usage monitored at operations meetings	1	2	2	4	None
Electricity for air conditioning	Excessive energy used	Atmosphere (CO2)	Only small units installed – impact minimal	1	1	1	1	None
Vehicle parking	Fluid spillage	Staff, surface water	Site walkovers – weekly environmental Audit. Spill kits available & flooring condition inspected as part of ppm. Personnel trained in safe use of spill kits.	2	1	1	2	None
Process material containers of materials in use around site	Leakage	Floor – effluent treatment plant	Site inspections by management team on rota basis Results discussed at operations meetings Specific locations for containers remaining in place for long periods Concrete floor	2	2	2	8	None
Noise	Noise polution	Residents	Procedure in place to ensure rear loading door in closed at 7.00 pm each night. Noise survey carried out across boundary 10 times per year	3	1	2	6	None
Light	Visible outside premises	Local residents	Minimal external lighting	2	1	1	2	None
Odours	Atmosphere	Residents	Local exhaust ventilation systems built to regulatory standards MCERTS consultants carry out independent measurements. Permitted site – Local Authority inspections	2	2	2	8	None
Delivery and collection of works orders	Engine emissions	Atmosphere	Transport company has third party certification Duty of Care audit Transport managers Customer liaison	2	2	1	4	None
Surface water run-off	Pollutants carried by water	Surface water	Drains marked Site walkover and drainage channels at front of building to return run off to effluent.	1	3	2	6	None
Visual aspects	Unsightly to neighbours	Residents	Regular site walk over audits. Scheduled removal of waste skips from front of building Contracted gardener	2	1	2	4	None

Reviewed by: Richard Chater **Review date:** **21/06/2024** **Next Review date:** **Jun-25**

Plating and Phosphating Pretreatment

Process	Accidental Release Mode	Receptor	Control Measures	Risk				Comments
				Severity	Likelihood	Detection	RPN	
Alkaline Cleaning	Tank overfilled	Drainage System Effluent Plant	Operator Training	4	3	1	12	Satisfactory
	Leak in Tank		Planned preventative Maintenance Tank Inspections Visual Lined Tank Effluent Monitoring	6	2	1	12	Satisfactory
Acid Pickling	Tank overfilled	LEV System Atmosphere	Operator Training Scrubbers	6	3	1	18	Satisfactory
	Leak in Tank	Drainage System Effluent Plant	Planned preventative Maintenance Tank Inspections Visual Lined Tank Effluent Monitoring	6	2	1	12	Satisfactory
Rinsing	Rinsing insufficient	Subsequent Process	Shift Check Lists	2	2	2	8	Ensure Check Lists are completed
	Rinses overflowing	Drainage System Effluent Plant	Visual Shift Check Lists	1	2	2	4	Satisfactory
	Rinses flowing too quickly - wasting water	Drainage System Effluent Plant	Visual Shift Check Lists Meter Readings	1	3	1	3	Investigate further Use of Flow Restrictors

Barrel and Rack Zinc Plating and Zinc Nickel Alloy Plating

Process	Accidental Release Mode	Receptor	Control Measures	Risk				Comments
				Severity	Likelihood	Detection	RPN	
Loading components into barrels or on to jigs	Nil							
Addition of solid process materials to solutions	Spillage	Floor, Drainage System, Effluent Plant	Training Spill Kits Bunds Effluent Plant Where practicable. additions are made to off-line tanks with stirrers, rigid pipework pumps, valves	3	2	1	6	Satisfactory
Addition of liquid process materials to solutions	Spillage	Floor, Drainage System, Effluent Plant	Training Spill Kits Bunds Effluent Plant Small quantities added per unit time Where practicable. metering pumps are used to automatically dose	2	2	1	6	Satisfactory
Retention of solutions in process tanks	Tank leaks	Floor, Drainage System, Effluent Plant	Gullies/bunding to guide solutions to correct side of the Effluent Treatment Plant All tanks are internally lined to reduce the likelihood of solution corroding process tanks. Planned preventative maintenance includes frequent emptying of tanks and lining inspections	6	1	1	6	Change to acid zinc would significantly reduce the hazard posed by a solution leak
Drag out of solution to subsequent rinses and processes	Process solution drag out excessive	Effluent Plant	Programmed plants with drain pauses sufficient to drain loosely adherent liquid Routine analysis	2	2	4	16	The use of drag-in, drag-out stations on new lines would reduce plating solution drag out
Application of torque modifiers / top coats	Nil							
Transfer of process solutions to incompatible solutions via barrels or flight bars	Evolution of heat /toxic gases due to chemical reaction causing danger to persons in the vicinity	Workplace	Programmed plants	8	1	2	16	Change to acid zinc would eliminate the possibility of toxic gases being evolved
Drying	Energy wastage	Environment	Temperature displays Over temperature cut-outs Scheduled calibration Energy use monitoring	1	1	3	3	Satisfactory
Cleaning and processing	Components not finished to correct specification. Parts have to be stripped and reprocessed	Environment	Control plans Planned preventative maintenance Training procedures Automated temperature control Solution analysis Equipment calibration	5	3	1	15	

Barrel Zinc Phosphating

Process	Accidental Release Mode	Receptor	Control Measures	Risk				Comments
				Severity	Likelihood	Detection	RPN	
Loading components into barrels	Nil							
Addition of basic chemicals to process tanks	Spillage	Floor, Drainage system, Effluent plant	Powders can be cleared with relative ease Training procedures Spill kit training Accidental release clean up procedures Bunded process tanks	3	2	1	6	Satisfactory
Addition of proprietary solutions to process tanks	Spillage	Floor, Drainage system, Effluent plant	Phosphate automatically dosed with metering pump Oil additions are small volume and infrequent. Training Bunded process tanks	2	1	1	2	Satisfactory
Retention of solutions in process tanks	Leakage	Floor, Drainage system, Effluent plant	Visual Shift changeover check lists Planned preventative maintenance Tank inspections carried out when process tanks emptied Tanks lined to minimise corrosion of steel by process solutions	5	1	1	5	Satisfactory
Drag out of process solutions	Drag out excessive causing contamination of subsequent process solutions and excessive contamination of rinses	Effluent treatment plant Greater necessity to correct solution parameters so increase in material consumption per unit output	Programmed transporter movements to ensure carry over is at a minimum Solution analyses Effluent monitoring	3	1	3	9	Satisfactory
Transfer of barrels to incompatible solutions	Evolution of heat causing a hazard to persons in the vicinity	Factory environment	Alkaline cleaner is relatively weak, there is low likelihood of a violent reaction occurring. Programmed plant	3	1	1	3	Satisfactory
Heating of process solutions	Specified temperature range not achieved.							
Drying	Wasted heat energy	Environment	Automated temperature control Scheduled calibration Over temperature control Data logger checks of temperature profile	1	2	1	2	Satisfactory

Electrophoretic Painting

Process	Accidental Release Mode	Receptor	Control Measures	Risk				Comments
				Severity	Likelihood	Detection	RPN	
Alkaline Cleaning	Tank overfilled	Drainage System Effluent Plant	Operator Training	4	3	1	12	Satisfactory
	Leak in Tank		Planned preventative Maintenance Tank Inspections Visual Lined Tank Effluent Monitoring	6	2	1	12	Satisfactory
Phosphate pre-treatment	Tank overfilled	Drainage System Effluent Plant	Operator Training	2	3	1	6	Satisfactory
	Leak in Tank		Solution content constitutes little environmental impact. Planned preventative maintenance. Lined tank. Tank inspections. Visual. Shift changeover checklists	2	2	1	4	Satisfactory
Phosphating	Tank overfilled	Drainage System Effluent Plant	Operator Training	6	2	1	12	Satisfactory
	Leak in Tank		Planned preventative maintenance. Lined tank. Tank inspections. Visual. Shift changeover checklists	6	2	1	12	Ensure Check Lists are completed
Painting	Leak in Tank	Drainage System Effluent Plant	Solution content constitutes little environmental impact. Planned preventative maintenance. Lined tank. Tank inspections. Visual. Shift changeover checklists	2	2	1	4	Ensure Check Lists are completed
Rinsing	Rinsing insufficient	Subsequent Process	Shift Check Lists	2	2	2	8	Ensure Check Lists are completed
	Rinses overflowing	Drainage System Effluent Plant	Visual Shift Check Lists	1	2	2	4	Satisfactory
	Rinses flowing too quickly - wasting water	Drainage System Effluent Plant	Visual Shift Check Lists Meter Readings	1	3	1	3	Investigate further use of flow restrictors
Drying and curing	Wasted heat energy Painted coating incorrectly cured	Environment	Automated temperature control Scheduled calibration Over temperature control Data logger checks of temperature profile	1	2	1	2	Satisfactory

Appendix B: Climate Change Risk Assessment

Task/Activity: Climate Change

Creation Date: 24.04.2024

Prepared by: R. Chater

Position: HSE & Technical support manager

Page 1 of 2

Hazard Identification	Associated Risk	Environmental impact	Existing Controls	Likelihood	Severity	Risk Rating	Comments / Actions required	After review Likelihood	After review Severity	After review Current Risk Rating
Summer daily temp increasing to 40 deg c +	Impact 1: Potential expansion of stress of plant, pipework and fittings. Leaks of polluting chemistry.	Contaminating ground water and Canal.	Pipework currently CPVC – temp up to 93 deg c. Test: Place CPVC pipework with glued elbow into NSS for 1 week and check for damage, leaks, hardness of the plastic.	1	4	4	Where necessary consider changing to stainless / mild steel. Ensure no UPVC is used.	1	3	3
	Impact 2: Increase in dust emissions	N/A								
	Impact 3: Increase in Odour from the site.	N/A								
	Impact 4: Increase in fugitive emissions.	N/a								
	Impact 5 & 6: Increase in water / energy consumption for cooling purposes.	Increase in use of mains water.	Water for heat exchangers is currently mains water on a recirc back to header tank.	2	2	4	Change to borehole water. Change from Cyanide Zinc to acid Zinc as this requires less power to cool solution.	1	2	2
Winter daily temp – Extreme cold	Impact 1: Failure of trace heating systems. Freezing pipework.	Contaminated water stream to drain.	Drain water pipework and systems during shutdowns or long down times. Usually 24/7 production. Effluent plant shuts down if reagents are not working. Test: Check control panel critical systems are working correctly.	2	2	4				
	Impact 2: Pipework fractures	Contaminated water stream to drain.	Usually 24/7 production. CPVC can be used as low -26 deg c. Bunded areas.	2	2	4				

	Impact 3: Failure of pH control.	Contaminated water stream to drain.	Usually 24/7 production. CPVC can be used as low -26 deg c. Bunded areas. Effluent plant shuts down if reagents are not working. Also Caustic pearl is available.	1	3	3				
	Impact 4: Frozen onsite roadways / carparks	n/a. Company cannot operate if factory is unsafe for personnel and customers / suppliers.	Weekly HSE audit to check on Salt levels and safety of ground floor.	2	2	4				
	Impact 5: Damage to site infrastructure from snow – loading over extending periods	ASK FOR ADVISE – Enviro agency								
Daily extreme rainfall	Impact 1: Flooding could lead to increased site surface water and flash flooding	Site not near to any natural water sources such as rivers.	Drain systems lead to effluent plant. Drainage system to be inspected yearly. All chemicals stored within factory building. Waste tankers are situated on off floor frames.	2	1	2				
	Impact 2: The site may experience reduced access or egress due to site flooding.	Access to factory is on a flat road. Near to bus routes.	Good site drainage.	1	1	1				
Average winter rainfall	Impact 1: This could lead to overland flow or groundwater flooding	Potential to cause chemistry to wash onto floor an into local drains.	Chemistry stored inside building. Bunding used for ibc's. Good drainage to effluent plant around site.	1	2	2				
	Impact 2: Increased risk of flooding and associated impacts, as previously identified.	Potential to cause chemistry to wash onto floor an into local drains.	Use up to date flood warning information gov website to find out short- and long-term forecasts. https://www.gov.uk/check-flooding	1	3	3				
	Impact 2:	Potential to cause chemistry to wash onto	Up to date site condition report	1	1	1				

		floor an into local drains.								
	Impact 2:	Potential to cause chemistry to wash onto floor an into local drains.	New guttering installed on roofs of all building	2	1	2				
	Impact 2:	Potential risk of electrocution and fire.	Keep electrical equipment off ground level at all times	1	1	1				
	Impact 2:	Potential to cause chemistry to wash onto floor an into local drains.	All holding tanks must be off the ground	1	2	2				
	Impact 2:	Potential to cause chemistry to wash onto floor an into local drains.	Site disaster recovery plan	1	2	2				
Sea Level Rise	Impact 1: If located near the coast a site could experience risk of flooding and corrosion	N/a	Site is based in Midlands N/A							
Drier Summers	Impact 1: Potential increased use or reliance on mains water for dust suppression and cleaning	n/a	Borehole water has now been installed.							
	Impact 2: There is potential for increase in dust emissions from site.	n/a	n/a							
River flow	Impact 1: Reduced dilution available in receiving watercourse for discharge of effluent, resulting in increased pollution.	n/a	No river close to factory							
Storms	Impact 1: Storms and high winds could damage building structures.	Potential structural damage.	Maintain building integrity – annual checks on ppm	1	3	3				
	Impact 1:	Potential structural damage.	Review wind loading calculations	1	2	2				

Reviewed by: R. Chater Date: 24/04/2024

Revision date: April 2026

Appendix C: Air Quality Screening Assessment

GLOBAL AIR QUALITY

ANOCHROME

Air Quality Screening Assessment

Anochrome Ltd

July 2024

This report has been prepared by Global Air Quality Ltd with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

Document Issue Log

Issue	Description	Date	Approved
1	Air Quality Assessment	23/07/2024	SI

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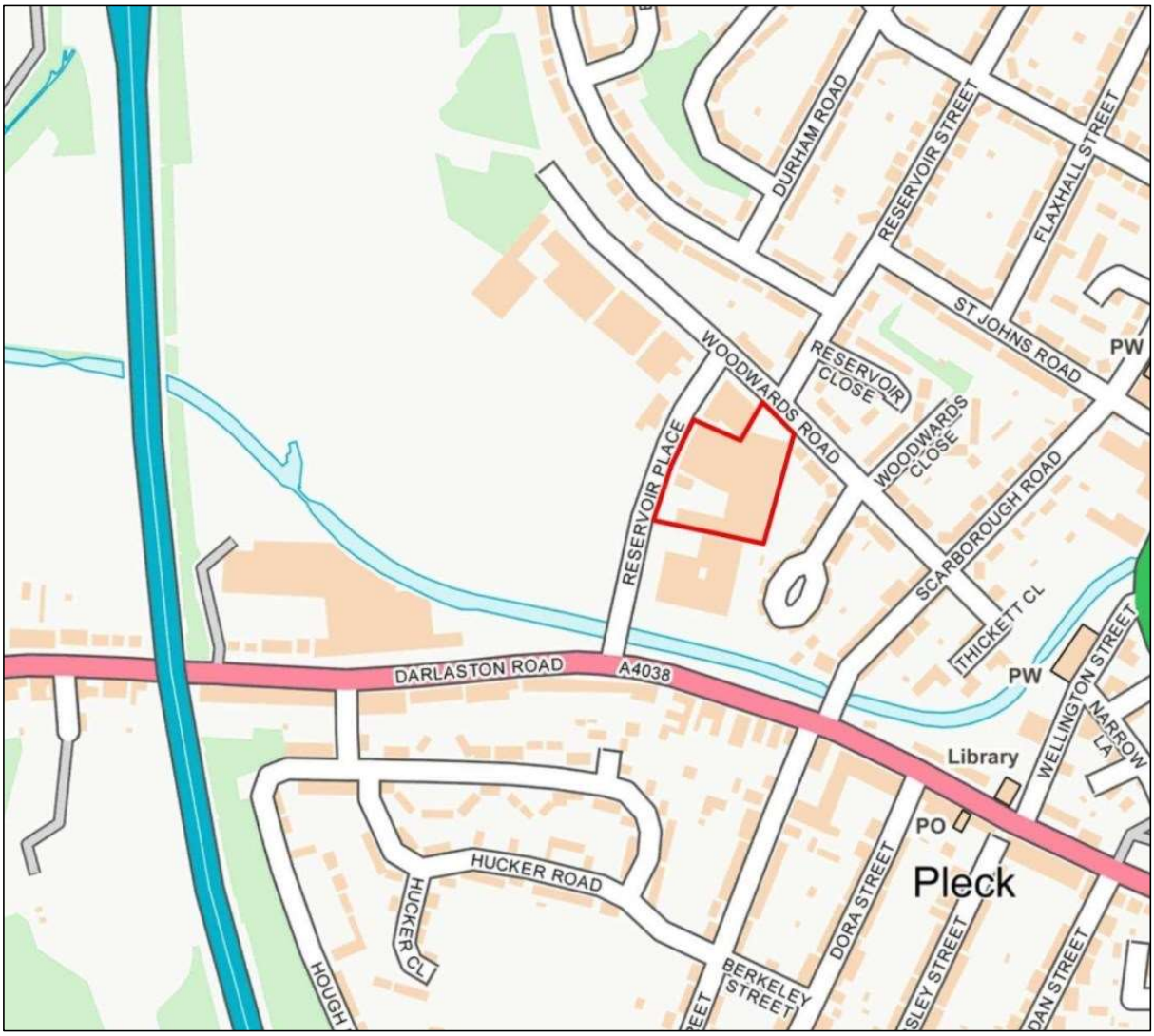
1 Introduction

Global Air Quality has been commissioned by Anochrome Ltd to undertake a screening assessment to determine potential air quality impacts associated with the proposed upgrade of their electroplating facility at Reservoir Road, Walsall, WS2 9RZ.

The Anochrome Site is located approximately 1.5 km southwest of Walsall town centre. There are existing residential properties adjacent to the Site to the east and to the north beyond Woodwards Road. The James Bridge Copper Social Club is opposite the Site on Reservoir Road. Land uses immediately to the west and south of the Site are predominantly industrial. The location of the Site is presented in Figure 1.1.

Figure 1.1: Site Location

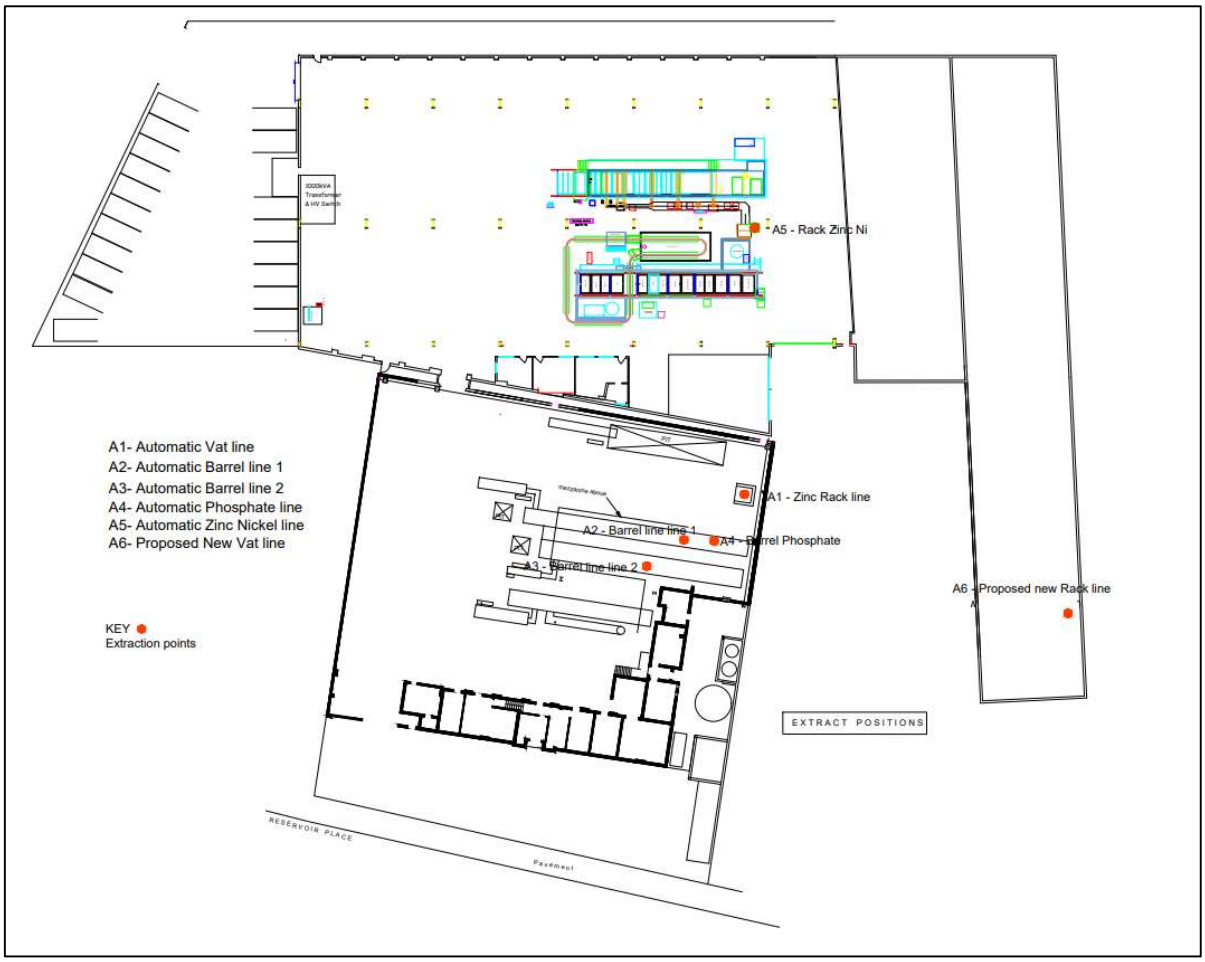


The primary emission to air associated with the Site is hydrogen chloride gas (HCl). Emissions of HCl from the following sources at the facility are regulated by the Environment Agency under the current Permit (EPR/BN0112IN/V002):

- A1 – Automatic Vat Line Scrubber Vent
- A2 – Automatic Barrel Line 1 Scrubber Vent
- A3 – Automatic Barrel Lane 2 Scrubber Vent
- A4 – Automatic Phosphate Plant Scrubber Vent
- A5 – Automatic Zinc Nickel Plating Line

As part of the upgrade of the facility, it is proposed to replace emission point A1 with a new Vat Line (A6). The location of the existing and proposed emission points is presented in Figure 1.2

Figure 1.2: Existing and Proposed Emission Points



The assessment utilises the Environment Agency's screening methodology to assess the potential impact of the proposed new emission point on local air quality. The methodology is deliberately conservative and is designed to either screen out insignificant releases to air or identify whether further assessment is required.

2 Regulatory Context

2.1 Emission Benchmark

The Environment Agency's (EA's) Guidance Note EPR 2.07 'The Surface Treatment of Metals and Plastics by Electrolytic and Chemical processes' provides indicative Best Available Technology (BAT) benchmarks for point source emissions to air from Part A(1) facilities. For HCl, the benchmark level is 10 mg/Nm^3 (reference conditions: STP, dry gas).

2.2 Assessment Criteria

The applicable Environmental Assessment Level (EAL) for HCl, as specified by the Environment Agency's Risk Assessment Guidance[1] is 750 µg/m^3, as a 1-hour mean. The EAL is based on guidelines recommended by the Expert Panel on Air Quality Standards (EPAQS)[2].

There is currently no appliable EAL for long-term impacts on human health.

[1] Air emissions risk assessment for your environmental permit, Environment Agency and Defra, May 2024
[2] Guidelines for Halogen and Hydrogen Halides in Ambient Air for Protecting Human Health Against Acute Irritancy Effects, EPAQS, 2006

3 Methodology

The EA screening methodology has been developed to rapidly identify potentially significant air quality impacts that require further, more detailed, assessment. The methodology provides a conservative estimate of annual and hourly mean process contributions (PC) arising from a specified Release Rate (RR) using long and short-term dispersion factors (DF) as follows:

$$PC = RR \times DF$$

The DFs provided within the risk assessment guidance are derived from detailed dispersion modelling and represent the maximum average ground level concentrations that would arise from a mass emission rate (RR) of 1 g/s. DFs are provided for a range of effective stack heights (Ueff), a parameter which is dependent on the height of the proposed stack compared with the height and proximity of nearby buildings. Where the release height is less than 3m above the building on which it is located, the effective stack height is zero.

The following criteria are applied to assess the significance of potential impacts and are designed to ensure that there is a substantial safety margin to protect human health.

Stage 1

A process contribution (PC) is potentially significant if:

- The long-term PC > 1% of the long-term EAL
- The short-term PC > 10% of the short-term EAL

Stage 2

If the Stage 1 screening criteria are not met, the PC should be considered in combination with relevant ambient background pollutant concentrations. The air quality standards are likely to be met if:

- The long-term PC + background concentration < 70% of the EAL
- The short-term PC < 20% of the (EAL – short-term background concentration)

Where a PC does not meet the Stage 1 or Stage 2 screening criteria, a detailed assessment of potential impacts is required.

4 Existing Baseline

Ambient monitoring of hydrogen chloride was carried out as part of the Defra Acid Gases and Aerosols Network (AGANet) at several rural locations around the UK until 2015. The closest AGANet monitoring sites to the Anochrome facility are at Sutton Bonington, in south-west Nottinghamshire and Rosemaund in Herefordshire. In 2015, the annual mean HCl concentrations measured at these locations was 0.19 and 0.26 µg/m^3. Ambient HCl concentrations are currently measured at just two locations, EMEP (the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe[3]) supersites at Chilbolton Observatory near Southampton and Auchencorth Moss in Eastern Scotland. The 2022 UKEAP (UK Eutrophying and Acidifying Atmospheric Pollutants) summary for Defra[4] reports annual mean HCl concentrations at Chilbolton Observatory and Auchencorth Moss of 0.038 µg/m^3 and 0.14 µg/m^3, respectively.

HCl emissions are primarily associated with the combustion of fuel that contains trace quantities of chlorine. The National Atmospheric Emissions Inventory (NAEI)[5] reports that emissions of HCl have fallen by 98% since 1990, primarily due to the reduction in coal-fired power stations.

The Anochrome facility is in an urban location where there is the potential for anthropogenic sources of HCl. However, in the absence of recent local monitoring data, the annual mean concentration measured at Rosemaund in 2016 of 0.26 µg/m^3 is assumed to be representative of the existing long-term background concentration at the Site for the purposes of the assessment. In accordance with the EA's risk assessment guidance, the short-term (1-hour mean) background concentration is assumed to be twice the long-term background concentrations (0.52 µg/m^3), just 0.74% of the EAL of 750 µg/m^3.

[3] https://emep.int/
[4] UKEAP 2022 annual report, CEH & Ricardo, August 2023
[5] https://naei.beis.gov.uk/

5 Predicted Impacts

5.1 Emissions

A summary of the emission parameters for the existing (A1 to A5) and proposed (A6) sources is presented in Table 5.1. The proposed new VAT Line (A6) will be fitted with a scrubber which will ensure a maximum HCl emission concentration of 2.5 mg/Nm^3, well below the BAT benchmark of 10 mg/Nm^3.

Table 5.1: Existing and Proposed Source Emissions

Parameter / Source	A1	A2	A3	A4	A5	A6
Stack height (m)	10.1	10.1	10.0	10.1	10.9	13.4
Actual Flow Rate (m^3/h)	9,407	6,048	6,056	11,048	24,559	60,000
Normalised Flow Rate (Nm^3/h) (c)	8,340	5,390	5,370	9,840	22,150	54,898
Temperature (K)	300	299	301	299	301	293
Moisture Content (%vol)	1.8	1.7	2.0WS2	1.8	1.6	1.8
Annual operation (h)	6,912	6,912	6,912	6,912	6,912	6,912
HCl Emission Concentration (mg/Nm^3)	7.0	1.6	1.1	0.36	7.56	2.5
HCl Emission Rate (g/s)	0.016	0.0024	0.0016	0.0010	0.047	0.038
(a) Proposed stack height (b) Reference conditions: STP, dry						

5.2 Stage 1 Screening

A summary of the stage 1 screening calculation for the existing and proposed emission sources at the site is presented in Tables 5.2 and 5.3, respectively. As discussed, there is no long-term EAL for HCl and therefore the screening assessment has been undertaken for short-term impacts only.

In accordance with the EA's risk assessment guidance, an effective stack height (Ueff) has been calculated for each source, which takes into account the potential effect of nearby buildings on the dispersion of the plume as follows:

$$Ueff = 1.66(Uact – H)$$

where,

H = tallest building height within a distance of 5 times the height of the building on which the stack is located; and

Uact = actual stack height

The existing stacks (A1, A2, A3, A4 and A5) protrude less than 1m above the ridge building and therefore as discussed, Ueff is zero.

The proposed stack height for A6 is 13.4m, 4.2m above the ridge height of 9.2m. The highest building within 46m of the new stack is 10.5m, therefore Ueff is calculated to be 4.8m.

Table 5.2: Stage 1 Screening Calculation (Existing Operation)

Parameter / Source	**A1**	**A2**	**A3**	**A4**	**A5**
Stack height (m)	10.1	10.1	10.0	10.1	10.9
Building ridge height (m)	9.4	9.4	9.4	9.4	10.5
Stack height above ridge (m)	0.7	0.7	0.6	0.7	0.4
Effective Stack Height, Ueff (m)	0 (a)	0 (a)	0 (a)	0 (a)	0 (a)
Release Rate (g/s)	0.016	0.0024	0.0016	0.0010	0.047
Total 1-Hour Mean PC (µg/m^3)			264		
EAL (µg/m^3)			750		
PC as a percentage of EAL			35.2%		
(a) Stacks terminate < 3m above roof ridge.					

Table 5.3: Stage 1 Screening Calculation (Proposed Operation)

Parameter / Source	**A2**	**A3**	**A4**	**A5**	**A6**
Stack height (m)	10.1	10.0	10.1	10.9	13.4
Building ridge height (m)	9.4	9.4	9.4	10.5	9.2
Stack height above ridge (m)	0.7	0.6	0.7	0.4	4.2
Effective Stack Height, Ueff (m)	0 (a)	0 (a)	0 (a)	0 (a)	4.8
Release Rate (g/s)	0.0024	0.0016	0.0010	0.047	0.038
Total 1-Hour Mean PC (µg/m^3)			289		
EAL (µg/m^3)			750		
PC as a percentage of EAL			38.5%		
(a) Stacks terminate < 3m above roof ridge.					

The PC for both existing and proposed operation is less than 40% of the EAL. The change in the PC between the existing and proposed scenarios is 24 µg/m^3, which is 3.3% of the EAL. In accordance with the guidance, the impact of the new source is *not significant* and Stage 2 screening is not required.

6 Summary and Conclusions

A screening assessment has been undertaken in accordance with the Environment Agency Risk Assessment guidance to assess whether hydrogen chloride emissions associated with the proposed upgrade of the Anochrome electroplating facility in Walsall has the potential to significantly affect local air quality. The proposed upgrade would replace the existing VAT line stack (A1) with a new VAT line stack (A6), in an adjacent building. The new stack will be fitted with a scrubber which will ensure a maximum HCl emission of 2.5 µg/Nm^3, well below the BAT benchmark.

The H1 tool (v9.2) has been used to calculate the potential impact on ground-level HCl concentrations. Both the existing and proposed impacts are less than 40% of the short-term EAL of 750 µg/m^3. The predicted increase in the 1-hour mean PC, following the upgrade, is 2**4** µg/m^3 (3.3% of the EAL). In accordance with the guidance, the impact of the proposed upgrade is therefore *not significant* and further assessment is not required.