Permit Application Notes for Vector Aerospace International Ltd

- **Application for Permit to Operate under the Environmental Permitting Regulations 2016 Surface Treatment of Metals, EPR 2016, Schedule 1, Part 2, Section 2.3, Part B.**
- **Application for Permit to Operate under the Environmental Permitting Regulations 2016 Disposal, recovery or a mix of disposal and recovery of non-hazardous waste, EPR 2016, Schedule 1, Part 2, Section 5.4, Part A.**
- **Application for a Permit to Operate under the Environmental Permitting Regulations 2016 Medium Combustion Plant, EPR 2016, Schedule 25A, Part 1 & Part 2.**

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Contents

1.0 Context

Vector Aerospace International Ltd (here after referred to as VAIL), undertake metal treatment processes, the disposal and recovery of non-hazardous waste and the operation of medium combustion plant within designated buildings at its Gosport site that require a permit issued by the relevant enforcement body, the Environment Agency (EA). The Environmental Permitting (England and Wales) Regulations 2016 (EPR 2016) sets out the requirements that should be met when undertaking permitted activities, namely:

- **Surface Treatment of Metals, EPR 2016, Schedule 1, Part 2, Section 2.3, Part B.**
- **Disposal, recovery or a mix of disposal and recovery of non-hazardous waste, EPR 2016, Schedule 1, Part 2, Section 5.4, Part A.**
- **Medium Combustion Plan, EPR 2016, Schedule 25A, Part 1 & Part 2.**

The site's main activity in relation to its Permit application for Surface Treatment of Metals: EPR 2016, Schedule 1, Part 2, Section 2.3 Part B. Surface Treatment of Metals.

Generally, surface treating metal and plastic materials using an electrolytic or chemical process where the aggregated volume of the treatment vats is more than $30m^3$ requires that the Operator holds a Part A Permit. Surface treating metals and plastics materials using an electrolytic or chemical process where the aggregated volume of the treatment vats is less than $30m^3$, and where the process is likely to result in the release into air of any acid forming oxide of nitrogen requires the Operator to hold a Part B Permit. The following guidance has been referenced in the Company's basis for determination and notes for its permit application:

- *1 DEFRA Environmental Permitting: Core Guidance March 2020;
- *2 EA Guidance - The Surface Treatment of Metals and Plastics By Electrolytic and Chemical Process (EPR 2.07) Mach 2009;
- *3 Environmental Permitting Core March 2020;
- *4 European Commission IPPC Reference Document of Best Available Techniques for the Surface Treatment of Metals and Plastics Aug 2006;

The site's main activity in relation to its Permit application for eluent recovery and disposal: EPR 2016, Schedule 1, Part 2, Section 5.4, Part A. Disposal, recovery or a mix of disposal and recovery of non-hazardous waste,

Generally, the disposal of non-hazardous waste with a capacity exceeding 50 tonnes per day involving physio chemical treatment requires that the Operator holds a Part A Permit. The sites effluent treatment plant located within B97 receives non hazardous effluent from NDT and Clean Bay process areas within B110. The capacity of the Effluent treatment plant exceeds the threshold of 50m3 per day and thus a Part A permit for a ERP2016, Schedule 1, 2.5 activity is required.

The site's main activity in relation to its Permit application for medium combustion plant: Medium Combustion Plan, EPR 2016, Schedule 25A, Part 1 & Part 2.

Generally, new and existing medium combustion plant (MCP) exceeding threshold values require a permit. Medium combustion in this context is combustion plant with a rated thermal input of greater than 1 but less than 50 megawatts. The site operates a number of gas fired boilers that are

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within scope of an MCP permit. Emission limit values will apply from specified dates for in scope boilers.

1.1 Installation Details Vector Aerospace International

- Obsolete Permit Details: Permit No. EPR/NP3930KB & EPR/NP3930KB/V002 (Variation)
- Company Name: Vector Aerospace International Ltd
- Address: Fareham Road, Gosport, Hampshire, UK, PO13 0AA
- Companies House Number: 6404274
- National Grid Reference: SU58899 04121

2.0 Permit Applicability

Only the vats specifically carrying out surface treatment count towards the 30 m^3 threshold. Tanks or vats used for the following are not included in the assessment of the treatment volume in relation to the 30 m^3 threshold, nor are trays or enclosures used to contain treatment liquors during spraying operations (even when the latter activities involve chemical change of the surface being treated):

- static or running rinsing
- degreasing or physical cleaning of the surface
- reagent storage or for effluent treatment

Similarly, tanks or vats used for chemical or electrochemical milling or used for electrophoretic coating are considered to be outside the scope of the treatment volume assessment because milling involves dissolution of the body of a work-piece rather than just treatment of its surface, and electrophoretic techniques do not involve any chemical change to the surface of the work. The following list summarises the types of immersion activity which do meet the description of "treatment" (ie. cause chemical change to the surface) and so contribute to the aggregation total for comparison with the 30m3 threshold:

- Electroplating
- Electroless (autocatalytic) plating
- Anodising, Passivation
- Electropolishing
- Pickling
- Activation
- Chromating
- Phosphating
- Bright dipping
- Chemical blacking
- Ddecorative oxidation
- Sstripping (removal of plated metal)
- Post-anodising sealing (both hot water and cold, e.g. with nickel acetate solutions)
- Surface etching (but not "chemical milling").

The following do not meet the description of "treatment ":

- Rinsing

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- Weak acid or alkaline dips to remove residual alkalinity or acidity respectively, from previous treatment stages,
- Alkaline soak cleaning of steel (and other metals that are unreactive under alkaline conditions)
- Electrolytic alkaline soak (except where the polarity is reversible and/or conditions favour metal corrosion)
- Bacterial cleaning
- Colour dying
- Electrophoretic lacquering or painting.

The above guidance has been used in the determination of treatment volumes.

3.0 Release of Oxides of Nitrogen

One of the key issues for the surface treatment of metal is the release into the air of any acid-forming oxide of nitrogen. Typically, where nitric acid is used in the treatment process. Key emissions limits from surface treatment process are:

- Oxides of nitrogen including nitric acid (expressed as nitrogen dioxide) from surface treatment baths = 200mg /m3 expressed as a 30min mean concentration
- Fluoride (expressed as hydrogen fluoride for processes using fluoride slats or hydrofluoric acid) = 5mg/m3
- There should be no emissions of offensive odour outside the site boundary.

4.0 Determination of Treatment Tanks

4.1Determination of Treatment Tanks Containing Nitric Acid:

The Company has the following tanks containing Nitric Acid:

- AEP Process - Tank A3 and A4, Ref Appendix B. (Out of scope of permitting)
- VAIL Clean Bay Building 110 – Tank C5 Ref Appendix A.

The site has the following tanks containing Sulphuric Acid:

- VAIL Nickle Strike Process – Tank 2. Ref Appendix C.

4.2 Determination of All Treatment Tanks:

The Site has the following tanks that are deemed Treatment Tanks:

- VAIL Clean Bay Building 110 - Tank D11, D13 & D14 & C6 Ref Appendix A.
- VAIL Nickle Strike Building 108 – Tanks 2 & 3. Ref Appendix C

As the above processes are considered metal treatment by chemical processes, they potentially fall within the scope of permitting. The total volume of treatment tanks is 3.96.

4.3 Determination of Pre-Treatment Tanks:

Other tanks containing chemical are either regarded as pre-treatment tanks because no physical change occurs to the surface of the metal or rinse tanks. The site has a total volume of 35.87m^3 of pre-treatment tanks containing chemical mixtures associated with the permit application. Details are found within Appendix A, B & C.

5.0 Summary of VAIL Treatment Processes

Vector Aerospace International Ltd are world leading maintenance, repair and overhaul (MRO) organisation of jet engines and aircraft components. Repair and overhaul process include engine and aircraft strip down (disassembly into components parts), component inspection, clean, non-destructive testing, rework, repair, rebuild and test. The Company operates a number of surface treatment process to passivate metal engine parts with a chromium conversion coating. Vector Aerospace International Ltd seek permission to apply for a permit covering the following metal treatment processes.

- VAIL - Clean Bay Building 110, treatment tanks (See Appendix A)

VAIL - Nickle Strike Building 108, treatment tanks (See Appendix C - included for review of applicability by EA See Appendix C)
VAIL - Silver Plate Removal Process Building 110 Laboratory (included for review of applicability by EA)
VAIL - Nital Etch Process Building 110 Laboratory (included for review of applicability by EA)
VAIL *AEP Area Building 112 (included for review of applicability by EA See Appendix B)

The following represents to two main flows of works for treatment activity:
1. Cycle 1 Overhaul or repair – Engine stripped, loaded to stillage and cleaned, NDT then Inspected.
2. Cycle 2 Rework and repair of individual components i.e. post machining, pre and post welding, pre weld or metal spray cleaning and or coating.

The Installation is primarily used to clean aircraft components in accordance with military and engine component supplier specifications. The Installation is also used to apply a Chromium conversion coating to selected parts. The process will typically operate 12 hours per day (6:30am to 6:30pm), Monday to Friday. To ensure fume has been adequately extracted from the plant, the VAIL fume scrubbers are operated by a time switch to start at 5:30 am and to stop at 9:30 pm.

5.0.1 Description of Main Activities

Whilst there are a variety of possible chemical, electrolytic and physical surface treatment processes, VAIL are constrained to the use of the processes prescribed by military specification and aircraft engine manufacturer requirements. The cleaning process comprises a number of vats that contain proprietary cleaning chemicals for grease, scale, paint, plating, and carbon removal. The treatment vat arrangement and chemicals used vary considerably depending on the engine component being cleaned and the nature of the contaminant on the component. Accordingly, there will also be significant variation in the concentration of contaminants released to air and wastewater.

The VAIL Clean Bay contains an ultrasonic cleaning bath that is electrically heated, whilst the other VAIL treatment vats are heated by recirculated thermal oil maintained at a temperature of 180° C to 210° C by a gas fired heater. The oil heater is located within the process building 110, hence any oil spillage will be retained on the concrete floor and removed for offsite disposal following the application of oil absorbent granules. Oil spill containment kits are available within the process building and operators are trained in spill management as part of the ISO14001 Environmental Management System.

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A vapour degreaser is used within the VAIL installation, see section 6.1.8 for further information.

The cleaning process is operated batchwise, with components dipped into a treatment vat for a prescribed period, then lifted out, washed with water and dipped into the next treatment vat. Where practicable, the vats are closed but in any event are continually extracted to prevent the release of a concentrated fume when the lid is opened to immerse or remove the component jig. Principally, contaminants in the vent stack emissions arise from:

- Evaporative losses from the surface of the chemicals within the vats.
- Evaporative and droplet losses from liquid "drag-out" when the component is removed from the treatment vat.

To provide agitation and to remove contaminants, the treatment chemicals are continually pump from the respective vat, through a carbon filter and returned to the vat. The filters are regularly monitored as part of routine maintenance with the spent elements being removed and disposed of off-site. The condition of the treatment chemical within the vats are monitored by sampling and analysis, with the spent chemical being disposed of off-site. Typically, the treatment vats require replenishing up to three times per year. The tanks are washed out by pumping the contents to the "off-haul" storage tanks (for off-site disposal) then removing remaining chemical and sludge with a water pressure jet. This contaminated wash water is also pumped to the "off-haul" tank for off-site disposal.

Water is continually recirculated though the rinse water vats and effluent treatment plant with only a small fresh water make-up to account for losses. The rinse water is contaminated with the liquid "drag-out" which is retained on the component upon removal from the chemical treatment vat. This contaminated rinse water is pumped to the effluent plant for treatment.

Chemical cleaning facilities are required at VAIL as pre-treatment preparation for non-destructive testing. Aircraft engine components, which have previously been stripped down, are cleaned with a variety of acids and alkalis detergents and solvents or mechanically abraded. Following cleaning and associated surface preparation, components are processed through a non-destructive testing regime which chemically involves immersion in a fluorescent penetrant either of water washable or post emulsified product before being washed off and then highlighted by a powder developer storm. Following application of penetrant, the products are inspected. After certification, a number of components are pre-treated to protect their surface in storage and therefore are re-processed through part of the immersion cleaning line.

The Permit application replaces an existing similar Part A authorised process for the surface treatment of metals (helicopter engine components) at the VAIL site.

5.1 VAIL Clean Bay, Building 110

Within the Clean Bay area of building 110 there are 4 rows of treatment tanks, these rows of tanks are numbered row A, B, C and D. Each row contains the chemicals specified within Appendix A.

- Tank row A is equipped with an LEV system and wet scrubber A1.

- Tank rows B & C are equipped with an LEV system which is routed to wet scrubber A2.
- Tank Row D is equipped with an LEV system and routed to wet scrubber A3.

The scrubber's air output is connected to separate stacks 15.1m high. The stack emission points are 3m above the nearest building's roof line. Chemical tanks are used for the cleaning, rinsing and or treatment of metal aircraft parts. The majority of tanks containing chemicals are used for static or running rinsing, for degreasing or physical cleaning of the part surface. There are 4 tanks associated with surface treatment, these tanks are used for chromate conversion coating and/ or pickling as detailed within Appendix A. Tanks containing chemicals may liberate hazardous and or environmentally harmful vapours, gases and mists. At the rear of each tank is an LEV system whose capture velocity has been designed to capture any mist, gas and or vapour produced by the process. The resulting air stream is fed through a wet scrubber system to reduce any potential contaminants before discharge to air via stack.

Wet Scrubber System and Stacks Building 110 (SU 59038 04270, SU 59048 04262, SU 59055 04255)

The scrubbers have a dosing system and use water on a bleed and feed system to keep a constant level of cleanliness, providing the vapour extraction system is correctly operated and maintained, the emissions will not exceed the following for those substances listed below: -

Chromium (VI) and compounds (as chromium):	1 mg per m3
Hydrogen Chloride:	10 mg per m3
Hydrogen Fluoride:	2 mg per m3
Nickel and its compounds (as nickel):	2 mg per m3
Oxides of Nitrogen (total acid forming as NO2):	200 mg per m3
Sulphuric Acid Mist:	5 mg per m3

For the VAIL cleaning lines, it is proven that emissions are significantly lower than that specified above. Where practicable, chemical tank design includes lids to minimise fugitive emissions when not in use. Ducting runs at high level, then exit through the factory wall to one of three scrubber and fan assemblies, then to an exhaust stack on a supporting structure, terminating 3m above the building apex with an efflux velocity of 15m/s in normal operation. The scrubber units are sited in a bund to contain 110% of the maximum volume of liquid within the unit.

Table 6.1.3: Emission limits into air

Parameters	Frequency	Emission Point					
		A1	A2	A3	A4	A5	A6
Heavy metals (excluding Cd) mg/m³	Every twelve months	1.5	1.5	1.5	N/A	N/A	N/A
VOCs (expressed as TOC) mg/m³	Every twelve months	20	20	20	N/A	N/A	N/A
Oxides of Nitrogen mg/m³	Every twelve months	N/A	10	N/A	N/A	N/A	N/A
Trichloroethylene mg/m³	N/A	N/A	N/A	N/A	N/A	N/A	Tank no longer used
Total Cadmium mg/m³	Every twelve months	0.05	0.05	0.05	N/A	N/A	N/A

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Emissions History from the Permitted Installation (Clean Bay Building 110)

Below lists the current Limit & target values as related to the Air Quality Standards (AQS) Regulation 2010. Also listed are limit values specified in permit EPR/NP3930KB:

Cadmium:
- AQS Target Value: 0.000005 mg /m3 in PM10
- Permit Limit Value: 0.05 mg/m3.
- BAT Limit Value: None

Notes: No dust is produced from the scrubbers. Current DEFRA Target values relates to dust in PM10.

VOC's
- AQS Limit/ Target Value: N/A
- Permit Limit Value: 20 mg/m3.
- BAT Limit Value: None.

Notes: No applicable target or limit values except WELs & Historical permit limits. Low level fugitive emissions only from all processes using chlorinated and organic solvents. Vat mixtures have high boiling and flash points. Low fugitive emissions only. Discharge history suggests no issues in relation to human health or environment.

Oxides of Nitrogen expressed as NO2
- AQS Limit Value:0.03 mg per annum
- Permit Limit Value: 10 mg/m3
- BAT Limit Value for Scrubbers: 200mg/m3 (Total forming Acid NO_2) [*2 page 11]

Notes on: 2.6mg/m3 is the highest reading in 3 years. 1.3% of BAT limit. Deminimus emissions. No combustion processes present.

Heavy Metals (Nickle)
- AQS Target Value: 20ng/m3
- Permit Limit Value: None
- BAT Limit Value: 2.0mg/m3.

Notes: May be transferred to air stream via mist. 5% of BAT limit value achieved in last 3 years

Heavy Metals (Chromium VI)
- AQS Limit/ Target Value: None
- Permit Limit Value: None
- BAT Limit Value: 1.0mg/m3

Notes: May be transferred to air stream via mist. 10% of BAT limit value achieved in last 3 years

Emissions to Air History for Building 110, Scrubber Stacks A1, A2 and A3 (2021 to 2023)

A1

Cadmium

- Permit Limit Value: 0.05mg/m3
- Results:
- 2023: 0.0003 mg/m3
- 2022: 0.0005 mg/m3 ,
- 2021: 0.0005 mg/m3 (5X normal background concentrations)

Nickel & Chromium VI

- Permit Limit Values: **1.5mg/m3**
- Results:
- 2023: 0.041 mg/m3
- 2022: 0.104 mg/m3
- 2021: 0.104 mg/m3 (Some traces present)

VOC's

- Permit Limit Value: 20mg/m3
- Results:
- 2023:2.92 mg/m3
- 2022:, 3.7 mg/m3,
- 2021: 3.7 mg/m3 2021. (Not an issue to human health – probably pull from indoor general use and low-level process emissions, normally monitoring associated with organic solvents i.e. vapour degreasers)

<u>A2</u>

Cadmium

- Permit Limit Value: 0.05mg/m3
- Results:
- 2023: 0.0004 mg/m3
- 2022: 0.0005 mg/m3
- 2021: 0.0005 mg/m3

Nickel & Chromium VI

- Permit Limit Value: 1.5mg/m3
- Results:
- 2023: 0.0244 mg/m3
- 2022: 0.035 mg/m3
- 2021: 0.035 mg/m3

VOCs

- Permit Limit Value: 20mg/m3
- Results:
- 2023: 0.44 mg/m3
- 2022: 2.67 mg/m3
- 2021: 2.67 mg/m3

Oxides of Nitrogen expressed as NO2

- Permit Limit Value: 10mg/m3

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- Results:
- 2023: 2.1 mg/m3
- 2022: 2.6 mg/m3
- 2021: 2.6 mg/m3

A3

Nickel & Chromium VI

- Permit Limit Value: 1.5mg/m3
- Results:
- 2023: 0.0193 mg/m3
- 2022: 0.016 mg/m3
- 2021: 0.016 mg/m3

Cadmium

- Permit Limit Value: 0.05mg/m3
- Results:
- 2023: 0.0004 mg/m3
- 2022: 0.0004 mg/m3
- 2021: 0.0004 mg/ m3

VOC's

- Permit Limit Value: 20mg/m3
- Results:
- 2023: 0.5 mg/m3
- 2022: 3.74 mg/m3
- 2021: 3.74 mg/m3

5.2 Segregation & Containment of Inventory

The sites containment strategy is summarised within document 'VAIL Inventory and Containment' Rev 1.1.

Exothermic Reactions in Treatment Baths

Temperature control of treatment baths and avoidance of incompatible materials in the key control measure in avoiding exothermic reactions as per risk assessment. Incidents of exothermic reactions are considered low risk. Treatment tanks are temperature controlled and operate below relevant boiling and flash points. Where there is a potential for reactive material to be placed into a tank, clear signage will be posted to warn of danger. Operators will be instructed on the hazards and risks associated with exothermic reactions.

Segregation of Incompatible Materials

Mixtures of incompatible materials within primary and secondary containment shall be evaluated and where unsafe mixtures may occur by design or loss of containment, control measures shall be applied to ensure such mixtures cannot occur. Please refer to Doc. 'VAIL Inventory & containment Rev 1.1 for an analysis of segregation.

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5.3 VAIL Nickle Strike Process, Building 108

The company wishes to introduce a nickel strike process on engine components to make the surface nickel rich to aid the vacuum brazing process. The nickel strike method that will be employed as follow:

1. Wet grit blast general area to be Nickel plated to remove surface oxides in building 110 clean Bay.
2. The component being plated is degreased using Ardrox 5503 (MIL-PRF-680) at ambient temperature in building 110 clean bay.
3. The areas that requires Nickel enrichment are wiped using MEK or IPA impregnated wipes.
4. The areas to be plated, are mechanically masked and the remainder surface of the component is totally encapsulated in wax to protect against the plating process.
5. The mechanical masking is removed, and the three locations are degreased using Ardrox 5503 (MIL-PRF-680).
6. Abrade the area to be plated with Scotchbrite and pumice powder.

a. Anodically etch parts in solution of Sulphuric acid (S.G. 1.84) – 300ml/l Building 108.
b. Wash part in clean, cold running water building 108.
c. Nickel strike parts in solution (Nickel Chloride 350 ±50 g/l and Hydrochloric Acid 110ml/l) in building 108.

7. Switch off equipment, remove part from plating solution and rinse under clean, cold running water.
8. Remove wax masking by hanging part in an oven set at 100°C until the baulk of the wax is removed (approximately 30 minutes) and immerse part in Ardrox 5414 (dewaxing oil heated at 100°C)in building 110 Clean Bay.
9. Clean part by immersing in Ardrox 6376 (liquid solvent cleaner with corrosion inhibitor) in Building 108.

Technical aspects including VAT design are listed within Appendix C. Since 2019, the largest number of parts requiring treatment in any given year is 15. The time to undertake the process is 12 minutes, there after the VAT will be lidded and sealed to atmosphere. The total time for fume to liberate is 180minitues per year.

Resulting fume will be extracted using a mechanical wall extraction fan and be discharged to atmosphere unabated. Any resulting fume due to the chemical boiling points and process duration is considered deminimus. See H1 assessment tool for further information.

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5.4 VAIL Silver Stripping Process, Lab Building 110

The Silver stripping process is carried out within the fume cabinet located in the laboratory, building 110. The process is used for stripping silver from Rolls-Royce T56/501 bearing separators.

Refer also to ERI T56-7200-11 (Rolls-Royce T56/501 Standard Practice, Strip silver plate from bearing separators) & VAIL procedure – VAIL-OPS-039, CDS-22*.*

Bearing separators are chemically stripped of existing silver plating in accordance with Rolls-Royce procedures. This is carried out on a small scale using 2 - 5 litre plastic containers in a fume cupboard in the laboratory. Two main solutions can be used:

1 Steel Bearing Separators:

- 50% volume nitric acid solution at room temperature.

2 Bronze or Brass Bearing Separators:

- 95% sulphuric acid
- 5% nitric acid
- NO WATER
- room temperature

Immersion times in these acidic solutions can vary, typically the 50% nitric acid will strip the silver plating in less than half an hour, to strip the silver in the 95% sulphuric/ 5% nitric solution can take up to 4 – 5 hours. Solution make-up procedures and safety precautions are covered in the above ERI and CDS-22. Spent waste acid solutions are transferred to a waste IBC containing compatible mixed acid waste. The output air emissions of the fume cabinet are discharged to air, unabated via a stack, the discharge point is approximately 0.5 above the roof line.

NOTE: *It is anticipated that the silver stripping process will be outsourced (either to Vector, Almondbank or sub-contracted to AEM) in the very near future. This will be safer for the operator, save many labour hours and streamline the whole process.*

Environmental considerations

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The use of strong acids can generate spillage capable of attacking concrete floors and subsequently polluting the soil and any groundwater beneath with acid and the dissolved metals. The disposal of used acid stripping solutions may exceed the treatment capacity of effluent systems and is thus disposed off site as hazardous waste. Acid vapour and mists are caused by reaction with the metals. These can cause local air problems, health effects in staff and deterioration of equipment in the installation.

5.5 VAIL Nital Etch Process, Lab Building 110

The Nital Etch process is carried out within the fume cabinet of the laboratory located in building 110. The process is used for chemical etching of grinding marks on Rolls-Royce T56/501 parts.

Refer also to ERI T56-7200-03 (Rolls-Royce T56/501 Standard Practice, Nital etch procedure for grinding abuse) & VAIL procedures – VAIL-OPS-039, CDS-10 & CDS-18.

This process takes place on a small scale in a fume cupboard in the laboratory; it is used to chemically etch ground surfaces and subsequently visually inspect for any grinding abuse. Mainly used on R-R T56/501 RGB prop brake inner cones or other gears.

Typical volume of solution used is approx. 1 – 2 litres in small containers.

Summary of process:
All steps are at ambient temperature.

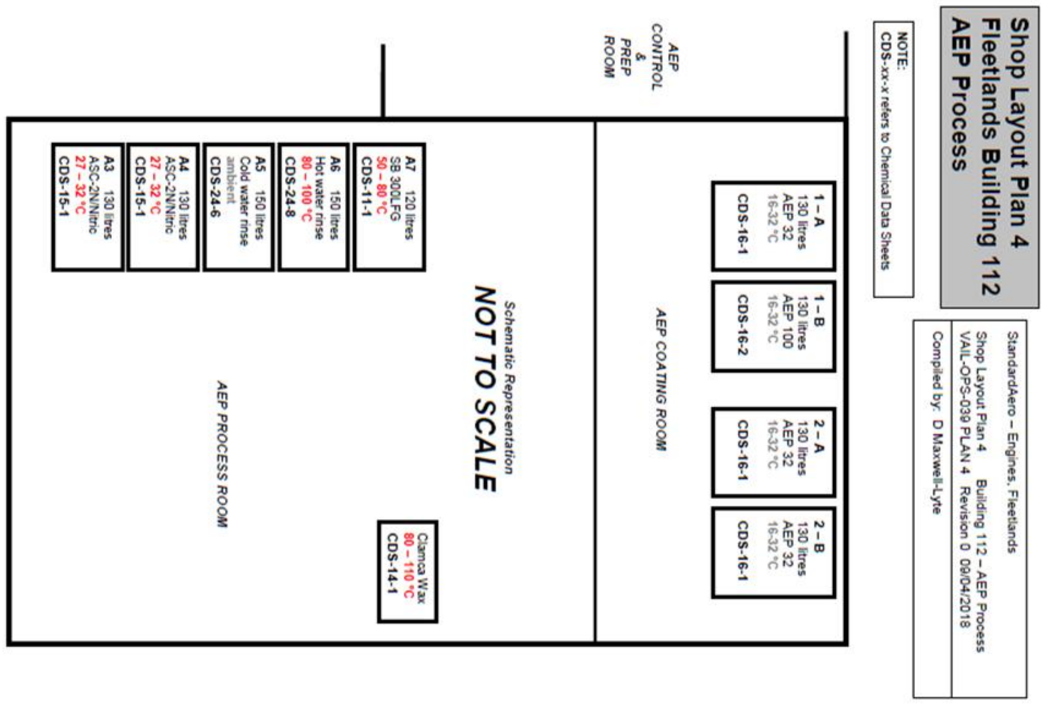
a. Prepare a 3 – 5 % volume of nitric acid (CDS-18) solution, ~ 1 litre
b. Submerge part into the 3 – 5 % nitric acid solution for ~ 5 – 10 seconds
c. Thoroughly rinse in the cleaning bay.
d. Prepare a 5 % volume of hydrochloric acid solution, ~ 1 litre
e. Submerge the part into the 5 % hydrochloric acid solution for 3 minutes
f. If required, Neutralise the parts in a sodium carbonate solution or 1% ammonia solution
g. On the main cleaning bay line, thoroughly rinse the parts in cold running water followed by hot water.

h. Dry the parts with clean compressed air.
i. Immediately apply Ardrox 3968 de-watering oil (CDS-10) to prevent corrosion
j. Visually Inspect etched surface under a white light wearing gloves

Solution make-up procedures and safety precautions are covered in the above procedure, CDS-18 and CDS-10. Spent waste acid solutions are transferred to a waste IBC containing compatible mixed acid waste. Spent waste acid solutions are transferred to a waste IBC containing compatible mixed acid waste. The output air emissions of the fume cabinet are discharged to air, unabated via a stack, approximately 0.5m above the roof line.

Environmental considerations
The use of strong acids can generate spillage capable of attacking concrete floors and subsequently polluting the soil and any groundwater beneath with acid and the dissolved metals. The disposal of used acid stripping solutions may exceed the treatment capacity of the effluent systems and is thus disposed off site as hazardous waste. Acid vapour and mists are caused by a reaction with the metals. These can cause local air problems, health effects in staff and deterioration of equipment in the installation.

5.6 VAIL AEP Building 112



The AEP process, located in building 112, produces an aluminide coating (AEP 32 or 100) by either electrophoretic deposition or selective brush-on slurry application of aluminium-manganese-chromium powder to provide an oxidation-/hot corrosion-resistant coating on the surfaces of nickel or cobalt base alloy components. The following coatings are applied to engine components:

- Coating AEP 32
  - Aluminium-Manganese-Chromium,

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  - Electrophoretic,
  - Diffused,
  - for Application to Nickel-Base Components Effluent Treatment Plant
- Coating AEP 100
  - Aluminium-Chromium
  - Electrophoretic
  - Diffused
  - for Application to Cast Cobalt-Base Components

Parts are prepared for coating by furnace heating and are cleaned within a Nitric Acid, ACS 2N Stripper solution. It is the belief of Vector Aerospace International Ltd that the AEP process is out of scope for Permitting as nether the nitric acid solution or the Electrophoretic processes are intended to change the surface composition of the parts and therefore do not constitute a treatment. That said, for consistency we have included the process within the application as the advice from the EA was that all chemical tanks other than rinse must be included.

6.0 Directly Associated Activities for VAIL Permitted Installation

The following is a non-technical summary of directly associated activities which have a technical connection with the main treatment processes identified within section 5.0. A summary of relevant environmental considerations is provided for each relevant, directly associated activity and is reflected within the environmental risk assessment for the proposed installation.

Summary of Directly Associated Activities

- Storage and handling of raw materials
- Mechanical, chemical, liquid or vapour preparation of the work to be treated
- Rinsing and drying of the work treated
- Post treatment work (where necessary to complete the treatment work)
- Vapour, mists and gas extraction and where required abatement
- Effluent Treatment and discharge to sewer under discharge consent
- Handling and storage of waste materials.

6.1 Pre-Treatment Activity

6.1.1 Delivery, handling and storage of work pieces and consumables materials

The work pieces to be treated are delivered to the Cleaning Bay in different ways according to size, material, quality and cost. Engine parts and related work pieces are stored separately by layering them in stillage’s with protective inter-layers (to protect against physical damage and/or corrosion) to protect high value components. Where required, high value parts may be individually packed in robust boxes to prevent damage.

Environmental considerations

- The amount and type of packing used and the minimisation of loss of materials by damage to work pieces.

6.1.2 Consumable Raw Materials

Due to the military and aerospace industry's stringent requirements regarding the quality of any aircraft engine component, the company maintains a high level of raw material quality control.

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However, the chemicals used for component cleaning are, for reasons of aircraft safety, specified and strictly controlled by the engine manufacturer and the company is not permitted to make substitutions or alter the composition of the formulations. The Company has considerable experience of aircraft engine cleaning and in the event of new cleaning techniques becoming commercially available they will discuss with the engine suppliers the possibility of obtaining approval for use. However, engine suppliers may require many years of testing and field experience before giving approval for new processes or chemical use.

In any event, VAIL and its customers comply with chemicals regulations such as the Registration, Evaluation, Authorisation of Chemicals Regulations and COSHH. These regulations require VAIL only uses chemicals permitted by law and hold where necessary an authorisation to use chemicals where REACh authorisations apply. The company has established a partnerships with its customers whom specify the chemical treatment processes for the cleaning of engine parts and periodically receives communications regarding REACh compliance. Where reasonably practicable and in accordance with the principles of risk assessment, the least hazardous substances are used. This principle is tested upon revision of risk assessments.

The cleaning process is operated as a batch process. The cleaning is specific to the engine component and whether it derives from a fixed wing or rotary aircraft. Hence, not all treatment vats will be used at any one time and as a consequence the composition of atmospheric emissions and the trade effluent will vary from day-to-day. The list of chemical reagents given below is therefore based on a typical, expected usage.

The proposed VAIL Installation comprises the following process operations:

Main Cleaning Line (See Appendix A)
- Alkali cleaning compounds and chromic acid solutions
- Acid and alkali chromium and permanganate cleaning compounds
- Acid and alkali based cleaning solutions
- Acid, alkali and solvent based cleaning solutions together with conversion coating materials for chromate deposits.
- Ultrasonic cleaning process

Additional cleaning line, comprising operations:
- Aqueous washing and degreasing
- Wet blasting

NDT Line
- Water washable and emulsifiable penetrant & enhancing process line
- NDT line involving cleaning, fluorescent penetrant and enhancing

Ancillary processes
- Thermal fluid boiler
- Magnetic benches
- Pumping stations

Abatement systems
- Fume extraction and scrubbing

- External (to building) storage tank farm
- Water purification for recirculation
- Waste water treatment plant
- Lidded tanks where practicable.

Environmental considerations

With regard to the main cleaning lines, the treatment chemicals are not used continually, rather a batch of a chemical is prepared within a vat by diluting the delivered raw material to the required concentration with water. The chemical is stored within the vat (being topped up with water as required) for many months until it is no longer usable and, at which point, it is disposed of and replaced with fresh solution.

The treatment chemicals will be delivered to the site in small drums, typically of 5 to 25 litre capacity, and then transferred from the warehouse to the proposed installation as needed. Movement of the drums to the installation will be by forklift truck on designated site roads. Procedures for assessing the impact of spillage, cleaning-up spillages and protecting surface water drains from contamination are maintained under the site ISO 14001 management system. During on-site transportation, the drums of chemicals are held within a proprietary, portable spill containment tray specifically designed for movement by forklift truck.

Based on information from the existing cleaning process operated by VAIL at their Gosport facility in England, the following assessment of raw material usage has been made for the proposed installation: See Appendix D

Plant and machinery on the permitted installation will be maintained by the VAIL. Oils and lubricants will be provided by, and waste machine oils removed by, site service personnel and proprietary equipment service engineers. Machine oils and maintenance wastes will not be stored on the permitted installation.

Raw material inputs include chemicals delivered in drums, jerrycans and IBC's (Intermediate Bulk Containers). Sizes rage from 25 to 1000 litre containers. Liquid chemical is stored 'as delivered' and used from the delivery containers. Liquid chemical containers are stored within bunded external chemical stores, Area 99 (SU59122 04241), or on internal bunds or within POL cabinets. Solid deliveries are delivered in 1-50 kg sacks, bags, tins, drums and other containers including disposable packaging. Solids are stored in the containers they are delivered in. Metals for deposition are usually delivered in flake form. Solids are stored in the bund and the bottom of D Line within the cleaning bay of building 110.

6.1.3 Process Replenishment

The principal raw materials for use in the proposed installation are listed in Appendix D. Raw materials used in the downstream processes (i.e. effluent treatment) are also listed. The site utilises effective storage and handling systems to prevent loss or spillage of raw materials and has established emergency procedures for spill containment and control. The sites Fire Crew act as the primary spill containment and control responders.

The main storage facilities servicing the installation is warehousing of cleaning chemicals. Cleaning chemicals are delivered as concentrated solutions in drums (2.5 to 205 litres capacity) or IBC and as powder in 25 - 50 kg drums/bags. These raw materials are delivered to the site's central warehouse where dedicated and separate bunded storage is provided for acids and alkalis. The location of the warehouse is shown on the site plan drawing in Appendix D.

Blending and preparation of raw materials

BAT requires provision for the handling and storage of dusty materials to minimise environmental impact. Raw materials are diluted to the required concentration by mixing with the water (recycled from the effluent plant) in the appropriate treatment vat. All vats within the Cleaning Bay area are fume extracted to comply with Health and Safety Work Place Exposure Limits. The extracted fume or dust is discharged to atmosphere via three scrubbers that use water as the scrubbing medium. With the exception of nitric acid, which is pumped to the treatment vats, the raw materials are brought from the warehouse by forklift truck. The floor of the process area is of concrete (and epoxy resin coated) construction and drains into catch sumps within the floor. Raw material spillages and floor washings collected in the catch sumps from where they are pumped to the effluent treatment plant. When dispensing chemical directly from the primary storage container via hose and pump, lines and pumps are purged with water into the tank after use to flush out the chemical, with the exception of Ardrox 23032.

Environmental considerations

- Prevention of unplanned releases to surface and groundwater's, and soils.
- Store acids and alkalis separately, store flammable and oxidisers separately.
- Avoid corrosion of external storage vessels, pipe work, delivery and control systems.
- Store in a well ventilated area.

6.1.4 Handling techniques for processing

When work pieces are in a suitable state for the core treatments, they are loaded for processing within baskets. The work pieces may be loaded into the baskets singly or in groups. In a limited number of cases, components are treated *in situ with* brush coating in various location around the site. Jigs (also known as racks or frames) may be used to provide physical support for handling during processing. Jigs are used for all sizes of components from small bearings and precision engineered components, to large engine parts. Small components may also be secured to the baskets by hooks or wire. Baskets are hung on an overhead hoist and gantry; this system is used to manually position cages containing parts within the desired treatment tank.

Environmental considerations

- Handling (such as emptying containers, etc.) may give rise to noise.

6.1.5 Abrasive blasting

This technique uses sand, grit, plastic media or glass bead in wet and dry forms to mechanically clean and remove paint residue and scale from the surface of the work pieces.

Environmental considerations

- Noise and dust are associated with this activity.
- Abrasive blasting creates solid wastes which may be non hazardous or hazardous.

6.1.6 Deburring and/or tumbling

Work pieces are mixed with abrasive stones and tumbled or vibrated for up to several hours. This technique is used in aqueous media with chemical additives to clean the parts. Waste water is routed to the effluent treatment plant for treatment, recycling and or discharge to sewer. Super polishing for compressor blades.

Environmental considerations

- Low noise and vibration are associated with this activity.
- Wastes generated directly may be contaminated with polishing additives and abrasive particles.
- The waste is sent to the effluent treatment plant.

6.1.7 Solvent Degreasing (EVT Degreaser)

The site uses an enclosed solvent vapour degreaser to remove contamination from engine parts as required by process specifications VAIL-OPS-039, CDS-12-2 & VAIL-OPS-096. The solvent used within the process is Safechem ‘DOWPER MC, perchloroethylene.

SAFECHEM MAXISTAB stabilisers are added as required to control the PH of the liquid. DOWPER MC is classified as H315, H219, H317, H351, H336, H411. The substance is environmentally hazardous. Its main constituents are Tetrachloroethylene, CAS: 127-18-4 (99.5%) and tert-Butylglycidyl ether, CAS: 7665-72-7 (0.41%).

CHC is used because of its good cleaning efficiency and universal applicability, as well as its quick drying and incombustibility. The process uses vapour phase cleaning. The solvent is vaporised in a purpose-built bath and the cold component suspended in the vapour. The vapour condenses on the component dissolving grease and drained off with the dirt and grease, leaving the component clean and dry. As the vapour is heavier than air they are contained in the bath.

The solvent is regularly checked (~ every 1 – 2 weeks) for AAV (acid acceptance value), alkalinity and pH. If corrections are required, stabilisers (MAXISTAB DJ-1N or MAXISTAB DK-2N) can added as required. Typically these additions are made about every 4 – 6 weeks, approximately 100 ml – 1000 ml at a time. Surplus water in the solvent is drained from the plant about 2 – 3 times per week, the volume drained off at any time can range from zero to up to over 500 ml. The drained water is poured into the waste solvent SAFE-TAINER.

The heated sump in the plant has a capacity of ~ 300 litres solvent. Additions of fresh solvent (due to losses from general usage and evaporation) from a SAFE-TAINER are made approximately every month using a closed system. A 200 litre drum of solvent can last up to a year.
The vapour temperature of DOWPER MC is ~ 120 °C (hotter than trichloroethylene which was ~ 80 °C). Operators need to take care when handling hot items.

There is a safety feature on the plant which will not allow the lid to be opened if the concentration of perchloroethylene is greater than 1 g / m3 .

During normal use a ‘distillation’ cycle is carried out about once a year, the ‘dirty’ solvent is pumped out of the machine into a waste SAFE-TAINER using a closed system avoiding any contact with the solvent. All used solvent (waste) is removed from site by VAIL’s SAFECHEM distributer, Caldic UK Limited and consignment notes retained on file.

After approximately every 16 cycles, a ‘regeneration’ is carried out, this effectively removes solvent from the activated carbon. The regeneration takes about 4 – 6 hours and is usually carried out overnight. All operators of the plant have received training in its use and are aware of the potential hazards. The vapour degreasing plant is currently only used on Rolls-Royce (T56/501) products, not specified for Pratt & Whitney PW300 series or Honeywell TFE731 series engines.

Environmental considerations
The classification of the solvent used is potentially carcinogenic and skin sensitising, it has a water endangering potential and potential health risk if there are emissions to the air.

6.1.8 Aqueous cleaning
The work pieces are placed in process solution for up to 60 minutes. The solution is usually alkaline or neutral and may be operated at increased temperatures (40 – 90 °C) because of the improved cleaning effect. The main components of the aqueous cleaning system are alkalis. Aqueous chemical systems avoid the use of solvents. The cleaned items can remain wet if the subsequent treatment is water-based. Process solutions have a short life, dependent on throughput and the amount of oil or grease on the work pieces. The efficiency of aqueous cleaning systems depends on the type and concentration of chemicals, the mechanical effect, the temperature and the time. The mechanical effect are by mechanical agitation by pump of the solution, or by using ultrasonics. Hot water is used effectively to remove oil and grease and aid the drying process.

Environmental considerations

- Energy usage: process tanks operate at 50 – 90 °C and require LEV extraction to remove water vapour and alkaline or acid vapour and mists.
- Rinse-waters (including those from air scrubber units) require simple pH treatment in waste water treatment plants.
- Metals can be stripped from the substrate surface (including trace elements such as lead which may have toxic effects). They can be separated after pH adjustment.
- Used acid or alkali solutions are often treated separately as they create a large pH change, which may not be accommodated by continuous flow waste water treatment plants.
- Solution maintenance by replacing consumed components and removing the accumulated oil dirt, oil and grease can greatly increase the solution life by various options.
- Cleaning solutions may need to be separated from other process effluents to avoid interference with the waste water treatment plant by excess surfactants.
- Cleaning solutions containing complexing agents should be separated from other waste water streams containing metal ions.

6.1.9 Hand wiping
Hand wiping uses a clean cloth and solvent to clean engine parts.

Environmental considerations
Waste Accumulations causing a nuisance.

6.1.10 Pickling, descaling and desmutting
Pickling and descaling are chemical metal-stripping procedures used to brighten and/or remove oxides from the degreased metallic surface prior to other surface treatment processes. During the pickling processes, disturbed or adhering layers, such as scale, oxide films and other corrosion products of the metal, are removed by chemical reaction with an acidbased pickling agent. In order to remove strong oxide layers effectively, specified acid concentrations, temperature and pickling times must be adhered to. Hydrochloric or sulphuric acids are normally used. In special cases nitric, hydrofluoric or phosphoric acid, or mixtures of acids are used.

Environmental issues

- Process tanks are equipped with LEV extraction to remove generated aerosols.
- Spent pickling solutions require either treatment and disposal as liquid wastes.
- Excessive attack of the metal surface removes a significant amount of iron, which can have adverse effects on the waste water treatment systems, such as significantly increased sludge production.
- Effluents can easily be treated in typical waste water plants.

6.1.11 Drag-out and rinsing

Drag-out is the liquid from the previous process which adheres to the work piece surfaces and baskets. Rinsing is necessary between most process steps to prevent cross-contamination of process solutions to ensure there is no deterioration of the work piece by residual chemicals, such as by over-reaction or by staining by the drying of dissolved chemicals. A reduction of drag-out is a primary measure for minimising losses of chemicals, operating costs and environmental problems in rinse-waters. Rinsing is carried out after nearly all process steps within the cleaning bays. Rinse-water varies in quality depending on the process requirements and is routed to the Effluent Treatment plant for either recirculating or discharge. Engines parts are held over VATs for a period of time to minimise drag out and facilitate effective rinsing in line with customer specifications.

Over flow of treatment tanks are primarily routed to floor bunds and in some cases to a holding sump and then to the Effluent Treatment Plant. Some lines are routed to the off-haul tanks as indicated with the installation process flow diagram.

Environmental Considerations

Rinsing is the largest potential source of waterborne contamination as rinse-waters carry all the process chemicals from the activity. Rinse-waters are treated within the Effluent Treatment plant prior to discharge. The following are environmental considerations related to rinse waters:

- minimisation of the loss of materials, including possible re-use of rinse-water
- metals can only be treated and moved to another waste stream, but cannot be destroyed
- complexing agents: (including cyanides) these may need to be treated separately to enable metals to be successfully treated subsequently
- surfactants, brighteners and other additives may interfere in waste water treatment or have their own environmental impacts
- Rinsing is one of the largest water usages in the installation.

6.1.12 VAIL Bearing Cleaning, Lab Building 110


Engine bearings are cleaned and dried within the laboratory area of building 110. The bearings are cleaned using the following process:

1 Submerge in Ardrox 185 (Sodium hydroxide),
- 30-35%
- Volume 110 Litres / 0.11m3.
- Temperature 91°C.

2 Cold Water Rinse.
- Volume: 200L / 0.2m3.

3 Ardrox 3968 (3-butoxypropan-2-ol, Hydrocarrbons C10-C13).
- Volume: 100L/0.1m3.

4 Air Dryer. Gas fired.

Rinse water from the cleaning process is routed to the treatment plant. The chemical is pumped out of the tanks into a 205L drum and sent to the Materials Recycling Facility as hazardous waste. The process tanks have a receiving hood LEV that is routed to the site of the building. The stack is approximately 0.5m above the roof line and is unabated.

Environmental considerations

- Emissions of VOCs to atmosphere.
- Prevention of unplanned releases to surface and groundwater's, and soils.

6.1.13 Linear NDT Line

Following cleaning, the components undergo non-destructive testing (NDT) for the purposes of quality assurance. A variety of techniques are incorporated, including component preparation, ultrasound testing, fluorescent-penetrant testing, etc. To highlight any cracks in the aircraft components, a fluorescent is applied to the surface, either by immersion in a bath or direct spray within an extracted spray booth. Effluent from the fluorescent process is also discharged to the effluent treatment plant. Once the fluorescent has been applied, it is dried in an oven prior to apply a powder developer storm for inspection purposes.

The Linear NDT line vessels are not bunded but are located within the process building. Any chemical spillage will be retained on the concrete floor of the building from where it will flow, or be flushed with water, into the building sumps for pumping the effluent treatment plant. Expansion joints in the concrete floor are filled with a chemical resistant compound. Building floors, bunds, and effluent sumps will be regularly inspected by site maintenance services as part of a Planned Preventative Maintenance programme.

Environmental considerations

- Emissions of fugitive VOCs to atmosphere.
- Prevention of unplanned releases to surface and ground waters, and soils.

6.2 Post-Treatment Activity

6.2.1 Effluent Treatment Plant Building 97

The Effluent Treatment Plant (Building 97) processes and treats rinse water and waste effluent from metal treatment processes and the applicable directly associated activities.

Indicative BAT requirements in relation to the operation of the effluent treatment plant are:

- Control of emissions to avoid breach of water quality standards;
- Precipitation of metals using a reagent;
- Reduction of BOD; and;
- Engineering systems to avoid effluent by-passing the treatment plant.

The location of the effluent treatment plant is shown on the site plan drawings in Appendix D. The effluent plant, and the building in which it is housed, are existing installations, there is a program of minor modification to be undertaken to address specific treatment requirements of the proposed cleaning process in building 118, namely installation of pipe work.

The effluent treatment plant is used to treat the rinse water, waste process solutions, and floor washings from the chemical cleaning and NDT process lines. The rinse waters are discharged to sumps in the building floor from where it is pumped to the effluent treatment plant for treatment. The sumps are dedicated to specific operations to permit segregation of wastewaters depending on the specific chemistry of the effluent. These particularly address hexavalent chromium, potassium permanganate, solvents and cadmium. Segregation of the recirculation systems, not only benefits the chemical treatment process but also minimises the risk of cross-contamination of clean recirculation water with cadmium or other hazardous chemical bearing streams.

With the exception of cadmium bearing effluents, wastewaters will be treated to remove solids, organics and ions and recycled back to the process. In the case of cadmium effluents, the treatment is by selective ion exchange with the concentrate stored for off-site disposal; cadmium-bearing wastewater is not suitable for recycling back to the cleaning plant owing to the risk of contaminating aircraft components.

The waste cadmium liquor will be held within a bunded "off-haul" storage tank to await off-site disposal. The bulk storage tank and road tanker standing areas are within concrete "catchment" areas that are designed to retain spillages and prevent contamination of site surface water drains. The pipework between the effluent plant and storage tank is run in below ground level concrete channels. The channels are covered to minimise rainwater ingress but to permit visual inspection. The channels are also designed such that in the event of an effluent spillage the liquor will back flow to the building sump for retention and off-site disposal.

The existing wastewater treatment plant will be modified to accommodate trade effluent from building 118's cleaning lines, however will principally operate in the same way as it is currently installed on site. The segregated wastewater streams will be pumped to ion exchange plant, with the treated water (with the exception of the cadmium effluent) recycled back to the cleaning lines. Upon regeneration of the ion exchange resins, the backwash waters will be further treated by pH correction, coagulation, flocculation and sedimentation before final discharge to the municipal sewer.

The basic components of the treatment process are as follows:

- Cadmium based rinse waters flow into the collection sumps for transfer through the pre-treatment purification train. Effluents will pass first through mixed media filters where solids will be removed before entering carbon filters for the removal of organics. Pre-treatment is required to protect the ion exchange process in which cadmium is removed on an ion exchange resin. Wastewater from the ion exchange process is pumped for further treatment to the effluent plant.

The cadmium rich effluent arising during backwash and regeneration of the ion exchange resin is transferred to the "off-haul" storage tank for off-site disposal.

- Potassium permanganate-based rinse waters flow into the collection sumps for transfer either directly to the effluent plant or alternatively to pre-treatment prior to recycle back to the cleaning process. Pre-treatment comprises a controlled reduction stage where potassium permanganate is reduced to manganese by addition of sodium bisulphide under redox control. From the reduction stage, effluents are transferred to the chromate rinse water treatment system.
- Chromate based rinse water effluents flow into the collection sumps for transfer to the effluent plant. The effluent is pumped through a mixed media filter for the removal of insoluble compounds prior to transfer to ion exchange vessels. The treated effluent is recycled back to the cleaning process.
- NDT based rinse waters may be pumped through a carbon filter to remove fluorescent dyes, oils and other organics. The treated effluent may be then pumped through an ion exchange resin prior to return to the cleaning process.
- General rinse waters from the processes are pumped through a mixed media filter and a carbon filter to remove insoluble and carbon compounds prior to ion exchange treatment. The purified effluent is recycled back to the cleaning process.
- Effluent from regeneration of the ion exchange resins and floor washings are segregated in accordance with their chemical categories. Segregated wastes containing chromium are processed through the effluent treatment plant's chromium reduction reaction modules, comprising reduction with sodium bisulphite under pH and redox control to reduce the chromium, from the soluble hexavalent form to insoluble trivalent form. Potassium permanganate will also be reduced to the manganese form within the chromium reduction stage. From the precipitation module, the effluents flow via the flocculation module to the sedimentation tank for solids removal. The clarified wastewater is discharged, via sand filters, to the municipal sewer. The sludge is thickened and disposed of off-site.

In line with BAT requirements on the control of fugitive emissions to surface water, the effluent plant is located within a building and is surrounded by a low spill containment bund to prevent spillages of chemicals entering site surface water drains. The bund has a capacity significantly in excess of the largest capacity effluent treatment vessel. In line with BAT requirements, the concrete floor of the building, including sumps, is sealed with an epoxy screed to prevent contamination of underlying ground/groundwater in the event of a spillage.

The final effluent settlement tank prior to discharge to the municipal sewer is located outside of the main effluent treatment plant building. The existing settlement tank will not be bunded as the water quality within the tank is similar in composition to the final effluent discharge.

Point Source Monitoring – Effluent

As the activities undertaken result in emissions to water, monitoring is undertaken to ensure the emissions comply with permit conditions. The following emissions are the maximum values that are estimated from the H1 assessment to be discharge to foul sewer W1 (outfall).

Emission to Sewer				
Point Source Reference and location	**Source**	**Parameter**	**Quantity**	**Unit**

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W1 Effluent Treatment Plant SU5910 0423	Installation Treatment and Rinse Tanks	Flow Data Logger	**<70**	m3/day
W1 Effluent Treatment Plant SU5910 0423	Installation Treatment and Rinse Tanks	PH Minim Data Logger	**>6**	No.
W1 Effluent Treatment Plant SU5910 0423	Installation Treatment and Rinse Tanks	PH Maximum Monthly Grab Sample	**<10**	No.
W1 Effluent Treatment Plant SU5910 0423	Installation Treatment and Rinse Tanks	COD Monthly Grab Sample	**<800**	mg/l
W1 Effluent Treatment Plant SU5910 0423	Installation Treatment and Rinse Tanks	Total Metals Monthly Grab Sample	**<0.05**	mg/l
W1 Effluent Treatment Plant SU5910 0423	Installation Treatment and Rinse Tanks	Total Cadmium Monthly Grab Sample	**<5**	µg/l

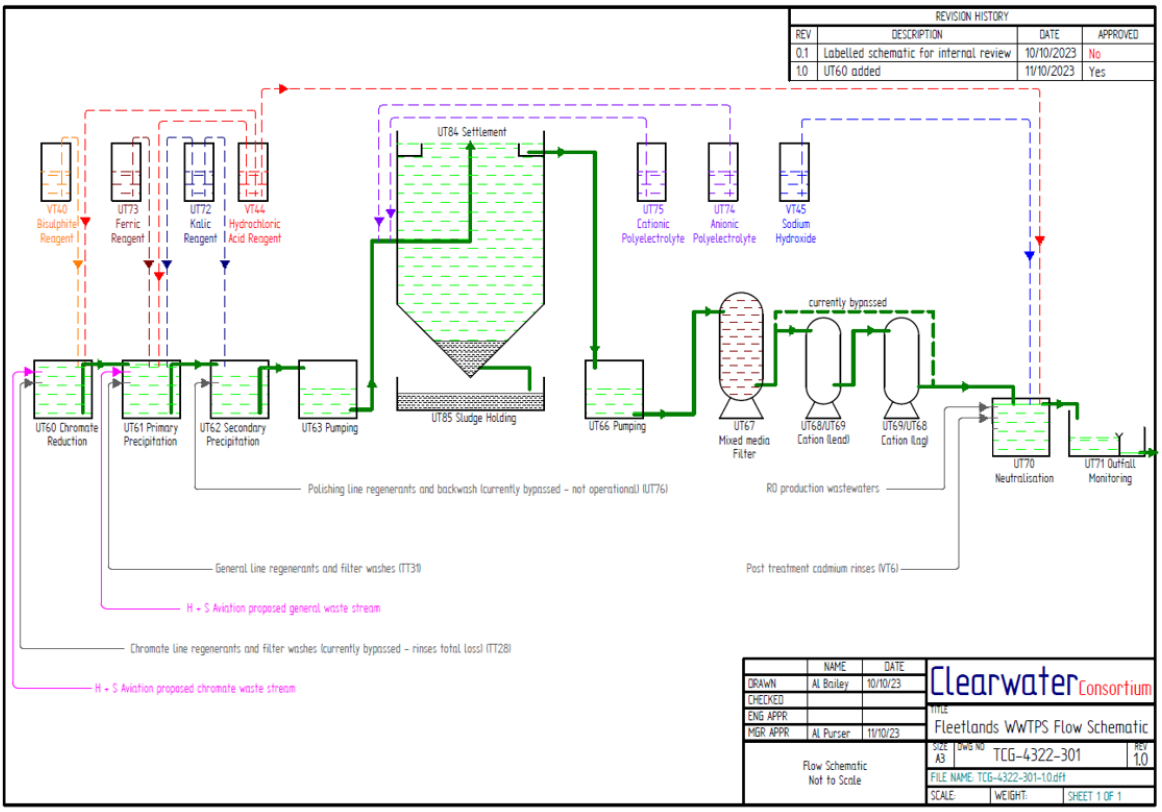
The following limit values have been assigned by the regulators associated to the discharge point W1 (outfall).

EA Emission Limits to Sewer (Permit EPR NP3930KB)		
Parameter	**Quantity**	**Frequency and Duration**
Flow, m3/day	≤70	Continuous
PH Minimum	≥6	Continuous
PH Maximum	≤10	Continuous
COD mg/l	≤800	Monthly Spot Sample
Total Metals	N/A	Monthly Proportional Sample
Total Cadmium µg/l	≤5	Monthly Proportional Sample

Southern Water Emission Limits to Sewer (Consent 14198)		
Parameter	**Quantity**	**Frequency and Duration**
Flow, m3/day	≤70	N/A
Flow rate l/sec	≤1.4	N/A
Temp°C	≤43.3	N/A
PH Minimum	≥5	N/A
PH Maximum	≤11	N/A
COD mg/l	≤800	N/A
Total Copper mg/l	≤0.5	N/A

Total Chromium mg/1	≤1	N/A
Total lead mg/l	≤0.5	N/A
Total Nickel mg/l	≤0.5	N/A
Suspended Solids 105°C mg/l	≤400	N/A
Total Cadmium µg/l	≤5	N/A

The Effluent Treatment Plant, building 97, receives waste rinse water from the rinse tanks and associated processes within the Cleaning Bay of building 110. The Effluent Treatment Plant will also receive rinse waters from the rinse tanks operating within the cleaning bay of building 118. The following diagram represents the basic flow of effluent through the Effluent treatment plant.



Water Treatment Effluent Treatment Plant

The above diagram depicts the current state water treatment processes within the Effluent Treatment Plant, building 97. Trade effluent is routed from process area sumps via double skinned pipework into a receiving tank for primary treatment to reduce chromates and or precipitate the metal from the effluent. Clean water is recirculated back to the treatment processes. Precipitated effluent is routed to the settlement tank where cationic and anionic pollys are added to aid in the settlement of sludge. The output water from the settlement tank is routed to a mixed media filter then to a tank for PH naturalisation before discharge to outfall W1. Sludge is pressed to form a filter cake.

Coagulants & flocculants and are used to aid dewatering and settlement of sludge. The sludge is pumped into the plate and frame filter press and filtered against a fine weave cloth. The pressure

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in the system may rise to 10-15bar at which point the pump will stop and the press opened to drop the cake. The press is de-pressurised to enable separation of the filter cloths and to scrape off the cake waste into the bins below. Coagulants i.e. polyamines are also used to create the sludge.

Coagulants & flocculants and are used to create the sludge and clarify the remaining water in the settlement chamber. Settled water post proceeding weirs over the top and settled solids are pumped from the bottom of the chamber.

Filtration is used to aid in the removal of remaining solids. Backwashing is used to remove accumulated particles and debris from the filter media. Back washing helps to stop the filter media becoming clogged. The pressure drop and water clarity is monitored across the filter media and back washing cycles are completed as required. Anionic flocculants are used where effluents contain minerals or metals. The metals are dropped out by adjusting the pH of the effluent to the pH required for optimum precipitation (lowest solubility) of the specific metal.

Chemical tank numbers (A13, A14 and rinse waters) are used to treat parts that may contain cadmium. Treated parts may contaminate the chemical tank and subsequent rinse tanks with traces of cadmium. Effluent rinse water from these rinse tanks is routed to the off-haul tanks adjacent to the Effluent treatment Plant Building 97.

Effluent Treatment Plant Chemical Use

The Effluent Treatment Plant, building 97 uses the following chemicals:

- **Hydrochloric Acid -** PH Balancing, used to reduce alkalinity of water. Corrosion Control. Aiding coagulation and flocculation. Aid precipitation of heavy metals in rinse water.
- **Sodium Hydroxide (Caustic Soda)** – Used for PH adjustment, raises PH levels. Used to dissolve magnesium and calcium in water. Keeps tanks and lines free from minerals that could block water flow and corrode system components. Decreases solubility of heavy metals so they may collect in filers and or sludge. Use as a corrosion inhibitor.
- **Kalic Lime** – Used to neutralise acid. Used to treat PH of sludge.
- **Ferric Sulphate** – Used as a coagulant. Aids in the removal of pollutants, organic matter and suspended solids. Used for PH adjustment and dissolved heavy metal precipitation.
- **Sodium Bisulphate** – Used for adjustment of PH (reducer).
- **Klaraid PC1194 (Poly)** – Coagulant – Convert suspended solids to sludge. Used to clarify water for reuse or discharge.
- **Betz Dearborn AE1125 (Poly) -** BetzDearborn AE1125 is an anionic, medium charge density, high molecular weight, polymeric flocculant, which is designed to function in industrial treatment programs as a coagulant aid, or flocculant, in clarification, thickening, and sludge dewatering processes.

Effluent Treatment Plant Waste Water Discharge Point

The outfall flow measurement system is serviced and calibrated annually by an MCERTs accredited organisation. The flow measurement system comprises:

- Weir tank
- V-notch weir plate
- Ultrasonic level transducer
- Flow transmitter

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The gauging structure comprises of a thin plate V-notch weir which is located in a bespoke GRP [SJ1]weir tank. The flow rate over the weir is measured by an ultrasonic flowmeter that monitors the level in the upstream section of the weir tank and converts it into units of flow. The flow indicator/transmitter is located on the wall of the building approximately 1m from the tank. The flow measurement electronics comprise of a Pulsar Ultra 4 controller and DB3 transducer, MCERTS product certificate number SIRA MC140269/08.

The 4 –20mA output signal from the flowmeter is transmitted to the site's environmental management computer system. The 4 -20mA output signal also feeds to a panel indicator in the Effluent Treatment Plant control room. The weir plate is installed in a dedicated GRP coated weir tank, which is also used for conductivity and pH sampling. The weir measures total treated effluent from the site process and is representative of the total treated discharged flow. Flows run to the local Southern Water Sewer system on the Fareham Road.
The flow structure is clean & well maintained under a program of maintenance.

Design Considerations for Effluent Discharge
The effluent from permitted processes flows into the settlement tank (UT64) at 4930 litres per hour. *(i.e. 5,000 litres/hour)*

The flow rate into the settlement tank dictates the downstream flow rate out of the settlement tank into the v-notch (via the neutralisation tank). So, we can state that the flow attributed to the treatment plant correlates with the 1.40 litres/second. (Source Commissioning document)

1.4x60x60 =5040 litres/hour *(i.e. 5,000 litres/hour)*

It should be kept in mind that there are other waste streams that enter the v-notch without going through the treatment plant, the only notable example being the RO concentrate. The RO processes 2000l/h of raw water and generates 1500l/h of RO and 500l/h of concentrate. The 500l/h of concentrate essentially goes straight to the v-notch so the maximum rate of discharge could potentially be higher than 5000litres/hour (5000l/h + 500l/h = **5,500l/h**). The pdf schematic shared shows the RO concentrate entering the treatment plant after the settlement tank. Other inputs at this stage of NDT rinses and Cadmium rinses are negligible.

As a sensible safety margin to account for any other small inputs i.e. rain water from bunds we have added a 10% safety margin to the 5,500l/h figure so we get 6,000l/h (1.67litres/second).

In terms of 70,000 litres per day figure (answers to 3b and 3d as we assume there is no rainfall input to outfall), it is chosen as the maximum to not be exceeded.

The facility running continuously for 10 hours would produce 10x6,000 = 60,000litres/day, Adding 15% for safety margin totals 70,000litres/day

The above covers what the wastewater treatment plant **can** process so we now check that the plant can process the likely wastewater inputs. The new cleaning bay in Building 118 will produce a maximum of 15,000 litres/day and the current Fleetlands cleaning bay generally produces approximately 20,000 litres/day, totalling 35,000 litres/day. There is therefore a 50% overhead for the maximum allowable discharge (70,000 litres/day). This is a healthy overhead to cover spikes in production or other unforeseen scenarios.

Water Sample Analysis
Water samples are taken periodically and sent to a UKAS accredited laboratory for testing and analysis. The water sample point is located within the outfall tank within building 97 (SU59114 04206). Results from water samples are logged and compared against discharge limit values. Values include heavy metals, COD, PH, Suspended Solids. Operator standard work includes, but is not limited to, daily treatment plant checks including:

- Outfall PH reading
- Chemical tanks level checks
- Calt bin check
- Filter press and settlement checks
- PH probe cleaning
- File and line checks
- Daily temperature checks
- Weekly outflow, water & energy checks
- Spot and flow samples are taken from the out fall.

Effluent Treatment Plant Air Emission Discharge Point
A 1m3 hydrochloric acid tank is located on the second floor of B97. hydrochloric acid is used for PH balancing, to reduce alkalinity of water, corrosion control and aiding coagulation and flocculation. Vapour within the head of the tank is routed to a small scrubber unit on the third floor of B97 to reduce emissions to air when filling the tank. The air emissions from the scrubber is routed through the side wall to air via a vent pipe.

- Stack height; **1145mm**
- Stack diameter; **325mm**
- Location of stack; **3rd floor B97 WWTP**
- Size of Hcl storage tank (I believe you mentioned it was 1m3 in the meeting); **1000 litres**



6.2.2 Tank Farm

A small tank farm is located opposite the effluent treatment plant building 97. The tanks within the tank farm area are used to store either chemical regenerates for use within the effluent treatment plant or off haul waste from the treatment plant and cleaning bay VATs. Tank inspections are conducted periodically and where last inspected in May 2022. The tank descriptions are detailed below with notes on pollution, prevention and control strategies.

Tank 29 – Chromate Regenerates Volume 15m^3 (Used for chemical regeneration of filter media)

Thermoplastic vertical tank supported on an integral plastic bund above a concrete base. Tank 29 stores a chemical, Chromate Regenerates. The bund is lidded to prevent rain water ingress. Tank 36 is fitted with a non-return valve which limits capacity. Level gauges are linked to the PLC within building 97 which indicates tank and bund capacity. The tank roof contains a swan neck free vent. Regen chemical to clean chromate media. The level detector within the bund will automatically swich off the pump sending liquid waste to the primary container.

Tank 30 – Cadmium Regenerates Volume 4.5m^3 (Used for chemical regeneration of filter media)

Thermoplastic vertical tank supported on an integral plastic bund above a concrete base. Tank 30 stores a chemical, Cadmium Regenerates. The bund is lidded to prevent rain water ingress. Tank 34 is fitted with a non-return valve which limits capacity. Level gauges are linked to the PLC within building 97 which indicates tanks capacity. The tank roof contains a swan neck free vent. The level detector within the bund will automatically swich off the pump sending liquid waste to the primary container.

Tank 31 – General Regenerates – Volume 30m^3 (Used for chemical regeneration of filter media)

Thermoplastic vertical tank supported on an integral plastic bund above a concrete base. Tank 31 stores a chemical, General Regenerates. The bund is lidded to prevent rain water ingress. Tank 34 is fitted with a non-return valve which limits capacity. Level gauges are linked to the PLC within building 97 which indicates tanks capacity. The tank roof contains a swan neck free vent. The level detector within the bund will automatically swich off the pump sending liquid waste to the primary container.

Tank 32 – NDT Regenerates Volume 15m^3 (Used for chemical regeneration of filter media)

Thermoplastic vertical tank supported on an integral plastic bund above a concrete base. Tank 32 stores a chemical, NDT Regenerates. The bund is lidded to prevent rain water ingress. Tank 34 is fitted with a non-return valve which limits capacity. Level gauges are linked to the PLC within building 97 which indicates tanks capacity. The tank roof contains a swan neck free vent. The level detector within the bund will automatically swich off the pump sending liquid waste to the primary container.

Tank 33 – ACID Waste Off Haul Volume 25m^3

Stainless Steel vertical tank supported on an integral plastic bund above a concrete base. Tank 33 stores a chemical, Acid waste off haul. The bund is lidded to prevent rain water ingress. Tank 34 is fitted with a non-return valve which limits capacity. Level gauges are linked to the PLC within building 97 which indicates tanks capacity. The tank roof contains a swan neck free vent. The level detector within the bund will automatically swich off the pump sending liquid waste to the primary container.

Tank 34 – Alkali Waste Off Haul Volume 25m^3

Thermoplastic vertical tank supported on an integral plastic bund above a concrete base. Tank 34 stores a chemical, Alkali waste off haul. The bund is lidded to prevent rain water ingress. Tank 34 is fitted with a non-return valve which limits capacity. Level gauges are linked to the PLC within building 97 which indicates tanks capacity. The tank roof contains a swan neck free vent. The level detector within the bund will automatically swich off the pump sending liquid waste to the primary container.

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Tank 35 – NDT Waste Off Haul Volume 25m^3

Stainless Steel vertical tank supported on an integral plastic bund above a concrete base. Tank 35 stores a chemical, NDT waste off haul. The bund is lidded to prevent rain water ingress. Tank 35 is fitted with a non-return valve which limits capacity. Level gauges are linked to the PLC within building 97 which indicates tanks capacity. The tank roof contains a swan neck free vent. The level detector within the bund will automatically swich off the pump sending liquid waste to the primary container.

Tank 36 – Cadmium Waste Off Haul Volume 25m^3

Thermoplastic vertical tank supported on an integral plastic bund above a concrete base. Tank 36 stores a chemical, Cadmium Waste Off haul. The bund is lidded to prevent rain water ingress. Tank 36 is fitted with a non-return valve which limits capacity. Level gauges are linked to the PLC within building 97 which indicates tanks capacity. The tank roof contains a swan neck free vent. The level detector within the bund will automatically swich off the pump sending liquid waste to the primary container.

6.2.4 Medium Combustion Plant

The site has the following medium combustion plant.

- An High Temperature Gas (HTG) Babcock boiler, Model TPC 1000B, SNo BC 5002 -17003I1903 rated at 1,371 KW (thermal input) is used for VAT Heating within the Cleaning Bay, B110 (SU 59010 04250). This boiler is a high efficiency, gas fired, thermal oil heating system and is used to maintain the temperature of the heating baths within the Clean Bay B110. The thermal oil heater is located close to the treatment baths, with heat loss minimised by the short transmission distance and a high standard of insulation is to be provided on the pipework and around the vats. The emissions reference is A4.
- The gas fired Nu-way, Summer Boiler, Model MGN2800 T3D 496 SD, open flue, is located in the yard area of B62 (SU 59126 04310) Surface Refinish and is used to provide both process

(room heating to cure spray painted surfaces) and thermal comfort heating. The boiler is rated at 3294 KW (thermal input) gas fired. The emissions reference A11.

- The Boiler House is located at B135 (SU 58895 04035). The boiler house has three Weishaupt gas fired, fire tube boilers installed. Model Rgl70/2-a, SNo: 4529946, 4529949 and 4529948. These boilers provide comfort heating for site buildings. The emissions from these three boilers route to a common stack. The rated thermal input of the boilers is estimated at 5.7 MWth. The emissions reference is A10.

Note: See emissions monitoring report '8101-1Ar1 – Air Quality Assessment – Standard Aero, Gosport' for risk analysis.

7.0 Environmental Considerations

7.1 Water Use

Water is primarily used in the proposed installations for reagent dilution and preparation, and for rinsing the engine components between each chemical treatment stage. The water use is therefore dictated by the volume of the treatment baths (i.e. for dilution of the concentrated reagent) and the quantity of water required to provide adequate component cleaning (i.e. rinse waters). The production throughput and engine manufacturers cleaning specifications dictate both of these. Rinse water arisings are classified as:

- Immersion rinse stations
- Spray rinse stations

The proposed cleaning process to be operated by VAIL differs from the typical industrial surface treatment (e.g. plating, decorative oxidation, etc) operations associated with a manufacturing process. For the latter it is usually possible to have a fixed cleaning regime with inter-stage immersion rinse baths through which the rinse water is cascaded in accordance with indicative BAT requirements. At the proposed installation, the duty of the plant is to clean, using a variety of physical and chemical techniques, a wide range of aircraft components. Therefore, depending on factors such as the manufacturers cleaning specification, the component metal type, the debris on the component, etc. the components may be treated in one or more of a number of chemical vats. Accordingly, the layout of the treatment vats on the proposed installation has been carefully optimised to minimise the manual movement of components. However, this use and layout of rinse baths does not facilitate cascade rinsing and therefore an eco-rinse system based upon spray rinsing of the components over the treatment bath has been implemented instead. The rinse system has the advantage over cascade rinsing in that the treatment chemical is rinsed back into the treatment vat thereby significantly reducing chemical carry-over.

Between each chemical treatment stage, the components are immersed in a rinse bath for washing-off any remaining chemical. Water is continually pumped through the rinse baths, with the wastewater treated in the effluent plant and then recirculated back to the rinse baths.

In addition to immersion rinsing, the cleaning specifications require some components to be cleaned by spray rinsing. The spray wastewater is captured, pumped to the effluent treatment plant, and recycled back to the process. In accordance with BAT requirements, water used for component rinsing is recycled with only a small freshwater make-up to account for losses.

In the case of immersion rinses it is normal practice to ensure water contaminant concentrations do not exceed the specified level required for the final washing or for onward processing to the next rinse bath. This is established on the basis of rinse vat volume, starting concentration, carry-over from previous rinse, and rinse water recirculation rate. To minimise process solution carry-over, when components are lifted out of the treatment vat, they are allowed to drain; are turned to promote solution drainage; and, where the cleaning specification permits, are spray rinsed over the process vat.

In the case of spray rinsing, the operator controls the water application, though, in accordance with BAT requirements for washing activities, all water is recycled.

Once the plant has been commissioned, water use will be optimised and regularly reviewed as part of the ISO14001 audit process. Water consumption is monitored continuously with records maintained by the Process Manager. Fresh process make-up water is drawn from the town-water supply; annual consumption is detailed below:

Activity	Source 2023 Data Collected	Annual flowrate (m^3)
Process make-up	mains water supply	6,847
Discharge to municipal sewer	effluent treatment plant	4,210
Off-site disposal	effluent treatment plant	61

A diagram of the water circuits with indicative flows is provided in drawing 002 Clean Bay and WWTP.

Minimising the risk of surface water contamination
In line with BAT requirements the drainage from process areas are independent from surface water drainage in order to prevent contamination of local watercourses. The proposed installation is located within a building, the floor of which is of epoxy-coated concrete construction. All treatment tanks are located within spill containment bunds. Any chemical or wastewater spillage onto the building floor is collected in a sump and pumped to the effluent treatment plant. There are no surface water drains in the processing area of the building.

Rain water run-off from the building roof is discharged directly to the surface water drain system.
Raw material and waste storage tanks are located within spill containment bunds. Rain water or spillages within the bunds will be pumped to the effluent plant. Pipe-lines between the bunded tank and the process are run in below ground level concrete trenches for VAIL, any spillage will back flow to the process building sump.

Minimising water use in cleaning and washing down activities
Water for general cleaning of process areas and the reagent tanks will be monitored as part of the ISO14001 EMS and, with appropriate operator training, water use will be kept to a minimum. The main water use within the installation is associated with rinsing stages between treatments tanks to prevent process contamination. The main water source is town mains and secondary is recycled grey water from the treatment plant. The Installation for surface treatment by chemical and associated activities is predominantly water-based and generates significant quantities of effluents containing both inorganic and organic pollutants. The wide range of processes and of raw materials means that effluents are complex and vary in composition by time, process and plant used. The most effective method for preventing pollutants entering the water environment is minimisation of the loss of materials by direct or indirect paths. The primary source of loss includes:

- loss of materials by drag out into rinse-waters;
- loss of chemical containment;
- Unintended discharge resulting from an accident, incident or system malfunction.

Rinse water from the installation is pumped to the effluent treatment plant, building 97 for PH adjustment, neutralisation, coagulation and flocculation of suspended solids including heavy metals i.e., cadmium. The waste water is recirculated back into the process or discharged to sewer for municipal waste water treatment. Discharged waste water is tested routinely to ensure it meets regulatory discharge requirements. Waste water from the cleaning tanks and treatment plant is contaminated by used reagents and the breakdown products from the processes. The main ingredients of concern are:

> organic materials
> immiscible – non-halogenated oils, greases, solvents
> soluble – wetting agents, brighteners, organic ions etc.
> particulates suspended solids i.e. residues, metallic particles
> acids and alkalis
> metals, cadmium etc.

The effluent treatment plant processes rinse water from the installation of building 110. Effluent is routed via pipes to holding tanks and then the treatment plant for chemical treatment to destroy or change harmful chemicals to less harmful species and separates harmful chemicals from the water to predetermined levels. The removal of the contaminants from water is achieved by filtering and/or settlement techniques, followed by flocculation at the correct pH and settlement. Waste water treatment lines are segregated by type then subsequent mixed treatment. Treatment is by continuously flow.

Abatement of point-source emissions to surface water and sewer
Indicative BAT requirements for wastewater emissions are:

- water use should be minimised and wastewater reused or recycled
- contamination risk of process or surface water should be minimised
- effluent streams should be characterised to optimise treatment
- systems should be engineered to avoid effluent by-passing the treatment plant
- emissions should be controlled to avoid breach of water quality standards

With the exception of rainwater run-off from the process building roof, there is no discharge of process wastewater to surface water drainage. In addition, process service trenches outside of the production buildings are covered to minimise the ingress of rainwater.

All process wastewater and rinse water from the production operations is transferred to the effluent plant for treatment. The treated water from the effluent plant is either:

- recycled to the production operations
- disposed of off-site as Hazardous Waste
- discharged to sewer

In accordance with indicative BAT, the effluents from the production operation are segregated to maximise the quantity of treated water that can be recycled. Segregation allows cadmium-bearing effluents to be transferred to a storage tank for off-site disposal, eliminating the risk of contaminating the effluent discharged to municipal sewer and the treated water that is recycled back to the process.

The final effluent is discharged to the municipal sewer on Fareham Road, Gosport.

The municipal sewer system comprises separate foul and surface water drains. The latter discharges to the nearby Frater Lake, whilst the former discharges to the Peel Common municipal sewage treatment works, the outfall from both of which discharge to the estuary (Portsmouth Harbour).

The sewage treatment works provides effluent screening, primary treatment (settlement), secondary treatment (biological) and final settlement prior to discharge to the estuary. The treatment works provides effective solids and COD/BOD removal, however no specific treatment is provided for metals removal (though some reduction will occur as a consequence of sludge settlement).

The final treated effluent discharge to the sewer has the following composition:

Component	Design Concentration	Current Consent*
Temperature	ambient	less than 43.3 C
pH	5 - 11	5 - 11
COD	<800 mg/l	<800 mg/l
Volume	<70m^3/day & 1.67 ltr/sec	70m^3/day & 1.4 ltr/sec
Suspended Solids	400 mg/l	400 mg/l
Sulphate	500 mg/l	N/A
anionic detergents	50 mg/l	N/A
cationic detergents	50 mg/l	N/A
non-ionic detergents	50 mg/l	N/A
Copper	0.5 mg/l	0.5 mg/l
Chromium (total)	1 mg/l	1 mg/l
Chromium VI	0.2	-
Nickel	0.5 mg/l	0.5 mg/l
Zinc	2 mg/l	N/A
Lead	0.5 mg/l	0.5 mg/l
Cadmium	0.01 mg/l	0

* Note: Southern Water Services Ltd consent number 14198 for rinse waters arising from cleaning and plating processes associated with the repair and maintenance of helicopters.

The cleaning chemicals used within the process comprise acids, alkalis and organic solvents. In addition, mineral oils are used for controlling evaporative losses from the treatment vats. The cleaning solvents, (e.g. alcohols, glycol, etc) and mineral oils are readily biodegradable and it is anticipated that the resulting COD/BOD ratio of final effluent will be approximately 1.5, thus permitting effective treatment at the municipal sewage works.

Potential Issues Related to Waste Contamination
Source: Effluent Sewer discharge Point W1
Pathway: Foul Sewer Fareham Road
Receptor: Sewage treatment plant, land to ground water through loss is sewerage pipe work
Impact: Loss of biological sewage treatment, disruption of sewage sludge management, impact to water resources for drinking, impact to water use and aquatic ecosystems.
Cause: Poor housekeeping or accidents in handling and storing solutions, including the failure of storage containers and process tanks, cause acute polluting discharges to surface water drain or land, as well as both chronic and acute pollution events affecting groundwaters and soils.

The batch discharge of used process solutions without adequate treatment or which overload treatment facilities, is also a cause of surface water pollution. Overload may be caused by poorly designed or out-of-date facilities, production capacity increasing beyond the projected design capacity, changes in process type and/or poor control of water and material usage in the processes. losses in evaporation from drying components, hot solutions in open tanks and from some recovery processes. Water is used in making fresh process solutions (make up); the service life of these solutions varies according to the activity and throughput.

Leaking Pipes, tanks, Containment defects
Control of fugitive emissions to surface water, sewer and groundwater. BAT requirements in relation to site drainage are:

- Establish and record the routing of all installation drains and subsurface pipework
- Identify all subsurface sumps and storage vessels
- Engineer systems to ensure leakages from pipes are minimised and easily detected if they occur
- Provide secondary containment and / or leak detection for each subsurface pipework, sump or storage vessel.
- Establish an inspection and maintenance programme for all subsurface systems.

With regard to surfacing, BAT requirements are:

- Establish inspection and maintenance programmes for impervious surfaces and containment kerbs
- Provide as appropriate, an impervious surface, spill containment kerb, sealed construction joints or sealed drainage system to prevent contamination of ground or groundwater.

VAIL shall maintain drawings of all site drains and underground services. A copy of the drainage plan is given in Drawing 001.

The proposed installation does not have any underground storage vessels, though sumps will be installed in the production buildings to allow gravity draining of the rinse waters and to maintain a "dry floor" policy (i.e. floor washing and spillages drain into the 'sumps' for transfer to the effluent plant).

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To construct the 'sumps', trenches were excavated in the floor in to which thermoplastic tanks were placed. The trench is lined with concrete to prevent any leakage from the sump tanks to pollute the underlying ground/groundwater. The sump tanks are filled around with concrete so that floor washings flow into the sumps rather than the trench. However, the concrete fill is porous to a certain extent and therefore inspection probe holes are installed to permit monitoring for chemical leakage (e.g. any leakage from a sump will flow through the concrete fill and be observable in the probe holes).

The floors of the production buildings (cleaning lines and effluent plant) are of concrete construction and have a chemical resistant epoxy coating. The area of building associated with the VAIL NDT line will not be epoxy coated as aggressive chemicals will not be used in that area; though expansion joints in the floor will be filled with a chemical resistant sealant.

In accordance with BAT requirements, pipework between the process and storage tanks outside of the building will be run in below ground concrete channels with removable covers to prevent rainwater ingress but to permit maintenance inspections.

All treatment vats are mounted within spill containment bunds designed to hold, as a minimum, 110% of the capacity of the largest vat. Also, the chemical cleaning vats are all raised above floor level to permit full inspection and leak detection thus minimising the potential for concentrated chemicals to contaminate floor areas. With regard to the plastic sump vessels within the building floor, these will have a metal outer 'conductor' skin to permit leak detection by 'spark-testing'.

In accordance with BAT requirements external areas of the installation are of sealed concrete construction. The nitric acid and waste effluent storage tanks are located in a recessed "catchment" area to retain any spillages and to prevent possible contamination of site surface water drains.

In accordance with indicative BAT, bunds and floors are inspected as part of VAIL planned preventative maintenance programme.

Emissions to Groundwater

All potentially contaminated wastewater discharges from the installation are directed to the public sewer, there are no emissions to groundwater or other controlled waters.

Ground Conditions

The Permitted Installations are underlain by London Clay of Palaeocene age. These consist of mixed grey and brown clays, which will provide an effective barrier against migration of any polluted surface waters to the Cretaceous Chalks and Green sands beneath the clay. The British Geological Survey map (Portsmouth Sheet 331) indicates that there is no drift cover present under the site, though drift of less than several metres in depth is often unrecorded. The Environmental Agency Groundwater Vulnerability map relevant to the subject site 4(North-West Hampshire Sheet 4) shows the site overlying a non-aquifer.

Environment Agency public records note that the VAIL Site at Gosport are not within an indicative flood plain and is not within a flood protection warning area. The records also indicate that site is not within the Source Protection Zone of any groundwater abstractions. However, the highest risk from surface water flooding is a 1 in 1,000 year event of 0.10 - 0.30m depth and a 1 iin100 year event of 0.10 - 0.30m depth, within 50m of the site. The risk from groundwater flooding on site and within 50m is moderate to high, based on a 1 in 100 year event.

Site drainage
The area of the site in which the installation is located is hard covered. Whilst there are landscaped areas (grass and shrubs) on the site they are not in the vicinity of production activities and are not, therefore, at risk of pollution.

The site drainage systems comprise:

- Rainwater run-off from the building roof area. This water is uncontaminated and the site drains feed directly into the surface water sewer. The drain outfall is fitted with a shut off valve that can be closed if site drains are contaminated as a result of a chemical spillage or a fire on the site.
- Surface water (i.e. rainwater) run off from tank storage areas external to the process building. This water is retained within the tank farm "catchment" area. As there are no surface water drains within this area then collected water will either evaporate or, may, enter the below ground level pipework trench and flow to the process building sump. Water from the sump is pumped for treatment to the effluent plant and ultimately will be recycled to the process or discharged to the municipal sewer.
- Process wastewater. Wastewater from the process is treated in the effluent plant prior to being recycled to the process. Following treatment the water is recycled back to the process with the remainder either lost by evaporation or discharged to the municipal sewer.

Emissions to groundwater
The VAIL site is accredited to the ISO14001 environmental management system, and the proposed installation will be subject to an environmental aspects evaluation that will consider the potential for groundwater contamination. Following the aspects appraisal any issues identified will be addressed through specific operator training or the preparation of written control procedures.

As there are no direct or indirect discharges of potentially polluting effluent to groundwater, the risk of pollution is considered to be low. To minimise the risk of accidental pollution occurring as a result of a spillage, the following actions have been taken:

1. Process vessels, tanks on the effluent treatment plant and bulk storage tanks are bunded to contain spillages. Rainwater collecting in external bunds is pumped to the effluent treatment plant.
2. Production areas are hard covered and inspections are regularly undertaken to ensure integrity is maintained.
3. The integrity of underground drains and drainage channels is maintained by regular inspections as part of the site Planned Preventative Maintenance programme.

7.2 Emissions to Air

General Sector Guidance gives the BAT requirements relating to point-source emissions to air as no persistent visible plumes except for visible water vapour. In the case of releases from wet scrubbers there is also a BAT requirement to consider condensation of water, (and absorption of potentially harmful substances) which, combined with the less buoyant plume, may lead to inadequate dispersion of the pollutants. With regard to dispersion and dilution of the vent stack plume, stack heights are 3 metres above the roof ridge height of any building. To avoid unacceptable emission of droplets from wet scrubbers, the linear velocity in the ductwork should not exceed 9 m/s. The vent stack exit velocity should exceed 15 m/s during normal operation.

The current and proposed installations have 12-point source emissions, namely:

- Three fume scrubber vent stacks servicing the four VAIL chemical cleaning lines. For the purposes of identification, these scrubbers are designated A1,A2 and A3;
- The gas fired thermal oil heater vent designated A4;
- One LEV (local exhaust ventilation) extraction vents for the Lab fume cabinet, designed A6;
- 3 NDT LEV Stacks Designated A7, A8 and A9;
- Three gas fire tube boilers and common stack A10;
- Summer boiler A11;
- A wall fan for building 108's nickel strike process designated A12;
- One LEV Stack for Lab Bearing Clean A13.
- One vent pipe within B97 from a hydrochloric acid scrubber A14.

The location of these vent stacks is given on the plan in Appendix D. The only sources of significant nitrogen oxides (NOx) emissions are:

- the cleaning line scrubbers A2.
- the gas fired oil heater;

a) Cleaning Lines
Evaporation losses from the treatment vats could potentially result in trace quantities of other chemicals and oils in the extracted fume. To minimise this risk, where practicable primary pollution prevention is achieved by the use of two-phase chemical reagents that provide a floating oil layer on the treatment vat to suppress evaporation and reduce chemical "drag-out". In addition, the extracted fume from the chemical treatment lines is passed through a scrubber comprising water scrubbing section and impingement baffle mist eliminator.

In accordance with principles of pollution prevention rather than control, the proposed installation has been designed such that the fumes from acid and alkali vats are combined for neutralisation prior to fume scrubbing. This arrangement permits the use of water as the scrubbing medium with the associated environmental benefit of avoiding the storage and handling of acid and alkali scrubbing mediums. The proposed scrubber design provides for recirculation of the scrubbing medium with a fixed freshwater make-up flow. This arrangement displaces a corresponding volume of scrubber liquor to the effluent plant for treatment. Currently, it is considered that the use of a fresh (towns-water) make-up is preferable to the cost and energy use associated with recycling treated effluent.

Indicative BAT requires no visible persistent plume except for condensed water vapour. The fume scrubber will ensure compliance with this BAT requirement. In addition, as the temperature of scrubber vent gases will be close to ambient conditions it is considered unlikely, except occasionally on cold winter mornings, that water vapour condensation will give rise to a persistent visible plume. Water vapour plumes are typical of cooling tower and fume scrubbing operations in which hot or warm saturated air is discharged to significantly colder ambient conditions resulting in cooling of the plume and associated water condensation.

VAIL propose to monitor the emissions from the three scrubbers as detailed in Section below.

b) Gas fired thermal oil heater used for Vacuum Furnace.

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The oil heater is a proprietary 960 KW low NOx combustion unit. The heater will be serviced and maintained annually by the equipment supplier, or his authorised contractor, who will check flue gas oxygen and carbon monoxide concentrations to ensure the optimal combustion efficiency. As NOx emissions are minimal from the efficient combustion of natural gas in small industrial and domestic appliances then VAIL do not propose to monitor vent stack emissions of this pollutant.

c) NDT LEV Extracts

The NDT lines comprise spray booths and immersion baths for the application of florescent-penetrant; inspection booths; water rinse baths; and proprietary treatment activities, for example the vapour degreaser. Within the electrostatic penetrant spray booth, the operator sprays the penetrant on to the test piece, which is electrically charged to attract the florescent. The duration of spraying is in the order of a few seconds and is only undertaken on a few occasions per hour (i.e. perhaps four or five times). The booth is of the dry back type with a vent stack filter element to eliminate particulate emissions The booth also incorporates and water sump such that over-spray is captured and discharged to the effluent plant for treatment.

Installation Name	Vector Aerospace International Ltd				
Emission Point Reference and Location	Source	Parameter	EA Limit	Quantity	Unit
VAIL Scrubber A1 SU 59038 04270	LEV Extraction Cleaning Bay Line A	Heavy Metals (Ex Cd) VOCs Total Cadmium	1.5 20 0.05	**<1.5**	mg/m3 mg/m3 mg/m3
VAIL Scrubber A2 SU 59048 04262	LEV Extraction Cleaning Bay Lines B & C	Heavy Metals (Ex Cd) VOCs Total Cadmium NO2	1.5 20 0.05 10	<1.5 <20 <0.05	mg/m3 mg/m3 mg/m3 mg/m3
VAIL Scrubber A3 SU 59055 04255	LEV Extraction Cleaning Bay Line D	Heavy Metals (Ex Cd) VOCs Total Cadmium	1.5 20 0.05	<1.5 <20 <0.05	mg/m3 mg/m3 mg/m3
VAIL Gas Fired Heater A4 SU 59030 04270	Heater Exhaust	NOX	N/A	**Deminimus**	N/A
VAIL Lab Fume Cupboard Stack A6 SU 59050 04238	Silver Strip and Etch Process	NO2	10	**Deminimus**	mg/m3
VAIL 3 NDT Stacks A7, A8 & A9 SU 59040 04250	LEV Extraction for NDT Processes	VOCs	N/A	**Deminimus**	N/A
VAIL Boiler House A10	Three Fire Tube Boiler Stack Emissions	NOX	N/A	**Deminimus**	N/A
Summer Boiler A11	Emissions from boiler vent	NOX	N/A	**Deminimus**	N/A
VAIL Nickle Strike Stack Fan A12 SU 59072 04263	Nickle Strike Process Building 108	NO2	10	**Deminimus**	mg/m3
VAIL Lab Bearing LEV Stack A13 SU 59040 04230	Bearing Cleaning Lines	VOCs	20	**Deminimus**	mg/m3

VAIL ETP B97 Hydrochloric Tank Vent Pipe A14	Hydrochloric Tank Vent pipe from small scrubber unit	NOX	N/A	**Deminimus**	mg/m3

The vent stack emissions from the spray booths are negligible and not considered to be polluting. The sole purpose of the fume extract is to provide an airflow from behind the operator in accordance with COSHH (Control of Substances Hazardous to Health) requirements.

All LEV (local exhaust ventilation) equipment is inspected and tested annually; the tests include monitoring the extract rate, work place noise assessments, and occupational exposure monitoring.

The main source of pollution to air is from process vapour, gasses and mists from point sources i.e. LEV and scrubber stacks. Fugitive emissions may also contribute to emissions i.e. from spills. Process emissions may contain NO2, VOCs, heavy metals including cadmium. These emissions may add to background pollution and effect land, water and air quality.

The following table represents the point source emissions to air

Hexavalent chromium is used in the following process tanks:
GE Line - Tank 15b, 110 Cleaning Bay Tanks D11, D13 & D14. With the exception of tank D11, tanks are not heated or agitated. There is a low risk of liberating Hexavalent chromium in air. D11 is agitated by air, chromium may be liberated in mist and water droplets.

Hydrochloric, nitric, phosphoric, sulphuric, hydrofluoric, acetic acids or alkalis may produce acid fume and NO2. The following tanks contain these substances:

- Hydrochloric Acid - Nickle Strick Tank 3 (Ambient, low risk of emissions), ETP Hydrochloric dosing tank.
- Nitric Acid – M250 Line Tank 16, 110 Cleaning Bay Tanks A3 and A4
- Phosphoric Acid GE Line Tank 7, 110 Cleaning Bay Tanks C8
- Acetic Acid, GE Line Tank 6, 110 Cleaning Bay Tanks B11

Cleaning using sulphuric Acids is used in the following process tanks:
Nickle Strike Tank 2. Ambient, small volume, low risk of vapour liberation.
Aqueous alkaline cleaning > 60°C:

Control of fugitive emissions to air

The chemical cleaning process is located within a ventilated building. Each of the treatment vats is fume extracted to ensure the maintain building's air quality is within Health & Safety Occupational Exposure guidelines. In accordance with Health & Safety (i.e. COSHH) requirements VAIL carry out regular workplace air quality monitoring and LEV (Local Exhaust Ventilation) testing. Fugitive fume emissions as a result of natural building ventilation will therefore be dilute and present a negligible impact upon the environment.

The effluent treatment plant is also located within a building. Fugitive emissions will arise as a result of evaporative losses from the treatment vessels, though as these are fitted with lids that remain closed during normal operation the fugitive emission will be minimal and comprise essentially water vapour with negligible environmental impact.

Monitoring

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Point Source Monitoring – Air
As the activities undertaken result in emissions to Air, monitoring is undertaken to ensure the emissions comply with permit conditions.

For the purposes of pollution control, emissions of nitrogen oxides are considered relevant and will be monitored accordingly as follows:

- Release Point A2, Line 'B/C' Fume Scrubber

All cleaning line fume scrubber vent stacks will be equipped with monitoring ports in accordance with BSEN15259. The vent stacks will also be designed to permit access to the sampling ports by the erection of a scaffold frame structure or proprietary access platform.

Sampling of the VAIL A2 for compliance monitoring of nitrogen oxides will be undertaken annually in accordance with current standard and as summarised below:

Parameter	Monitoring Frequency	Methodology
Nitrogen Oxides	Annual	The method involves the pump extraction of a gas sample from the vent stack with the NO and NO_2 oxidised to NO_2 and NO_3 followed by the reduction of NO_3 to NO_2, which is then determined by ion chromatographic methods.

Release Point A4 - Gas Fired Thermal Oil Heater
The gas fired oil heater is a proprietary low NOx unit, which will be serviced annually by the equipment supplier or other maintenance contractor. The annual service includes for vent stack emission monitoring for the purposes of testing combustion efficiency. VAIL do not propose to undertake any other emission monitoring. The vent stack will be equipped with monitoring ports in accordance with BS6069 (Historic Asset). The vent stack will also be designed to permit access to the sampling ports by the erection of a scaffold frame structure or proprietary access platform.

Release Point NDT LEV stacks
Monitoring is not proposed for these stacks as the fume extraction is provided for the purposes of occupational exposure control. VAIL will be undertaking annual LEV testing in accordance with COSHH requirements. In addition, VAIL undertakes regular work place monitoring to ensure fume concentrations comply with occupational exposure standards.

Process Monitoring
In addition to emission monitoring VAIL monitors the following process variables:

a) Materials storage
The warehouse quality assurance department carries out regular compliance checks on all purchased raw materials.

b) Blending

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Chemicals are blended within the treatment vats in accordance with written procedures. Samples of the vat contents are routinely monitored to check the condition of the treatment chemicals.

b) Chemical treatment & NDT
Operations are undertaken by competent staff. Written component cleaning instructions are followed that detail specific treatment requirements for each engine component. Treatment vat temperatures and rinse water flowrates are monitored and recorded.

c) Effluent treatment plant
The treatment plant is operated under automatic control with reagents being added under pH and Redox control. The effluent outfall is monitored for pH and flowrate with the plant being automatically shut down in the event of abnormal conditions.

d) Fume scrubbers
The pH of scrubber liquor is continuously monitored to demonstrate correct function of the abatement systems.

e) Water consumption
Water consumption is monitored during the cleaning process to ensure the adequacy of component rinsing. VAIL monitors site wide water consumption on a monthly basis as part of their ISO14001 EMS policy.

f) Energy consumption
The plant's total consumption of electricity and gas is monitored on a monthly basis and reported for review as part of the VAIL ISO14001 EMS policy.

7.3 Noise & Vibration

Surface treatment and associated activities are not considered a significant noise nuisance. Some activities do generate noise. These would be heard as peaks, such as unloading of metal components in stillages, or continuous noise from fans and motors sited externally within LEV and scrubber systems. Peak noise level is expected within working hours. The site has conducted an environmental noise impact assessment. Excess noise and vibration may result from poorly maintained plant and equipment. The probability of a complaint is deemed low. The Company has established a complaint reporting process, should a noise complaint be received it will be investigated and appropriate action taken.
Please refer to Vector Aerospace, Gosport Noise Assessment. Technical Report: R10362-1 Rev 0 for further information. The conclusions of the report were the current and proposed installation, with noise mitigation measures implemented, will result in a low impact.

7.4 Energy & Water Demand

The permitted installation and directly associated activities include the Clean Bay area within building 110, the Effluent treatment Plant Building 97, Medium Combustion Plant and the Materials and Recycling facility. The later has been excluded in an estimation of energy demand as only minimal LED lighting is provided in the area, further reduction techniques would have a negligible impact on the installations overall demand thus the MRF area is not considered to be a significant energy user.

BAT requirements for energy efficiency techniques have been addressed within the BAT assessment '8101-1Br1 - Best Available Techniques Assessment - StandardAero, Gosport'. Please refer to the above assessment for a review of energy efficiency requirements as detailed within the Environment Agency guidance, The Surface Treatment of Metal and Plastics by Electrolytic and Chemical Process (EPR 2.07).

A detailed summary of permitted activities including directly associated activities is identified here in. VAIL is unable to effectively monitor energy and water consumption within the boundary of its permitted installation as there is insufficient submetering in place. Various options have been explored to enable VAIL to estimate energy demand.

Option 1: Measure demand from sub metering data.
Current data from installed submeters covers a significantly wider area than the permitted installation. It would be difficult to estimate the demand from other locations within the sub metered area as many processes are intermittent and the permitted installation represents a lower proportion of demand. The option to use current meter data encompassing the installation was discounted as results could not be relied upon to report an accurate picture of energy demand.

Option 2: Inventory of Energy Using Equipment
The option to create an inventory of energy and water using equipment was considered to estimate energy and water use within the permitted installation in conjunction with equipment run times. There are potentially thousands of pieces of energy and water consuming equipment within the installation. Due the intermittent nature of equipment use, and limited equipment specifications and or records it would not be practicable to accurately estimate energy and water demand using this methodology and thus this method to determine energy demand was discounted.

Option3 Data Logging of Installation Electricity, Gas and Water Supplies
The most viable option to estimating energy and water demand from the permitted installation was to establish a combination of meter reads (where the meters covered parts of the installation only) and data loggers on energy supplies routed to the installation. This method allowed VAIL to record daily energy and water demand for the permitted installation over a period of up to 34days. VAIL averaged the results of the data to omit holiday periods were relevant and produce a daily demand which was multiplied over the number of operational days in the year to provide an estimate of annual demand by area for the permitted installation. Whilst this method may have drawbacks in terms of not accurately accounting for seasonal variation in regards to comfort heating it was deemed the best method to be used in the circumstance.

Energy & Water Demand
Energy & water consumption within the permitted installation is identified below by use of a combination of daily meter and data logger reads averaged over the reported period to give an average daily demand for the installation. This average daily demand was multiplied by the number of operational days in the year to provide an estimate of annual energy and water demand for the installation. This demand is the effective baseline for the installation and will be used to set energy and water objectives and reduction targets. Note: average demand was determined during peak winter months, although some account for seasonal variation has been taken, actual demand is likely to be less for any given year. The data provided below is considered to be the highest demand likely for the installation.

For the VAIL installation, the forecast base line energy and water demand is:

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	B97 ETP		Boilerhouse				B110 Cleaning Bay			
	Electric (kwh)	Water (M³)	Electric (kwh)	Water (M³)	Gas		Electric (kwh)	Water (M³)	Gas	
Data collected between 10/12/24 - 15/01/25 (No data between 25/12/24 - 01/01/25)										
Note: MRF demand omitted. Minimal lighting units only, negligible demand. Site unable to impact on metrics with further reductions.										
Starting Figure	185787	89640	0	17623	5362391	m^3	0	31083	2370517	m^3
Closing Figure	189174	90125	15,909.56	17674	5480297	m^3	36,511.28	31168	2378580	m^3
Total Used	3,387	485	15,909.56	51	117906	m^3	36,511.28	85	8063	m^3
Days Measured	29	29	34	29	34	m^3	14	29	29	m^3
Daily Average	116.79	16.72	467.93	1.76	39,403.72	KWh	2,607.95	2.29	3159.21	KWh
Weekly Average	818	117	3275	12	275826	KWh	18256	16	22114	KWh
Annual Average	42512.69	6087.59	170325.88	640.14	7171477.55	KWh	949293.28	833.56	1149953.586	KWh

The determination for energy demand is detailed within document ‘Energy Data for Permit’.

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Basic Energy Requirements
VAIL has a site wide Environmental policy maintained under its ISO14001 management system. It is therefore advantageous for VAIL to consider energy efficiency on the existing installation as part of a co-ordinated site wide strategy, whilst delivering on specific BAT requirements. The basic energy management strategy is therefore based upon:

a) Incorporating energy efficiency within the design and specification of plant and equipment; and
b) Addressing energy supply, building services and maintenance issues as part of a site wide energy efficiency plan.

The Company's energy efficiency policy aims to:

- Raise the staff awareness of energy conservation
- Implement monitoring of energy consumption
- Assess the performance and efficiency of plant, equipment and their services
- Reduce wastage a compressed air
- Reduce unit energy consumption to improve product efficiency
- Ensure the purchase of energy efficient tools and equipment
- Provide adequate maintenance of equipment and services

These aims are formally addressed in a written Environmental policy statement and will be implement by establishing energy baselines for Business Units on the site, the appointment of designated employees to monitor monitoring energy use.

Further energy & water efficiency techniques
During the design of the installation the following techniques are adopted to reduce energy and water demand:

➢ Electric motors - Electric motors are used on the vent stack extraction fans and the pumps used for transferring rinse waters and effluents. Many of the motors are existing from the current treatment plant. In the event of new motors being purchased then energy efficiency will be considered.
➢ Vat heating - A high efficiency, gas fired, thermal oil heating system is used to maintain the temperature of the heating baths. The hot water is drawn from a site boiler, and whilst a central boiler is an efficient means of heating water there are problems with heat loss from transmission pipework. The proposed installation as a dedicated thermal oil heater that is located close to the treatment baths, with heat loss minimised by the short transmission distance and the high standard of insulation to be provided on the pipework and around the vats.
➢ Plant start-up - During the heat the plant is turned off resulting in fume build up within the vats. To prevent release of this fume when the operator lifts the vat lid to insert components, it is necessary to start the extract fans a short period prior to work commencing. The start-up and shut-down period for the extract fans will be optimised during plant commissioning.
➢ Building controls - The proposed installation is to be located within an existing site building that is already monitored in accordance with VAILs Environmental policy.
➢ Rinse water From Clean Bay Vats is routed through filtration trains to enable up to 70% of water used to be recycled back to the process. This enables the site to minimise demand on potable water supplies. For further information regarding water reduction methods please see section 7.0.

Electricity is used to operate the process plant and equipment such as pumps, transporter equipment, other motors and compressors. It is also used for tank heating as well as space heating and lighting in the installation. Gas is primarily used for space heating. There are transmission losses when electricity is transformed from high to low voltages. Energy can also be lost when drawing from more than one phase (reactive energy), as well as in DC (direct current) supplies to the treatment lines. Energy is also consumed in raising the temperature of the process baths, in drying components and for other heating activities. Losses occur from evaporation and as radiant heat from equipment. Some process chemistries require more heat energy than others. Energy is also used in drying workpieces and in extracting process vapours, gas and mist.

Source: Installation
Pathway: CO2 and NOx production to Air, Land, Water from power station.
Receptor: All, Global

7.5 Odour

Odour can be associated with processes giving rise to acid vapour, mists and gases especially when stripping metal layers. In all cases, resulting emissions are extracted and where required by risk assessment scrubbed. VAIL ensures where required the use of wet scrubber technology and stack heights will provide good dispersion. The control of linear stack velocity and the proximity of receptors, such as local housing poses a low risk of odour complaints. None of the reagents to be used at the installation have a particularly offensive odour and, other than the provision of process ventilation and fume scrubbing, no specific odour abatement controls have been provided or considered necessary. VAIL have been operating the Effluent Treatment Plant since 2009 without compliant.

Source: Installation Stacks & Fugitive Emissions
Pathway: VOCs, Heavy Metals and NOx production to Air, Land, Water.
Receptor: Land and Water

7.6 Waste

Waste management at the permitted installation is described within procedure ‘VAIL-EHS-074 Management of Waste’. This procedure sets the framework for waste management within the permitted installation. VAIL-EHS-074 is brought to the attention of employees during induction and environmental awareness training including refresher training.

Waste generated by the permitted installation include hazardous and non-hazardous materials. All waste is removed by an approved licensed waste contractor for treatment and disposal as required.

Mirror code wate, as described in WM3, is subject to basic characterisation and compliance monitoring/testing and is listed on the Company’s waste classification tool, ref Doc ‘SA Fleetlands Waste Sample Plan Issue 1.0’. All wastes arising from the process are assigned an EWC code and relevant waste transfer or consignment notes are retained on file. Waste mirror codes are assigned a sample number and sampling will be planned in accordance with compliance requirements i.e. basic characterisation and or compliance testing.

Handling & Storage of Waste Materials

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Hazardous and non-hazardous waste shall arise as a result of the surface treatment of metal part processes, the treatment of liquid waste and directly associated activities. The site has a secure dedicated waste storage area behind building 41. This area is named the Materials Recycling Facility (MRF). The MRF has a number of skips ranging from 6Yd to 40Yd ROROs for the bulk storage of non-hazardous waste streams including metal, general waste, paper and carboard. The area also has a partially enclosed, roofed, impermeable hard standing that is surrounded by a sump which acts as secondary containment for liquid spillages, its capacity if 65m3. This area is used to store hazardous waste by type including liquid effluent that is not stored within the off-haul tanks adjacent to building 97. Hazardous waste that arises from the Installation, that is not off hauled, will be transferred to the MRF via FLT or van and is stored within the hazardous waste semi-enclosure. Storage containers will be appropriate to the waste in question and include original containers, 205L drums & IBCs. All persons that handle waste are trained in that respect. Spill kits are strategically placed in areas where spill may occur including the Clean Bay B110, MRF, Bulk Chemical Stores Area 99 & ETP B97. The MRF area's surface water drainage systems in linked to an oil water separator.

Significant Waste Streams

Filter Cake - Filter cake from the treatment plant may contain heavy metals including cadmium and other hazardous substances. Filter cake is handled in line with COSHH Risk Assessment requirements and stored within a covered and locked skip in area 99. Composite samples are taken for WAC testing prior to acceptance by the wate transfer station and land fill site. The skip is covered to prevent rain water ingress and subsequent leaching from the skip to ground.

Spent Chemical Reagents

Spent chemical reagents from the Effluent Treatment Plant are routed to either storage tanks or Off Haul tanks within the bunded area adjacent to effluent treatment plant. See installation inventory for further information. The waste storage areas is clearly marked, secured and labelled in line with the sites risk assessment. All below ground pipe work routed to the Tank Farm is routed in concrete lined trenches that flow back to the given sump. All above ground pipework is double skinned with trace heating provided to prevent freezing and loss of containment.

Spent Chemical

Spent chemicals as indicated by the installation inventory list shall be either routed to the off-haul tanks for transferred to the MRF by FLT within drums or IBCs.

Quantity of Waste disposed by the permitted installation.

The quantity of waste disposed including disposal routes within the permitted installation is estimated within 'SA Fleetlands Waste Sample Plan Issue 1.0'. Records of waste disposed in the form of waste transfer or consignment notes are retained on file for two and three years respectively. Waste arising from the installtion are reported in line with PIEDC, the last reporting period 2023 is detailed below.

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Number	Waste stream	Category of waste	Mass (t/yr)	Disposal/Recovery option
1	Phosphoric & phosphorous acid (060104*)	Hazardous	0.2	Biological and physico-chemical treatment (D8 and D9)
2	Nitric acid & nitrous acid (060105*)	Hazardous	3.5	Biological and physico-chemical treatment (D8 and D9)
3	Other acids (060106*)	Hazardous	2.1	Biological and physico-chemical treatment (D8 and D9)
4	Filter cake (110110)	Other non-hazardous	1	Landfill (D5)
5	Aqueous rinsing liquids (110111*)	Hazardous	60.7	Biological and physico-chemical treatment (D8 and D9)
6	Oily water from oil/water separation (130507*)	Hazardous	50	Biological and physico-chemical treatment (D8 and D9)
7	Mixed wastes- grit/oil/water separators (130508*)	Hazardous	75	Biological and physico-chemical treatment (D8 and D9)
8	Contaminated packaging (150110*)	Hazardous	0.118	Other recycling (R3:R4:R5:R11 and R12)
9	Organic waste (160305*)	Hazardous	0.05	Other recycling (R3:R4:R5:R11 and R12)
10	Lab chems. cont. dangerous substances (160506*)	Hazardous	0.006	Other recycling (R3:R4:R5:R11 and R12)
11	Oxidising subs. not otherwise specified (160904*)		0.01	

Duty of Care - All wastes arising from the installation will be disposed of in accordance with the requirements of Duty of Care. An up-to-date record is kept of appropriate licenses to ensure waste is recovered or disposed of without endangering human health and to minimise environmental impact. VAIL regularly review waste disposal contracts and, in accordance with Duty of Care, review waste carrier and waste disposal site documentation; undertaking site audits as appropriate. In addition, the Company has developed a waste characterisation and testing strategy to determine EWC code allocation where required. Procedures for managing site wastes are documented as part of the site ISO14001 EMS.

Waste Hierarchy - VAIL applies the waste hierarchy were reasonably practicable to reduce the impact of waste materials on the environment. The selected option for waste treatment is identified within Doc: 'SA Leetlands Waste Sample Plan Issue 1.0.' Column O. Options selected are based on the practicality and feasibility of applying the waste hierarchy, non-exhaustive examples are provided below.

Prevention – Effluent from rinse waters is treated within the effluent treatment plant. Upto 70% of water is recycled back to the Clean Bay for reuse thus reducing demand on town water supplies. Water chemistry within the permitted installation will be monitored to ensure process are in control thus reducing consumption of raw materials and chemical through process errors etc. A program of maintenance and inspection shall be established to prevent early failure of system components.
Re use – An analysis of chemicals shall be undertaken to ascertain if cleaning chemical waste within VATs may be used for PH controls in substitution of dosing chemicals.
Recycling – Where practicable grey water is recycled from the ETP and returned to the Clean Bay for use in the Cleaning Processes.
Recovery – Where Prevention, Reuse and Recycling options are not reasonably practicable, waste will be transferred to a waste carrier and the most environmentally option will be selected. See Waste Sample Plan for further information.
Disposal - VAIL always selects disposal as the last option. Disposal routes would include hazardous and non-hazardous landfill.

Handling & Storage of Effluent Plant Hazardous Wastes - Spent reagent from the cleaning vats is either pumped to the effluent plant for treatment, or pumped to one of the effluent 'off-haul' tanks for off-site disposal. (See section 6.2.2) Off-haul tanks are provided for:

- Acid wastes;
- Alkali wastes;
- Solvent wastes; and

- Cadmium effluent

The tanks are bunded, and are located in a concrete "catchment" area outside of the effluent treatment plant building. See Doc. 'VAIL Inventory & Containment Rev 1.1' for information on containment.

The final stage of treatment in the effluent plant is the settlement of precipitated solids. The clarified liquor is discharge to the municipal sewer whilst the thickened sludge is pumped through a filter press for de-watering. As the sludge contains an elevated concentration of metals it is placed in a designated closed skip for off-site disposal as Hazardous Waste. The closed skip containing filter cake is stored within the FRM with is locate within a semi enclosed bunded area. The waste disposal contractor removes the skip when full for off-site disposal. The skip is clearly labelled and stored, awaiting disposal, within the Materials Recycling Facility (MRF).

Handling and storage of Non-Hazardous Wastes - As a site service, VAIL operates a materials recycling facility that is managed in accordance with ISO14001 written procedures. The materials recycling facility is managed by the site 'Yard Maintenance Manager' to whom report a team of dedicated Material Recycling Facility Operators responsible for the day-to-day operations, including waste segregation and document maintenance.

The materials recycling facility comprises a waste store and yard area of concrete construction. A secure fence with gates that are kept locked surrounds the compound. Waste chemicals stored in the compound are held in dedicated, bunded enclosures. Wastes, such as empty reagent drums, wooden pallets, waste machine oils, etc. are brought to the compound for segregation and storage prior to disposal/reuse. Under ISO14001, VAIL operate a strict recycling policy, and where practicable, all wastes are segregated for reuse, recycling or recovery. In the case of empty cleaning chemical drums, these are usually contaminated to such an extent that incineration or landfill is currently the only viable disposal option. However, for the proposed installation, VAIL intend to arrange supply contracts that require the chemical suppliers to take back the empty drums for reuse where practicable. Waste cardboard and similar materials that can be recycled are sent to the materials recycling facility. Other 'domestic' litter arising on the installation will be placed in waste bins, which will be emptied by the site services into a 13 m^3 skip for off-site disposal. The skip is located in the service yard area of the building housing the chemical cleaning installation (site building number 110).

Waste recycling, recovery or disposal - VAIL EMS Objectives and Targets programme encourages waste minimisation, re-use and recycling of materials for the site as a whole. During the design of the proposed installation, consideration has been given to the recycling of rinse waters and extending the useful life of treatment chemicals by preventing cross-contamination and minimising 'drag-out' when components are lifted out of the vats.

The spent treatment chemicals and the effluent treatment plant sludge are the main wastes arising from the proposed installation. For process economic reasons it is essential to minimise treatment chemical wastage, hence the Company closely monitor the condition of the treatment vat reagents. In most instances the spent chemical is too concentrated or too contaminated with a variety heavy metals and chemical species for effective on-site treatment. It is therefore necessary to send the wastes for off-site treatment, in which the liquors will be bulked with other liquid wastes to produce an effluent that is readily treatable.

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Recycled materials - Waste maintenance oils are typically removed for disposal and replenished by the service contractors. Waste oils handled by site services are sent for off-site recycling. Wooden pallets are re-used on site.

Non-recyclable wastes - The spent chemicals from the proposed installation will contain a wide range of contaminants from cleaning the aircraft engine components and are not, therefore readily recyclable. VAIL has an annual contract with the waste disposal contractor Cleaning Services Group Ltd. CSG currently collect and transport sites wastes to their registered waste transfer stations, treatment sites and or landfills as appropriate. It is VAILS intention to continue to use CSG to carry and dispose of wastes arising from the proposed installation. VAIL are committed to minimising waste generation where this is practicably achievable.

VAIL determines the condition of the cleaning reagents by regular sampling and analysis. The Process Manager maintains records of reagent and water use.

In accordance with indicative BAT requirements the component racks are designed for rapid self-draining to minimise drag-out and maximise rinsing and drying efficiencies. In addition, upon lifting the racks they are held over the treatment vat to allow free draining of the chemical. To further reduce treatment chemical loss, where practicable (i.e. aqueous treatment chemicals) the operator rinses the components whilst they are over the vat with a fine water spray.

Much of the waste produced from process activities is likely to be classed as hazardous. Liquid wastes are spent process solutions that cannot be treated or discharged, and solid wastes are largely sludges from the waste water treatment plant and treatments of process solutions.

Sludges are compressed into a filter cake. The sludge contains dirt, small quantities of insoluble organic salts, organic compounds and metals removed (dissolved) from the surface of workpieces and chemicals, including dissolved metals, carried over from the treatment processes.

Other solid wastes include broken equipment such as jigs (which may contain recoverable materials), packaging for workpieces as well as used chemicals.

7.7 Waste Metals

Engine parts cleaned comprise a variety of metals and metal alloys, including heavy metals. The use of heavy metals within engines is now governed by regulation including the Registration, Evaluation, Authorisation and Restriction of Chemicals Regulations (REACh), thus the prevalence and use of heavy metals such as Cadmium is restricted, however VAIL undertakes repair and overhaul operations for engine parts manufactured before such regulations were enforced thus the presence of heavy metals on and within engine parts is likely. Metal fragments including cadmium may be present within rinse waters treated by the effluent treatment plant. VAIL has a dedicated process line for rinsing parts that may contain cadmium.

The main impact of metals is as soluble salts. Metals are neither created nor destroyed in the treatment processes or in waste water treatment. Their form is changed and/or managed by the Effluent Treatment Plant so as to reduce their concentration below permitted limit values before discharge thus reducing their impact on environmental pathways and receptors but their disposal in effluent and filter cake means that the metals still remain in part of the environment. Metals are treated, settled and flocculated within the treatment plant before disposal. Resulting treated

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sludge is strained and compressed to produce a cake. The cake is then disposed as waste in line with statutory requirements. Some levels of metal with remain in the process waster. Metals that are not removed from the effluent accumulate in sewage sludge or are transferred to the Wier Tank and then to outfall.

Six metals are of most concern for their environmental and/or health effects: cadmium, lead, nickel, chromium, copper and zinc.

Cadmium's toxic properties are well established and it is a priority hazardous substance. Cadmium particles may be contained within the tanks used to clean and treat cadmium bearing engine parts. Cadmium particle may work their way to the effluent treatment plant to outfall.

A number of treatment tanks contain Hexavalent chromium, this has adverse health effects, causing skin and mucus membrane irritation and cancer. Aerosol production of hexavalent chromium is not foreseeable as associated tanks are at ambient temperature and are not agitated. However, some Hexavalent chromium may be liberated within vapour, particularly in the summer months.

Hexavalent chromium is also soluble at a wide range of PHs and may contribute to high aquatic toxicity. Due to its solubility and chemistry, it must first be reduced to trivalent chromium before precipitation in waste water treatment plants.

Nickel metal and its salts are hazardous to health. Nickel sulphate is currently classed as a carcinogen. Aerosols and airborne particles can arise from plant and solution maintenance operations. Nickel and its salts can cause allergic contact dermatitis.

In all cases, effluent containing heavy metals is treated as indicated above. Resulting effluent discharged to foul sewer is monitored every two weeks to ensure any consent and or permit limit values are not exceeded. Stained solid filter cake from resulting sludges are WAC tested before accept to non-hazardous or hazardous landfill.

7.8 Waste Chemical

Nitric Acid - is used for the descaling and cleaning of engine components. It is a powerful oxidising agent, corrosive and gives of harmful vapours of nitrogen oxides (NOx). As an acid, it is harmful in the aquatic environment. Nitric acid fumes comprise a mix of the oxides of nitrogen, though these rapidly oxidise in the atmosphere to brown fumes of nitrogen dioxide. Nitrogen dioxide is one of the main pollutants in road traffic exhaust emissions and is a precursor to ground level ozone generation. Nitrogen dioxide is harmful to human health, vegetation and ecosystems.

ARDROX Chemicals - Most of the treatment chemicals to be used at the permitted installation are marketed under the ARDROX trade name. These chemicals comprise acid, alkali and solvent based materials. Typically, they are corrosive and harmful if ingested. High concentrations will be harmful to aquatic organisms by the effect on pH and, in the case of solvent-based cleaners, due to deoxygenation of the water during biodegradation. The environmental impact of relevant components within the Ardrox chemicals is discussed below.

Sodium Hydroxide - is used as a rust and scale remover. It is very corrosive and harmful by ingestion and skin contact. High concentrations in receiving water will injure aquatic life by effect on PH.

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Sulphuric Acid - is very corrosive and harmful by ingestion and skin contact. High concentrations in receiving water will injure aquatic life by effect on PH.

Chromic Acid - is corrosive, a skin irritant and carcinogenic by ingestion. The heavy metal (chromium) is harmful to micro-organisms used to treat wastewater and also harmful in the aquatic environment.

Sodium & Magnesium Chromate - The heavy metal (chromium) is harmful to micro-organisms used to treat wastewater and also harmful in the aquatic environment.

Mineral Oil - used as a floating oil layer on reagent vats to minimise the evaporation of the chemical reagent. The release of mineral oils to the environment is severely restricted due to the hazard that oils pose to wildlife and aquatic habitat.

2 butoxyethanol - is a high-production-volume glycol ether, widely used as a solvent in the surface coating industry and in household cleaners. Because the chemical has a short atmospheric half-life of approximately 17 hours, the risk for transport via the atmosphere is considered to be low. The estimated half-life in water is approximately 1 to 4 weeks, and the chemical is likely to readily biodegrade in aerobic soil and water; its potential for bioaccumulation is low. 2-Butoxyethanol has moderate acute toxicity and is irritating to the eyes and skin; it is not a skin sensitizer.

MAGNAFLUX Chemicals - The NDT chemicals are typically aliphatic petroleum distillate based. They generally emulsify in water and are considered to be a moderate toxic hazard to aquatic organisms and mammalian wildlife. The products have a low to medium potential to bioaccumulate, being biodegradable at low concentrations.

Chlorinated solvents - have an insignificant effect on the atmosphere; they degrade within 6-8 days (trichloroethylene) and 5-6 months (methylene chloride) and are regarded as low tropospheric ozone creators as well as insignificant (<0.5%) contributors to acid rain formation. Chlorinated solvents are unlikely to accumulate in the environment; spillages to water or soil are most likely to re-evaporate to the atmosphere, where they will break down. Furthermore, methylene chloride is completely biodegradable under both aerobic and anaerobic conditions. None of the solvents is regarded as bio-accumulative.

7.8 Decommissioning

In accordance with BAT requirements, VAIL undertakes activities in such a way as to prevent the deterioration of the site. Where an incident occurs, the Company will determine whether the incident has resulted in pollution and if necessary will undertake remedial actions in consultation with the Environment Agency. The need to prevent pollution and minimise the overall environmental impact is an integral element in the design and build of all new and the refurbishment of existing structures and processes at the site. Upon definitive cessation on cleaning operations at the site, VAIL will apply to the Environment Agency to surrender the relevant permit. Whilst the circumstances of such a permit surrender are not known it is probable that the plant and equipment would be decommissioned and removed from the site, and the process building refurbished for other use.

8.0 Emissions Inventory

The following section provides an emission inventory and benchmark comparison.

NOTE: THIS DOCUMENT IS UNCONTROLLED WHEN PRINTED

8.1 Emissions to Air

There are 9 vent stacks on the installations that are within the scope of the Permit as follows:

- VAIL Fume Scrubber Line A - Vent Stack A1
- VAIL Fume Scrubber Line B/C - Vent Stack A2
- VAIL Fume Scrubber Line D - Vent Stack A3
- VAIL Gas Fired Boiler - Vent Stack A4
- VAIL Lab Fume Cabinet - Vent Stack A6
- NDT LEV Exhausts - Vent Stacks A7, A8, & A9
- Boiler house - Vent Stack A10
- Summer Boiler - Vent Stack A11
- Hydrochloric Acid Tank - Vent Stack A14

Releases Point A1, A2, A3 & A12 - Fume scrubbers

The scrubbers will typically operate 12 to 16 hours per day, 3000 - 4000 hours per year. The treatment baths are not always in use, and the highest fume emission will occur as components are lifted out of the treatment chemical. It is likely, therefore that fume emissions will be highly variable.

iii)

Release Point A6 – VAIL Lab Fume Cabinet LEV stack Silver

Due to the frequency of the process (monthly), duration (<5Hours), Volume (<5L) polluting emissions from this vent stack is considered deminimus; the extraction is provided solely for the purposes of occupational exposure control. Monitoring is not proposed for this stack. Due to the infrequent nature of the process and minimal volume of solution chemical used emission point A6 was omitted from the H1 assessment tool.

iv)

Release Point A7, A8 & A9 - NDT LEV stacks

The are no polluting emissions from these vent stacks; the extraction is provided solely for the purposes of occupational exposure control. Monitoring is not proposed for this stack as detailed within the original permit application in 2009.

8.1.1 Effluent Discharge to Municipal Sewer

The monitoring data below depicts the wastewater analysis discharged to the municipal sewer on Fareham Road during 2023. The data demonstrates the Effluent Treatment Plants capability to reduce emissions of hazardous effluent to below consent limits.

Permitted Substance/Criteria	Permitted Value - Milligramme per litre mg/L	Report No 23-33789	Report No 23-34043	Report No 23-34364	Report No 23-34680	Report No 23-35017	Report No 23-35240	Report No 23-35461	Report No 23-35890
Date sample taken		10/01/2023	24/01/2023	07/02/2023	21/02/2023	07/03/2023	21/03/2023	04/04/2023	02/05/2023
Suspended Solids TSS	400 mg/L	7	5	9	8.5	15	5	11.5	5
SPOT COD	800 mg/L	25	25	25	25	25	25	25	25
Spot Metals	0.005 mg/L	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Chromium	1 mg/L	0.06	0.02	0.02	0.02	0.02	0.02	0.04	0.02
Copper	0.5 mg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Lead	0.5 mg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Nickel	0.5 mg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Temperature of Trade Effluent Discharged °C	No greater than 43.3 °C	11	7	8	11	8	13	13	16
Acidity or alkalinity of Trade Effluent Discharged PH	Between 6.0 and 10.0 PH	5.98	7.58	7.02	6.5	6.3	6.91	6.63	7.16
FLOW Cd	0.005 mg/L	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
FLOW COD Sample.	800 mg/L	25	25	25	25	25	25	25	25

Report No 23-36127	Report No 23-36370	Report No 23-36601	Report No 23-36871	Report No 23.37176	Report No 23-38014	Report No 23-38642	Report No 23-39210	Report No 23-39709
16/05/2023	18/01/1900	01/02/1900	28/06/2023	17/07/2023	30/08/2023	05/10/2023	08/11/2023	07/12/2023
8	8	13	5	32	67	5	10.5	5
25	25	130	25	25	25	25	25	25
0.003	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.003
0.02	0.02	0.09	0.02	0.1	0.02	0.02	0.02	0.02
0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02
0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02
15	18	23	22	20	19	18	13	10
7.55	6.58	7.4	6.93	6.79	6.97	7	7	7.05
0.003	0.003	0.003	0.003	N/R	0.003	0.003	0.003	0.003
25	25	25	25	N/R	25	25	25	25

Notes: 1: figures based on actual monitoring by VAIL during 2023.

Emissions to Sewer

There will be one wastewater discharge from the installation to the municipal sewer. The effluent is treated at the Peel Common sewage works prior to discharge to the Portsmouth Harbour. Whilst the sewage treatment works is consented by the Environment Agency to discharge treated effluent to the estuary at a concentration that will not cause harm, the Guidance Note H1 procedures also test the significance of the discharge from the proposed installation upon the estuary. The methodology for this significance test is given in the Guidance Note H1 and summarised below.

English Nature provides the following listings for Portsmouth Harbour:

- Portsmouth Harbour SSSI - notified under Section 28 of the Wildlife and Countryside Act 1981.
- Portsmouth Harbour - qualifies under Article 4.2 of EC Directive 79/409 on the Conservation of Wild Birds Special Protection Area.
- Portsmouth Harbour - qualifies under Criterion 2b and 2c of the Ramsar Convention on Wetlands of International Importance especially as waterfoul habitat.

Technical Guidance Note H1, provides guidance on assessing the impact of wastewater emissions to sewer. The assessment is similar to that for air quality impact assessment in that a Process Contribution (PCwater) is calculated and compared to environmental quality standards (EQS) published in guidance note H1.

The factors used in the assessment are as follows:

- the discharge is to sewer and will be treated in a municipal sewage treatment works
- sewage treatment reduction factor = 0.6
- The sewage treatment works discharges to an estuary
- The estuary is saline
- The estuary provides medium nominal dilution conditions giving a Dispersion Rate of 5 m^3/s.
- In the absence of actual data on estuary then the background concentration of metals is assumed to be insignificant.

As a worst-case assessment, the peak release of contaminants is assumed to be the trade effluent consent limits that are currently applied at the VAIL site. Actual monitoring data from VAIL Gosport installation indicates that pollutant concentrations within the trade effluent will be significantly below these consent conditions.

The final discharge point from Southern Waters Peel Common Sewerage Works is to the Solent. Easting 458100, Northing 097700. Shellfish Waters.

Habitats Regulations

The impact assessment of the emissions from the proposed installation upon local sensitive receptors is presented herein. The assessment demonstrates that the installation will not impact upon any nature reserve or sites as designated for the purposes of the Conservation (Natural Habitats, etc) Regulations 1994.

English Nature provided details of the local natural habitats. Upon review of the information provided, the following sites were considered relevant to the impact assessment owing to their proximity and because effluent from the installation is discharged via the municipal sewage treatment works into the estuary (Portsmouth Harbour):

Habitat	Grid Reference	Approximate distance from the installation
Portsmouth Harbour, Ramsar site	459000 104500	300 metres
Portsmouth Harbour, EC Directive 79/409 on the Conservation of Wild Birds Special Protection Area	459000 104500	300 metres
Portsmouth Harbour, SSSI	459000 104500	300 metres

The plan provided in Drawing 003 – Basic Conservation Screening Report and Maps shows the boundary of the Portsmouth Harbour site.

For the purposes of the Technical Guidance H1, other nearby natural habits include:

Habitat	Grid Reference	Approximate distance from the installation
Solent Maritime, candidate Special Area of Conservation	460900 097800	6,000 metres
The Wild Grounds SSSI	458000 101000	3,000 metres
Titchfield Haven SSSI	453900 103500	6,000 metres
Gilkicker Lagoon SSSI	460900 097800	6,000 metres
Browndown SSSI	458000 099000	4,600 metres
Lee on the Solent SSSI	455000 101600	4,200 metres
Solent & Southampton Water, Ramsar site	460900 097800	6,000 metres
Solent & Southampton Water EC Directive 79/409 on Conservation of Wild Birds: Special Protection Area	460900 097800	6,000 metres

9.0 Environmental Management System

9.1 EMS Scope

VAIL has established an Environmental Management System (EMS) that follows the Plan, Do, Check, Act approach. The scope of the EMS includes:

“The maintenance, repair, overhaul and testing (including flight test) of helicopters, gas turbine engines and associated electrical and mechanical support equipment including power plant, in accordance with original equipment manufacturers or other suitably approved data. The design, manufacture and proof installation of design authority modifications for both aircraft and non-aircraft parts. Fault and damage investigation and associated design, manufacture and repair of helicopter, fixed wing, engine and non-aircraft parts. Storage of helicopters, engines and associated ground and support equipment, aircraft and non-aircraft parts and material.”

This is broadly considered to cover all undertakings within the site boundary and associated activities outside of the site boundary where those activities are in the course of work. Any such activities include the permitted installation as detailed herein. Below is a summary of EMS documentation to provide evidence of linkage of the permitted installation to the EMS.

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9.2 EMS Policy

The Environment and Sustainability Policy sets the framework of the EMS and is signed by the site Managing Director. This includes the setting of objectives and targets for energy and water consumption reduction within the site, including the permitted installation.

9.3 EMS Procedures

Vector Aerospace International Limited (VAIL) have also established a number of EMS Procedures that details roles, responsibilities and protocols in regard to compliance requirements including:

- VAIL-EHS-048 Pollution Prevention Control (PPC), Consents & Licenses
- VAIL-EHS-040C Fleetlands Emergency
- VAIL-EHS-080 EHS Management Review
- VAIL-EHS-059 Energy Saving Procedures
- VAIL-EHS-046 Spillage Response Plan
- VAIL-EHS-070 Evaluation of Environmental Aspects Procedure
- VAIL-SUP-068 Business Continuity Plan

The above procedures are relevant to all activities within the site's boundary, including the permitted installation.

9.4 Risk Management

VAIL has established a risk assessment register of which includes any assessments within the permitted installation as provided. In addition to the risk assessment register, VAIL has established an Environmental Aspects register, linking a number of aspects and impacts assessments covering site activities, including the permitted installation. Copies of relevant aspects and impacts assessments for the permitted installation have been provided for review.

9.5 Compliance

The EMS includes an assessment of compliance to relevant legal and other requirements, including ISO14001, Environmental legislation and any site-specific compliance requirements, i.e. those arising from a permit. VAIL have provided a copy of the compliance register, including relevant references, which detail compliance requirements for the permitted installation.
Company Leadership undertakes routine EHS workplace inspection to ensure EHS standards are sustained. Any such inspection includes a review of safe working practices and conditions. Each work area is assigned a Team Leader and or Manager whom is responsible for direct supervision on employees. The Company has also established an audit schedule that includes a review of permitted activities and compliance.

9.6 Training & Competence

VAIL ensure employees are provided appropriate information, instruction, training and supervision for undertaking tasks. Please see the EHS training and learning and development procedures for further information. Competence for installation operators or similar will be determined in accordance with the above procedures and any required records held. The staff training needs are identified through staff performance appraisals and through discussions with managers and team leaders. The staff performance appraisal process is used by the relevant manager to develop a company Training Plan. All staff receive training in the correct use of their equipment and on the correct response to faults or emergency situations. Staff operating equipment and plant, which have been identified as posing a significant risk to human health and the environment through an abnormal event or an emergency, are provided in their training with clear guidance on the correct procedures to prevent or to respond to such events. Training needs may also be identified during the ISO14001 environmental aspect review process.

9.7 Maintenance & Inspection Plan

Maintenance on permitted installation equipment is referenced in various procedures including the Asset Registration and Maintenance Procedure and the Cleaning Bay Maintenance Procedure. VAIL has established a programme of inspection and auditing to verify alignment with compliance requirements, including arrangements for the permitted installation. The business unit's complete regular inspections of their areas and we have an audit schedule in place (reference Auditing Procedure and Audit Schedule). Any such audits will include areas within the permitted installation. Please see records provided.
Preventative maintenance programmes for relevant plant and equipment

VAIL operate a planned preventative maintenance (PPM) system. Documented method statements and/ or OEM requirements will be implemented, which will detail the specific activities to be followed when preparing equipment for maintenance and for the undertaking of maintenance itself. The PPM programme is reviewed annually or following the installation or modification of plant and equipment. When preparing the programme, consideration is given to the ISO14001 Register of Environmental Aspects to ensure maintenance operations specifically address environmentally critical plant and equipment. A maintenance facilitator and/ or process plant manager is responsible for producing a maintenance programme that details when specific maintenance activities are to be followed. Once work has been carried out, a report on the maintenance required is returned to the facilitator. The information received from the maintenance team is used to identify any trends in maintenance requirements. Inspection monitoring of plant and equipment is undertaken as part of the PPM programme.

Cleaning line daily operator tank checks are/will be completed to check the tanks temperature is with specification, ensure pipework is not leaking, check associated equipment i.e. floats, condition of rinse water and chemical within the tanks. Cleaning line operators undertake weekly checks of scrubber probes, Inline filters, line filter, sump condition etc. in line with OEM requirements. Weekly analysis and test of chemicals within tanks is undertaken and recorded on a lab results sheet.

9.8 Security

StandardAero is a secure facility with a 24/7 unmanned security team, we encompass a multi-layered approach of security functions including; ingress/egress barriers, access control, perimeter fencing and regular patrols. Security deter and detect criminal activity by being visible and available to support our customers, challenging, denying and removing access for unauthorised personnel. The security and safety of our facility, assets, staff and customers is our priority. Security arrangements apply to all site activities including the permitted installation.

9.9 Auditing

Bureau Veritas is the external validation and certification body for the VAIL EMS & BSI for the H+S EMS. The current ISO certificates are:

- ISO 14001:2015 certificate number is US018353. Issue date 29/06/23.
- ISO 45001:2018 certificate number is US018345, Issue date 04/07/23.
- ISO 14001:2015 certificate number is EMS 544259. Issue date 25/01/24.

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A formal internal environmental auditing system is maintained as part of the ISO14001 EMS. All aspects of the EMS are reviewed over a 24 month cycle with non-compliances reported to the Environmental, Health and Safety Manager for onward action. The audit procedure is documented in the ISO14001 & QMS MS.

9.10 Roles & Responsibilities

Overall responsibility for the management of the proposed installation including the responsibility for environmental performance lies with the Managing Directors of VAIL. As part of the implementation of the EMS, the environmental responsibility of all staff, and in particular those responsible for activities associated with the identified significant aspects and with the proposed installation, are defined and formally documented. The EMS and associated Company Policies and procedures define clear roles and responsibility for these key personnel in relation to the effective management of the activities undertaken at VAIL.

9.10 Objectives and Targets

VAIL's Environmental Policy meets the requirement of ISO14001 and commits the companies to the prevention of pollution, the meeting of all legal requirements and the achievement of continual improvement in environmental performance. On the basis of the environmental aspect review process, VAIL have prepared environmental Objectives and Targets for the site. Upon routine review of the environmental aspects of the proposed installation, and in consideration of this Permit application, any identified improvements will be incorporated into the EMS objectives and targets programme. The Company has prepared an environmental improvement programme, which is implemented, monitored and controlled within the ISO14001 environmental management system.

9.11 Operational Controls (Site Operations)

Vail has established operational controls to prevent and minimise significant environmental impacts. Any such operational controls are specified within risk assessments, procedures or similar. There are formal and documented procedures for managing significant environmental impacts. These procedures are maintained in accordance with the ISO14001 EMS. The specific plant operation or maintenance activity is carried out by competent, trained, staff in accordance with the Original Equipment Manufacturer (OEM) manuals, which specify the steps to be followed for each specific activity. Operations procedures governing preparation, Control and maintenance of chemicals and solutions is detailed within VAIL-OPS-039 and associated records. Clean Bay maintenance schedules are specified within VAIL-OPS-123. ETP maintenance arrangements are identified within VAIL-OPS-113.

9.12 Emergency Planning & Accident Prevention

VAIL maintain an Emergency Response Plan for site operations as part of their ISO14001 EMS. Please refer to VAIL-EHS-048 Pollution Prevention Control (PPC), Consents & Licenses for a summary of associated documentation. Such plans include Fire Risk assessments and tertiary containment plans for fire water runoff. Contingency plans associated with the installation are managed in accordance with VAIL-SUP-068 Business Continuity Plan and include breakdown, enforced shutdowns and changes in normal operations.

9.13 Monitoring & Measuring Performance

The Company has identified the following key indicators of environmental performance:

- Consumption of Electricity, gas and Water

NOTE: THIS DOCUMENT IS UNCONTROLLED WHEN PRINTED

- Monitoring of trade effluent discharge quality
- Monitoring of scrubber discharge to air in comparison to permitted limit values.

The EHS Department receives and reviews consumption figures and analytical data to ensure targets are maintained and anomalies are identified and actioned. The main arrangements in this respect are detailed within VAIL-EHS-048 Pollution Prevention Control (PPC).

9.14 Accident and Incident Reporting

It is the responsibility of all members of staff to report any actual or potential non-conformities in the operation of the installation processes to line management. The actions required in response to emergency incidents are laid down in the Emergency Response Plan. Incidents of non-conformity in relation to the licences and consented activities are reported, via the Environmental, Health and Safety Manager, to the appropriate regulatory body. For further information refer to VAIL-EHS—073 Accident, Incident, Dangerous Occurrences and Disease procedure.

9.15 Complaints

Internal and external complaints or enquiries from members of the public and regulatory bodies are directed to, and dealt with by the Environmental, Health and Safety Manager as detailed within VAIL-EHS-048 Pollution Prevention Control (PPC), Consents & Licenses. Anu such records are retained for 5 years.

9.16 Corrective Action & Root Cause Analysis

If an operator of equipment or plant identifies that a process is not operating within its environmental parameters and so is a non-conformity, it is their responsibility to identify the cause of the non-conformity and to take the necessary corrective action. If the non-conformity cannot be addressed then the process is stopped. All non-conformities are reported to line management, who if they deem it necessary will immediately contact the Environmental, Health and Safety Manager. It is the responsibility of the Process Manager to ensure that the cause of the non-conformity has been identified and that suitable measures to prevent reoccurrence have been implemented. Any environmental impacts will be identified and suitable mitigation measures advised by the Environmental, Health and Safety Manager. For further information refer to VAIL-EHS—073 Accident, Incident, Dangerous Occurrences and Disease procedure.

9.17 Environmental Performance

The ISO14001 EMS performance is reviewed annually by senior management. The review includes consideration of environmental performance, legal compliance, audit reports and progress against environmental Objectives and Targets including those in association to the permitted installation.

9.18 Document Control

Core elements of the environmental management system are maintained under the ISO14001 certification. Document control all records including those from the permitted installation are evaluated.

9.19 Site Infrastructure Plan

VAIL has prepared a site infrastructure plan that is summarised within VAIL-EHS-048 Pollution Prevention Control (PPC), Consents & Licenses. The plan includes details of key installation details such waste and inventory storage areas, site services including electricity, gas and water, details of secondary & tertiary containment systems, effluent discharge points, drainage, locations of vulnerable receptors etc.

9.20 Climate Change

Risk associated with a changing climate are considered and addressed within the risk assessment for the permit application. Such risk will be periodically reviewed in line with the sites risk assessment procedure VAIL-EHS-013.

9.21 Complaints Procedure

Arrangements for dealing with complaints for the permitted installation are detailed within VAIL-EHS-048 Pollution Prevention Control (PPC), Consents & Licenses.

9.22 Record Keeping Requirements

Arrangements for keeping records associated with the permitted installation are detailed within VAIL-EHS-048 Pollution Prevention Control (PPC), Consents & Licenses.

9.23 Waste Management

Summary arrangements for Waste Management associated with the permitted installation are detailed within VAIL-EHS-048 Pollution Prevention Control (PPC), Consents & Licenses & VAIL-EHS-074 Waste Management. The site has established an inventory of wastes arising from the installation, contained within document 'SA Fleetlands Waste Sampling Plan'. This plan identifies waste accordance with WM3 and provides a sample plan and compliance testing regime for mirror code wastes. The plan also identifies compliance checks as part of the sites duty of care arrangements to ensure waste carriers, consigners and consignee's hold appropriate insurance, consents and permits as is required.

9.24 Site Closure Plan

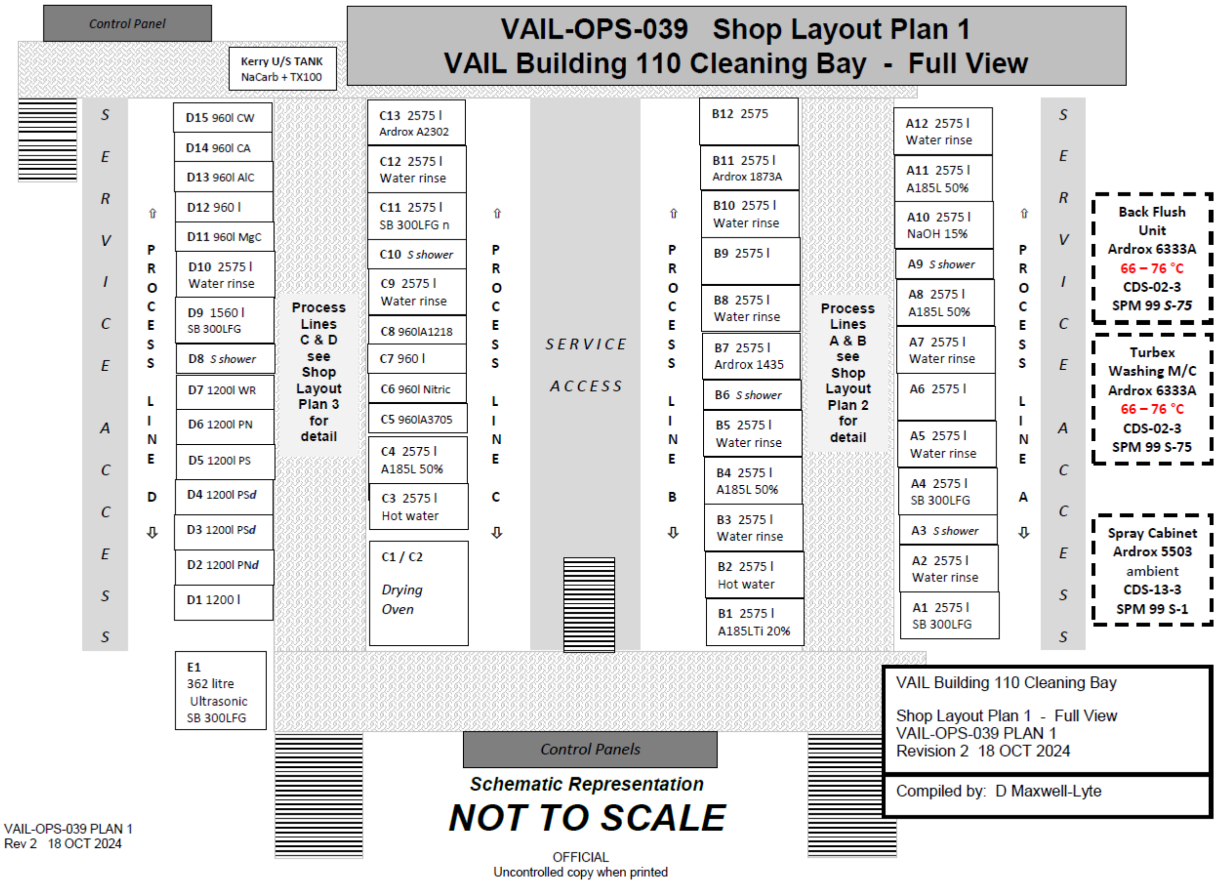
Summary arrangements for a closure of the permitted installation are detailed within VAIL-EHS-048 Pollution Prevention Control (PPC), Consents & Licenses

9.25 Information for the public

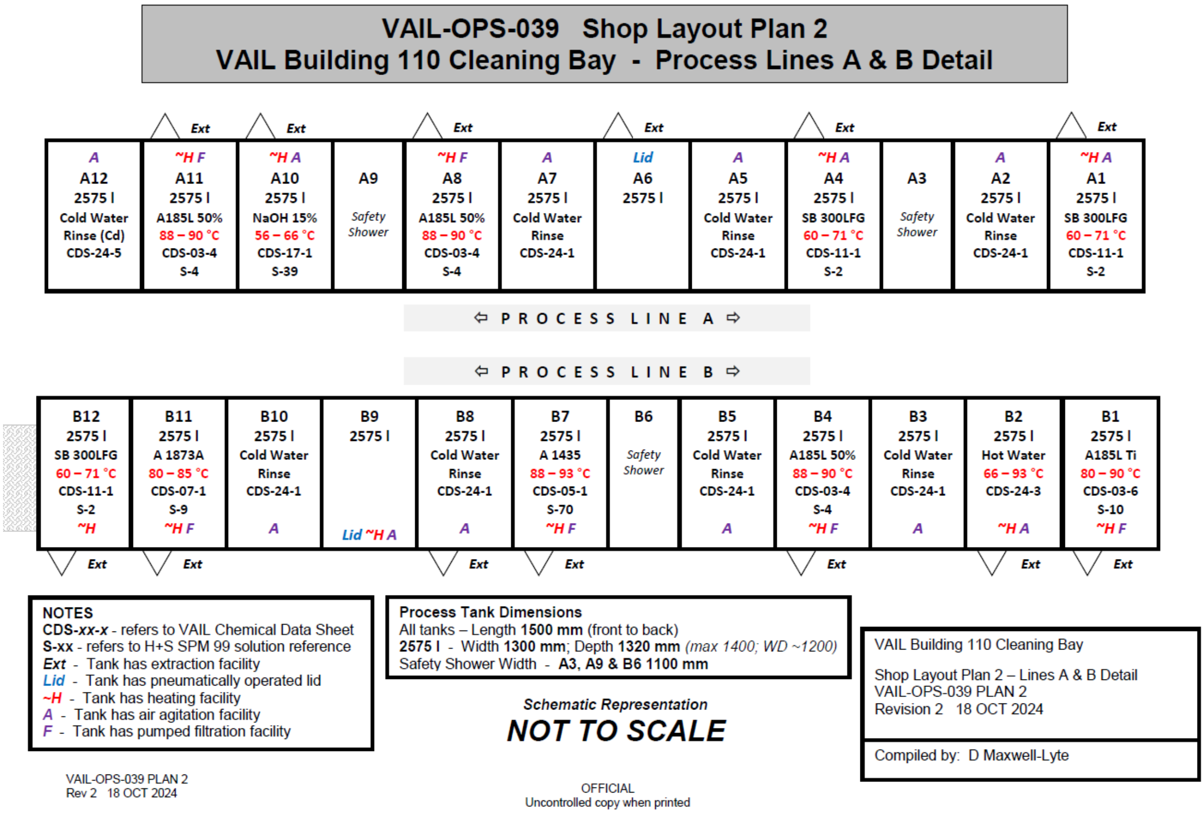
Arrangements for providing information to the public are detailed within VAIL-EHS-048 Pollution Prevention Control (PPC), Consents & Licenses. This information will be posted on receipt of a permit for the installation.

Appendix A - Cleaning Line Chemical & Tank Specification for Building 110

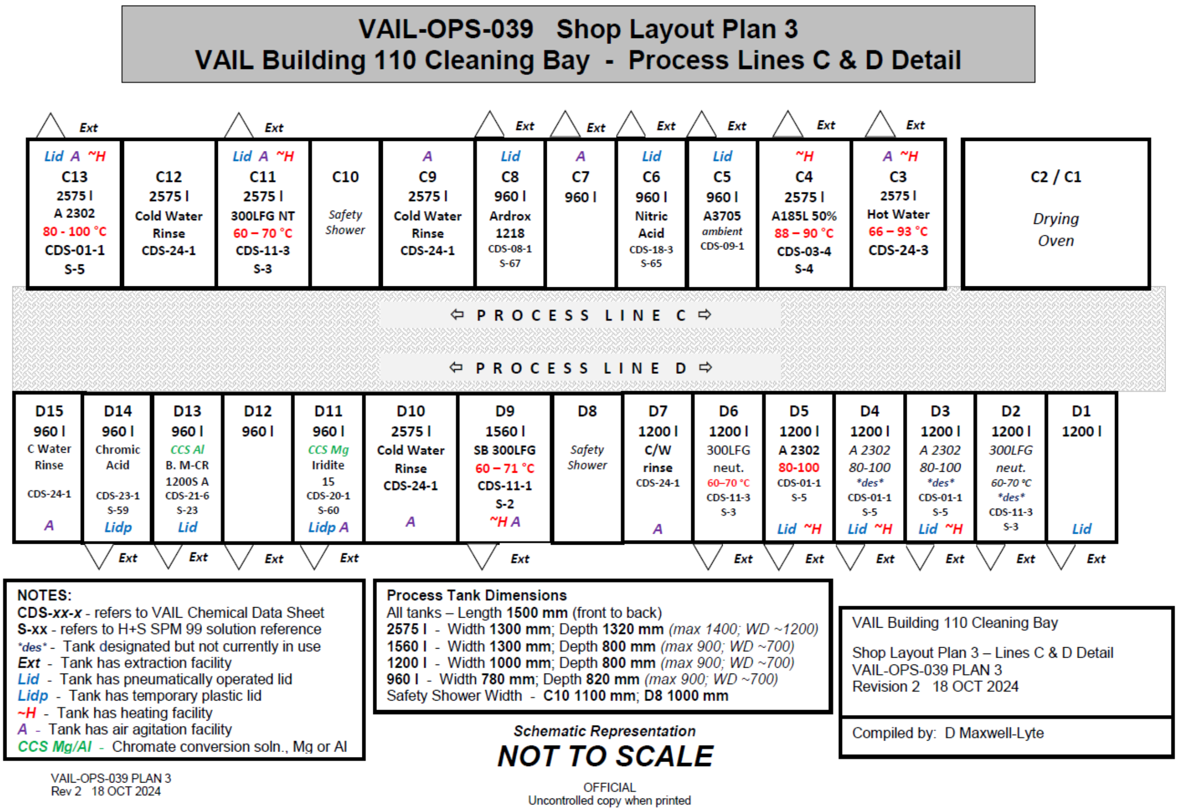
The following diagram represents the plan view of the VAIL cleaning lines within building 110.



The following diagram represents the plan view of the VAIL cleaning lines A & B.



The following diagram represents the plan view of the VAIL cleaning lines C & D



The following represents the summary information regarding vat contents for D line.

Key: Surface preparation, Surface Treatment, Rinsing, Drying
Total Volume of surface preparation tanks: 35.98 m3
Total Volume of treatment tanks: 6.72 m3
Total Volume of rinse tanks: 35.81 m3

Building 110 Cleaning Line SW1
Total Volume of surface preparation tanks: 0.08 m3
Total Volume of treatment tanks: 0 m3
Total Volume of rinse tanks: 0 m3
Tank E1 Ardrox 6333A (Surface preparation) Aqueous Degreaser. General cleaning of oils and grease from surface of parts.
CLP Classification: H314 Burns, H361d teratogen, Boiling point 100°C, Flash Point: N/A. No Env Haz Classification
LEL: No Data
Storage Temp - 66°C. Tank Volume: 0.08m^3
Concentration: (10% Vol), Waste: Off Haul, PH
Contains:
Dipotassium tetraborate, CAS 1332-77-0, >= 5.2 - < 10%
Potassium Hydroxide, CAS 1310-58-3, > = 2.5 - < 5%
Potassium silicate, MR <= 1.6, CAS 1312-76-1, >= 1 - < 2.5
aliphatic alcohols, alkoxylated, CAS 438476-83-6, >= 1 - < 2.5%
Alcohols, C8-10, ethoxylated propoxylated, CAS 68603-25-8, >= 1 - < 2.5%
WEL/STEL = Potassium Hydroxide STEL 2mg/m3.
Emergency Limits: TEEL-1 = No Data
Density: 1.14 Buoyant, Heavier than air.
Volatility: Low (at process temp and enclosed)
DSEAR: Low Risk – no associated flash point. LEV installed. Earth bond tanks.
Building 110 Cleaning Line E
Total Volume of surface preparation tanks: 0.36 m3
Total Volume of treatment tanks: 0 m3
Total Volume of rinse tanks: 0 m3
Tank SW1 SuperBee 300 FLG (Surface preparation) Aqueous Degreaser. General cleaning of oils and grease from surface of parts.
CLP Classification: H315 Irritation, H318 Eye Damage, Boiling point 100°C, Flash Point >100°C. No Env Haz Classification
LEL: No Data
Storage Temp - 66°C. Tank Volume: 0.36m^3
Concentration: : CDS-11-1 (20% Vol), Waste: Off Haul, PH 10-12.
Contains: ETHOXYLATED PROPOXYLATE FATTY ALCOHOL, 1-10%.. H318
SODIUM XYLENE SULFONATE, 1-10% CAS-No.: 1300-72-7
SODIUM METASILICATE , 1-10%, CAS-No.: 6834-92-0
SODIUM NITRITE, <1%, CAS-No.: 7632-00-0,
WEL/STEL = No Data
Emergency Limits: TEEL-1 = No Data
Density: 1.058 Buoyant, Heavier than air.
Volatility: High (at process temp)
DSEAR: Low Risk – Solution use below flash point. LEV installed. Earth bond tanks.

Building 110 Cleaning Line D
Total Volume of surface preparation tanks: 5.96 m3
Total Volume of treatment tanks: 2.88 m3
Total Volume of rinse tanks: 4.97m3
Tank D1 – Empty
Tank D2 – SuperBee 300 FLG (Surface preparation) Aqueous Degreaser. General cleaning of oils and grease from surface of parts.
CLP Classification: H315 Irritation, H318 Eye Damage, Boiling point 100°C, Flash Point >100°C. No Env Haz Classification
LEL: No Data
Storage Temp - 66°C. Tank Volume: 0.36m^3
Concentration: : CDS-11-1 (20% Vol), Waste: Off Haul, PH 10-12.
Contains: ETHOXYLATED PROPOXYLATE FATTY ALCOHOL, 1-10%.. H318
SODIUM XYLENE SULFONATE, 1-10% CAS-No.: 1300-72-7
SODIUM METASILICATE , 1-10%, CAS-No.: 6834-92-0
SODIUM NITRITE, <1%, CAS-No.: 7632-00-0,
WEL/STEL = No Data
Emergency Limits: TEEL-1 = No Data
Density: 1.058 Buoyant, Heavier than air.

Volatility: High (at process temp)
DSEAR: Low Risk – Solution use below flash point. LEV installed. Earth bond tanks.

Tank D3 - Ardrox 2302, Supplier: BASF (Surface preparation) Paint Stripper, Carbon Remover. Dose not effect surface of parts.
Classification: H314 Burns, H335 Resp Irr , H360D Teratogen , H412 Env. - Boiling point >150, Flash Point 108°C. Env Haz
Storage Temp: 90°C. Tank Volume: 1.2m^3
Concentration: CDS-01-1 (100% as supplied). Waste: Off Haul. **PH TBD**
Contains: 2-aminoethanol, >= 25 % - < 30 %, CAS Number: 141-43-5
N-methyl-2-pyrrolidone, >= 25 % - < 30 %, CAS Number: 872-50-4, STEL 20ppm.
2-(2-butoxyethoxy)ethanol, >= 20 % - < 25 %, CAS Number: 112-34-5
Toluene-4-sulfonic acid, >3 % - <5%, CAS number: 104-15-4,
WEL/STEL = 2-Aminoethanol. TWA 1ppm. N-Methyl-2-pyrrolidone 10ppm. 2-(2-Butoxyeth-oxy)ethanol; dieth-ylene glycol mono-butyl ether 10ppm.
Emergency Limits: TEEL-1 = No data
Density: 1.045 (Heavier than air)
Volatility: High (Solution heated near flash point)
DSEAR: Low Risk – Solution used below flash point. LEV installed. Earth bond tanks. No LEL.
Note: Exceedance above WEL likely if LEV lost.
Tank D4 - Ardrox 2302, Supplier: BASF (Surface preparation) Paint Stripper, Carbon Remover Dose not effect surface of parts.
Classification: H314 Burns, H335 Resp Irr , H360D Teratogen , H412 Env. - Boiling point >150, Flash Point 108°C. Env Haz
Storage Temp: 90°C. Tank Volume: 1.2m^3
Concentration: CSD-01-1 (100% as supplied). Waste: Off Haul **PH TBD**
Contains: 2-aminoethanol, >= 25 % - < 30 %, CAS Number: 141-43-5
N-methyl-2-pyrrolidone, >= 25 % - < 30 %, CAS Number: 872-50-4, STEL 20ppm.
2-(2-butoxyethoxy)ethanol, >= 20 % - < 25 %, CAS Number: 112-34-5
Toluene-4-sulfonic acid, >3 % - <5%, CAS number: 104-15-4,
WEL/STEL = 2-Aminoethanol. TWA 1ppm. N-Methyl-2-pyrrolidone 10ppm. 2-(2-Butoxyeth-oxy)ethanol; dieth-ylene glycol mono-butyl ether 10ppm.
Emergency Limits: TEEL-1 = No data
Density: 1.045 (Heavier than air)
Volatility: High (Solution heated near flash point)
DSEAR: Low Risk – Solution used below flash point. LEV installed. Earth bond tanks. No LEL.
Note: Exceedance above WEL likely if LEV lost.
Tank D5 - Ardrox 2302, Supplier: BASF (Surface preparation) Paint Stripper, Carbon Remover Dose not effect surface of parts.
Classification: H314 Burns, H335 Resp Irr , H360D Teratogen , H412 Env. - Boiling point >150, Flash Point 108°C. Env Haz
Storage Temp: 90°C. Tank Volume: 1.2m^3
Concentration: CDS-01-1 (100% as supplied). Waste: Off Haul **PH TBD**
Contains: 2-aminoethanol, >= 25 % - < 30 %, CAS Number: 141-43-5
N-methyl-2-pyrrolidone, >= 25 % - < 30 %, CAS Number: 872-50-4, STEL 20ppm.
2-(2-butoxyethoxy)ethanol, >= 20 % - < 25 %, CAS Number: 112-34-5
Toluene-4-sulfonic acid, >3 % - <5%, CAS number: 104-15-4,
WEL/STEL = 2-Aminoethanol. TWA 1ppm. N-Methyl-2-pyrrolidone 10ppm. 2-(2-Butoxyeth-oxy)ethanol; dieth-ylene glycol mono-butyl ether 10ppm.
Emergency Limits: TEEL-1 = No data
Density: 1.045 (Heavier than air)
Volatility: High (Solution heated near flash point)
DSEAR: Low Risk – Solution used below flash point. LEV installed. Earth bond tanks. No LEL.
Note: Exceedance above WEL likely if LEV lost.
Tank D6 SuperBee 300 FLG (Surface preparation) Aqueous Degreaser Dose not effect surface of parts.
CLP Classification: H315 Irritation, H318 Eye Damage, Boiling point 100°C, Flash Point >100°C. No Env Haz Classification
LEL: No Data
Storage Temp - 66°C. Tank Volume: 1.2m^3
Concentration: CDS-11-03 (10% Vol), TBC, Waste: Off Haul, **PH TBD**
Contains: ETHOXYLATED PROPOXYLATE FATTY ALCOHOL, 1-10%.. H318
SODIUM XYLENE SULFONATE, 1-10% CAS-No.: 1300-72-7
SODIUM METASILICATE , 1-10%, CAS-No.: 6834-92-0
SODIUM NITRITE, <1%, CAS-No.: 7632-00-0,
WEL/STEL = No Data
Emergency Limits: TEEL-1 = No Data
Density: 1.058 Buoyant, Heavier than air.
Volatility: High (at process temp)
DSEAR: Low Risk – Solution use below flash point. LEV installed. Earth bond tanks.
Tank D7 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 1.2m^3
Concentration: CDS-24-1, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.

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WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank D8 – Shower
Tank D9 – SuperBee 300 FLG (Surface preparation) Aqueous Degreaser. General cleaning of oils and grease from surface of parts.
CLP Classification: H315 Irritation, H318 Eye Damage, Boiling point 100°C, Flash Point >100°C. No Env Haz Classification
LEL: No Data
Storage Temp - 66°C. Tank Volume: 1.56m³
Concentration: : CDS-11-1 (20% Vol), Waste: Off Haul, PH 10-12.
Contains: ETHOXYLATED PROPOXYLATE FATTY ALCOHOL, 1-10%.. H318
SODIUM XYLENE SULFONATE, 1-10% CAS-No.: 1300-72-7
SODIUM METASILICATE , 1-10%, CAS-No.: 6834-92-0
SODIUM NITRITE, <1%, CAS-No.: 7632-00-0,
WEL/STEL = No Data
Emergency Limits: TEEL-1 = No Data
Density: 1.058 Buoyant, Heavier than air.
Volatility: High (at process temp)
DSEAR: Low Risk – Solution use below flash point. LEV installed. Earth bond tanks.
Tank D10 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m³
Concentration: CDS-24-1, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Tank D11 – IRIDITE 15, Supplier: (Surface Treatment) Chromate Coating Magnesium Alloy Coating Proces (Chromate conversion solution – Passivation)
Classification: H271, H301, H310, H330, H314, H334, H317, H340, H350, H361f, H335, H372, H400, H410, Boiling point No Data, Flash Point N/A. Env Haz
Storage Temp: Ambient °C. Tank Volume: 0.96m³
Concentration: CDS-20-1 (41g/l), Waste: Off Haul, PH 0.6 – 1.0
Contains:
Sodium nitrate, 40 - <60%, CAS-No.: 7631-99-4
Chromium trioxide, 40- 60 %, CAS No. 1333-82-0
WEL/STEL = Chromium trioxide, 0.05 mg/m3 TWA.
Emergency Limits: TEEL-1 = No Data
Density: No Data (Heavier than air) Flakes / Power in water solution.
Volatility: Low (Solution heated near flash point) Powder / flake additive.
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank D12 – Empty
Tank D13 – Bonderite M-CR 1200 S, Supplier: Henkel (Surface Treatment) Aluminium coating Process (Chromate conversion solution – Passivation)
Classification: H271, H301, H330, H310, H314, H318, H334, H317, H340, H350, H361f, H335, H372, H400, H410, Boiling point No Data, Flash Point N/A. Env Haz
Storage Temp: Ambient °C. Tank Volume: 0.96m³
Concentration: CDS-21-1 (15g/l). Waste: Off Haul, PH 1.1 – 1.8.
Contains: Chromium trioxide, 40- 60 %, CAS No. 1333-82-0
Potassium tetrafluoroborate, 20- 40 %, CAS No. 14075-53-7
Tripotassium hexacyanoferrate, 10- 20 %, CAS No. 13746-66-2
sodium fluoride, 5- < 10 %, CAS No. 7681-49-4
Dipotassium hexafluorozirconate, 5- < 10 %, CAS No. 16923-95-8
WEL/STEL =
Chromium trioxide, 0.05 mg/m3 TWA
sodium fluoride, 2.5 mg/m3 TWA.
Dipotassium hexafluorozirconate, 5mg/m3 TWA, 10 mg/m3 STEL.
Emergency Limits: TEEL-1 = No Data
Density: 1.07 (Heavier than air)
Volatility: Low (Solution heated near flash point) Powder / pellet addative.
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank D14 – Chromic Acid Solution, Supplier: Brenntag (Treatment Tank) Passivation Process
Classification: H301. H311, H314, H317, H330, H334, H340, H350, H361f, H335, H372, H410, Boiling point >100°C, Flash Point N/A. Env Haz

Storage Temp: Ambient °C. Tank Volume: 0.96m³
Concentration: 60g/L. Waste: Off Haul
Contains: Chromium trioxide, 40- 60 %, CAS No. 1333-82-0
WEL/STEL = Chromium trioxide, 0.025 mg/m3 TWA (As CR process generated) & 0.01 mg/m3 as CR.
Emergency Limits: TEEL-1 = No Data
Density: 1.5 (Heavier than air)
Volatility: Low (Solution heated near flash point).
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank D15 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 0.96m³
Concentration: CSD-24-1, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.

The following represents the summary information regarding vat contents for C line.

Building 110 Cleaning Line C
Total Volume of surface preparation tanks: 4.32 m3
Total Volume of treatment tanks: 3.84 m3
Total Volume of rinse tanks: 7.71 m3
Tank C1 – N/A Drying Oven
Tank C2 – N/A Drying Oven
Tank C3 – Hot Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: 93°C. Tank Volume: 2.57m³
Concentration: CDS-24-3, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank C4 - Ardrox 185, Supplier: BASF (Surface preparation) Degreaser, Rust, Scale Remover
Classification: H290, H314, Boiling point 100°C, Flash Point N/A. No Env Haz Classification
Storage Temp: 93°C. Tank Volume: 2.57m³
Concentration: CDS-03-6 (450ml /L). Waste: Off Haul **PH – TBD**
Contains: sodium hydroxide, >= 50 % - < 75 %, CAS Number: 1310-73-2
WEL/STEL = Sodium Hydroxide: STEL: 2mg m3.
Emergency Limits: TEEL-1 = No Data
Density: 1.43 (Heavier than air)
Volatility: High (Solution heated near flash point)
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with Loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank C5 - Ardrox 3705, Supplier: Chemetall (Surface preparation) Aqueous Corrosion Inhibitor (Temporary corrosion inhibitor)
Classification: Non Hazardous, Boiling point 95°C, Flash Point N/A. No Env Haz Classification
Storage Temp: Ambient °C. Tank Volume: 0.96m³
Concentration: CDS-09-1 (1-2%). Waste: Off Haul **PH – TBD**
Contains: Aqueous solution organic corrosion inhibitors
WEL/STEL = N/A
Emergency Limits: TEEL-1 = No Data
Density: 1.07 (Heavier than air)
Volatility: Low (Solution heated near flash point)
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with Loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank C6 – Nitric Acid 65-70%, Supplier: Brenntag (Surface Treatment) Corrosion Inhibitor, Protective surface layer
Classification: H272 Oxidiser, H314: Burns, H290 Corrosive. Boiling point: N/A, Flash Point: N/A No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 0.96m³
Concentration: 545 ml/L. Waste: Off Haul
WEL/STEL = STEL: 1ppm / 2.6 mg/m3
Emergency Limits: TEEL-1 = No Data

Density: N/A Heavier than air.
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank C7 – Empty
Tank C8 - Ardrox 1218 (Surface preparation) Temporary Inhibitor, scale and rust remover
Classification: H314 Corrosive, H314 Burns, Boiling point 100°C, Flash Point N/A. No Env Haz Classification (Possible NOx emissions and Acid Mist)
Storage Temp: Ambient. Tank Volume: 0.96m³
Concentration: CDS-08-1 (490ml/L). Waste: Off Haul **PH – TBD**
Contains: Orthophosphoric acid, >= 30 % - < 50 %, CAS Number: 7664-38-2
WEL/STEL = Orthophosphoric acid (50%): STEL 2mg m/3. TWA 1mg,m3.
Emergency Limits: TEEL-1 = No Data
Density: 1.26 (Heavier than air)
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL specified.
Note: Exceedance of STEL unlikely with loss of LEV.
Tank C9 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m³
Concentration: Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank C10 – Shower
Classification: N/A.
Storage Temp: Ambient. Tank Volume: N/A
Concentration: Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank C11 SuperBee 300 FLG (Surface preparation) Aqueous Degreaser
CLP Classification: H315 Irritation, H318 Eye Damage, Boiling point 100°C, Flash Point >100°C. No Env Haz Classification
LEL: No Data
Storage Temp - 66°C. Tank Volume: 1.2m³
Concentration: CDS-11-1 (20% Vol), Waste: Off Haul,
Contains: ETHOXYLATED PROPOXYLATE FATTY ALCOHOL, 1-10%.. H318
SODIUM XYLENE SULFONATE, 1-10% CAS-No.: 1300-72-7
SODIUM METASILICATE , 1-10%, CAS-No.: 6834-92-0
SODIUM NITRITE, <1%, CAS-No.: 7632-00-0,
WEL/STEL = No Data
Emergency Limits: TEEL-1 = No Data
Density: 1.058 Buoyant, Heavier than air.
Volatility: High (at process temp)
DSEAR: Low Risk – Solution use below flash point. LEV installed. Earth bond tanks.
Tank C12 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m³
Concentration: Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank C13 - Ardrox 2302, Supplier: BASF (Surface preparation) Paint Stripper, Carbon Remover
Classification: H314 Burns, H335 Resp Irr , H360D Teratogen , H412 Env. - Boiling point >150, Flash Point 108°C. Env Haz
Storage Temp: 90°C. Tank Volume: 1.2m³
Concentration: CDS-01-1 (100% as supplied). Waste: Off Haul
Contains: 2-aminoethanol, >= 25 % - < 30 %, CAS Number: 141-43-5
N-methyl-2-pyrrolidone, >= 25 % - < 30 %, CAS Number: 872-50-4, STEL 20ppm.
2-(2-butoxyethoxy)ethanol, >= 20 % - < 25 %, CAS Number: 112-34-5
Toluene-4-sulfonic acid, >3 % - <5%, CAS number: 104-15-4,
WEL/STEL = 2-Aminoethanol. TWA 1ppm. N-Methyl-2-pyrrolidone 10ppm. 2-(2-Butoxyeth-oxy)ethanol; dieth-ylene glycol mono-butyl ether 10ppm.

Emergency Limits: TEEL-1 = No data
Density: 1.045 (Heavier than air)
Volatility: High (Solution heated near flash point)
DSEAR: Low Risk – Solution used below flash point. LEV installed. Earth bond tanks. No LEL.
Note: Exceedance above WEL likely if LEV lost.

The following represents the summary information regarding vat contents for B line.

Building 110 Cleaning Line B
Total Volume of surface preparation tanks: 12.85 m3
Total Volume of treatment tanks: 0 m3
Total Volume of rinse tanks: 12.85 m3
Tank B1 - Ardrox 185, Supplier: BASF (Surface preparation) Degreaser, Rust, Scale Remover
Classification: H290, H314, Boiling point 100°C, Flash Point N/A. No Env Haz Classification
Storage Temp: 93°C. Tank Volume: 2.57m^3
Concentration: CDS-03-6 (450ml /L). Waste: Off Haul **PH – TBD**
Contains: sodium hydroxide, >= 50 % - < 75 %, CAS Number: 1310-73-2
WEL/STEL = Sodium Hydroxide: STEL: 2mg m3.
Emergency Limits: TEEL-1 = No Data
Density: 1.43 (Heavier than air)
Volatility: High (Solution heated near flash point)
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with Loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank B2 – Hot Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: 93°C. Tank Volume: 2.57m^3
Concentration: CDS-24-3, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank B3 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m^3
Concentration: CSD-24-1, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank B4 - Ardrox 185, Supplier: BASF (Surface preparation) Degreaser, Rust, Scale Remover
Classification: H290, H314, Boiling point 100°C, Flash Point N/A. No Env Haz Classification
Storage Temp: 93°C. Tank Volume: 2.57m^3
Concentration: CSD-03-4 (450ml /L). Waste: Off Haul, **PH – TBD**
Contains: sodium hydroxide, >= 50 % - < 75 %, CAS Number: 1310-73-2
WEL/STEL = Sodium Hydroxide: STEL: 2mg m3.
Emergency Limits: TEEL-1 = No Data
Density: 1.43 (Heavier than air)
Volatility: High (Solution heated near flash point)
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with Loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank B5 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m^3
Concentration: CDS-24-1, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank B6 – Safety Shower
Tank B7 - Ardrox 1435 Part A & B, Supplier: BASF (Surface preparation) Scale & Carbon Remover
Classification: H290, H314, H 318 (A) H314, H318, H411, H272 (B) Boiling point 105 (A & B)°C, Flash Point N/A (A & B). No Env Haz Classification
Storage Temp: 93°C. Tank Volume: 2.57m^3

Concentration: CDS-05-1 (25% Vol A & B), Waste: Off Haul **PH – TBD**
Contains: Sodium hydroxide, >= 30 % - < 50 % (A), CAS Number: 1310-73-2 (A)
Sodium permanganate, >= 15 % - < 20 % (B), CAS Number: 10101-50-5
WEL/STEL = Sodium Hydroxide: STEL: 2mg m3, Sodium permanganate: STEL 0.5 mg/m3, WEL 0.05 mg/m3,
Emergency Limits: TEEL-1 = No Data
Density: 1.15 (Heavier than air)
Volatility: TBD (Solution heated near flash point)
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with Loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.

Tank B8 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m^3
Concentration: CDS-24-1, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant. **PH – TBD**
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.

Tank B9 – empty

Tank B10 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m^3
Concentration: CDS-24-1, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant. **PH – TBD**
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.

Tank B11 - Ardrox 1873A, Supplier: BASF (Surface preparation) Scale Remover
Classification: H412, H314, H318 Boiling point 100°C, Flash Point N/A. No Env Haz Classification (Possible acid mist and NOx)
Storage Temp: 85°C. Tank Volume: 2.57m^3
Concentration: CDS-07-1 (450ml /L), Waste: Off Haul
Contains: Acetic acid, hydroxy-, monoammonium salt, Content (W/W): >= 10 % - < 12.5%, CAS Number: 35249-89-9
Glycolic acid, Content (W/W): >= 10 % - < 12.5%, CAS Number: 79-14-1
Triammonium citrate, Content (W/W): >= 7 % - < 10 %, CAS Number: 3458-72-8
N,N-diethylhydroxylamine, Content (W/W): >= 3 % - < 5 %, CAS Number: 3710-84-7
WEL/STEL = No data
Emergency Limits: TEEL-1 = No Data
Density: 1.12 (Heavier than air)
Volatility: High (Solution heated near flash point)
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with Loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.

Tank B12 SuperBee 300 FLG (Surface preparation) Aqueous Degreaser
CLP Classification: H315 Irritation, H318 Eye Damage, Boiling point 100°C, Flash Point >100°C. No Env Haz Classification
LEL: No Data
Storage Temp - 71°C. Tank Volume: 2.57m^3
Concentration: CDS-11-1 20% Vol), Waste: Off Haul, PH 10-12
Contains: ETHOXYLATED PROPOXYLATE FATTY ALCOHOL, 1-10%.. H318
SODIUM XYLENE SULFONATE, 1-10% CAS-No.: 1300-72-7
SODIUM METASILICATE , 1-10%, CAS-No.: 6834-92-0
SODIUM NITRITE, <1%, CAS-No.: 7632-00-0,
WEL/STEL = No Data
Emergency Limits: TEEL-1 = No Data
Density: 1.058 Buoyant, Heavier than air.
Volatility: High (at process temp)
DSEAR: Low Risk – Solution use below flash point. LEV installed. Earth bond tanks.

The following represents the summary information regarding vat contents for A line.

Building 110 Cleaning Line A
Total Volume of surface preparation tanks: 12.85 m3
Total Volume of treatment tanks: 0 m3
Total Volume of rinse tanks: 10.28 m3

Tank A1 SuperBee 300 FLG (Surface preparation) Aqueous Degreaser
CLP Classification: H315 Irritation, H318 Eye Damage, Boiling point 100°C, Flash Point >100°C. No Env Haz Classification

LEL: No Data
Storage Temp - 66°C. Tank Volume: 2.57m³
Concentration: CDS-11-1 (20% Vol), Waste: Off Haul, PH 10-12
Contains: ETHOXYLATED PROPOXYLATE FATTY ALCOHOL, 1-10%.. H318
SODIUM XYLENE SULFONATE, 1-10% CAS-No.: 1300-72-7
SODIUM METASILICATE , 1-10%, CAS-No.: 6834-92-0
SODIUM NITRITE, <1%, CAS-No.: 7632-00-0,
WEL/STEL = No Data
Emergency Limits: TEEL-1 = No Data
Density: 1.058 Buoyant, Heavier than air.
Volatility: High (at process temp)
DSEAR: Low Risk – Solution use below flash point. LEV installed. Earth bond tanks.

Tank A2 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m³
Concentration: CDS-24-1, Trace contaminants. Waste: Rinse Transfer Tank.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.

Tank A3 – Safety Shower

Tank A4 SuperBee 300FLG (Surface preparation) Aqueous Degreaser
CLP Classification: H315 Irritation, H318 Eye Damage, Boiling point 100°C, Flash Point >100°C. No Env Haz Classification
LEL: No Data
Storage Temp - 66°C. Tank Volume: 2.57m³
Concentration: CDS-11-1 (20% Vol), Waste: Off Haul, PH 10-12
Contains: ETHOXYLATED PROPOXYLATE FATTY ALCOHOL, 1-10%.. H318
SODIUM XYLENE SULFONATE, 1-10% CAS-No.: 1300-72-7
SODIUM METASILICATE , 1-10%, CAS-No.: 6834-92-0
SODIUM NITRITE, <1%, CAS-No.: 7632-00-0,
WEL/STEL = No Data
Emergency Limits: TEEL-1 = No Data
Density: 1.058 Buoyant, Heavier than air.
Volatility: High (at process temp)
DSEAR: Low Risk – Solution use below flash point. LEV installed. Earth bond tanks.

Tank A5 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m³
Concentration: CDS-24-1, Trace contaminants. Waste: Rinse Transfer Tank.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.

Tank A6 – Empty

Tank A7 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m³
Concentration: CDS-24-1, Trace contaminants. Waste: Rinse Transfer Tank. PH 10-12.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.

TankA8 - Ardrox 185, Supplier: BASF (Surface preparation) Degreaser, Rust, Scale Remover
Classification: H290, H314, Boiling point 100°C, Flash Point N/A. No Env Haz Classification
Storage Temp: 93°C. Tank Volume: 2.57m³
Concentration: CDS-03-4 (450ml /L), Waste: Off Haul, **PH – TBD**
Contains: sodium hydroxide, >= 50 % - < 75 %, CAS Number: 1310-73-2
WEL/STEL = Sodium Hydroxide: STEL: 2mg m3.
Emergency Limits: TEEL-1 = No Data
Density: 1.43 (Heavier than air)
Volatility: High (Solution heated near flash point)
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with Loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.

Tank A9 – Safety Shower
TankA10 – Sodium Hydroxide 20%, Supplier: Sigma Aldrich, (Surface preparation) Aqueous Degreaser
Classification: H290, H314, Boiling point 1390°C, Flash Point N/A. No Env Haz Classification
Storage Temp: 95°C. Tank Volume: 2.57m^3
Concentration: CDS-17-1 (210g/L), Waste: Off Haul. PH TBD
Contains: sodium hydroxide, >= 20%, CAS Number: 1310-73-2
WEL/STEL = Sodium Hydroxide: STEL: 2mg m3.
Emergency Limits: TEEL-1 = No Data
Density: 1.43 (Heavier than air)
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with Loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.
TankA11 - Ardrox 185, Supplier: BASF (Surface preparation) Degreaser, Rust, Scale Remover
Classification: H290, H314, Boiling point 100°C, Flash Point N/A. No Env Haz Classification
Storage Temp: 93°C. Tank Volume: 2.57m^3
Concentration: CDS-03-04 (450ml /L), Waste: Off Haul, **PH – TBD**
Contains: sodium hydroxide, >= 50 % - < 75 %, CAS Number: 1310-73-2
WEL/STEL = Sodium Hydroxide: STEL: 2mg m3.
Emergency Limits: TEEL-1 = No Data
Density: 1.43 (Heavier than air)
Volatility: High (Solution heated near flash point)
DSEAR: Low Risk – Solution below flash point. LEV installed. No LEL Specified.
Note: Exceedance of STEL not likely during escape with Loss of LEV.
DSEAR: Low Risk – Solution below flash point. LEV installed.
Tank A12 – Cold Rinse (Rinsing)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 2.57m^3
Concentration: CDS-24-5, Trace contaminants. Waste: Rinse Transfer Tank.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Volatility: Low
DSEAR: Low Risk – Solution below flash point. LEV installed.

Appendix B – Cleaning Line Chemical & Tank Specification for Building 112 AEP

Key: Surface preparation, Surface Treatment, Rinsing, Drying

Total Volume of surface preparation tanks: 0.4 m3

Total Volume of treatment tanks: 0 m3

Total Volume of rinse tanks: 0.3 m3

Air may contain chromium – BAT 1.0 mg/m3
Air may contain VOCs – to be defined by regulator
Air may contain NOX (Nitric Acid Vapor) – to be defined by regulator

The following represents the summary information regarding vat contents for the AEP Process.

AEP 112
Total Volume of surface preparation tanks: m3
Total Volume of treatment tanks: m3
Total Volume of rinse tanks: m3

Tank 1-A AEP 32 - electrophoretic coating, not regarded as treatment.
CLP Classification: H302, H332, H320, H335, H350, H336, H400, H410, Boiling point 180°C, Flash Point: 51°C. Env Haz
LEL: No Data
Storage Temp – Ambient. Tank Volume: 0.13m^3
Concentration: CDS-16-2 (Mixture), Waste: Off Haul,
Contains:
Isopropyl alcohol CAS: 67-63-0, 50-65%,
Nitromethane, CAS: 75-52-5, 30-45%
Aluminium, CAS: 7429-90-5, 1-3%
Chromium, CAS: 7440-47-3, 1-3%

Manganese, CAS: 7439-96-5, 1-3%
Cobalt nitrate hexahydrate, CAS: 10026-22-9, 0.1-1%
WEL/STEL
Isopropyl alcohol TWA 990 mg/m3, STEL 1250 mg/m3
Nitromethane TWA 254 mg/m3, STEL 381 mg/m3
Aluminium, TWA 10 (Inhalable) & 4 (Respirable) mg/m3
Chromium (VI) TWA 0.01 mg/m3 Carc, sen, BMGV
Manganese, TWA 0.2 (Inhalable) & 0.05 (Respirable) mg/m3
Emergency Limits: TEEL-1 = No Data
Density: 2.1 Heavier than air.
Volatility: Low
DSEAR: Low Risk – Used below flash point. LEV installed. Earth bond tanks.

Tank 1-B AEP 100 electrophoretic coating, not regarded as treatment.
CLP Classification: H302, H330, H320, H335, H350, H336, H400, H410, Boiling point 180°C, Flash Point: 51°C. Env Haz
LEL: No Data
Storage Temp – Ambient. Tank Volume: 0.13m³
Concentration: CDS-16-1 (Mixture), Waste: Off Haul,
Contains:
Isopropyl alcohol CAS: 67-63-0, 50-65%,
Nitromethane, CAS: 75-52-5, 30-45%
Aluminium, CAS: 7429-90-5, 1-3%
Chromium, CAS: 7440-47-3, 1-3%
Cobalt nitrate hexahydrate, CAS: 10026-22-9, 0.1-1%
WEL/STEL
Isopropyl alcohol TWA 990 mg/m3, STEL 1250 mg/m3
Nitromethane TWA 254 mg/m3, STEL 381 mg/m3
Aluminium, TWA 10 (Inhalable) & 4 (Respirable) mg/m3
Chromium (VI) TWA 0.01 mg/m3 Carc, sen, BMGV
Emergency Limits: TEEL-1 = No Data
Density: 2.1 Heavier than air.
Volatility: Low
DSEAR: Low Risk – Used below flash point. LEV installed. Earth bond tanks.

Tank 2-A AEP 32 electrophoretic coating, not regarded as treatment.
CLP Classification: H302, H332, H320, H335, H350, H336, H400, H410, Boiling point 180°C, Flash Point: 51°C. Env Haz
LEL: No Data
Storage Temp – Ambient. Tank Volume: 0.13m³
Concentration: CDS-16-2 (Mixture), Waste: Off Haul,
Contains:
Isopropyl alcohol CAS: 67-63-0, 50-65%,
Nitromethane, CAS: 75-52-5, 30-45%
Aluminium, CAS: 7429-90-5, 1-3%
Chromium, CAS: 7440-47-3, 1-3%
Manganese, CAS: 7439-96-5, 1-3%
Cobalt nitrate hexahydrate, CAS: 10026-22-9, 0.1-1%
WEL/STEL
Isopropyl alcohol TWA 990 mg/m3, STEL 1250 mg/m3
Nitromethane TWA 254 mg/m3, STEL 381 mg/m3
Aluminium, TWA 10 (Inhalable) & 4 (Respirable) mg/m3
Chromium (VI) TWA 0.01 mg/m3 Carc, sen, BMGV
Manganese, TWA 0.2 (Inhalable) & 0.05 (Respirable) mg/m3
Emergency Limits: TEEL-1 = No Data
Density: 2.1 Heavier than air.
Volatility: Low
DSEAR: Low Risk – Used below flash point. LEV installed. Earth bond tanks.

Tank 2-B AEP 32 electrophoretic coating, not regarded as treatment.
CLP Classification: H302, H332, H320, H335, H350, H336, H400, H410, Boiling point 180°C, Flash Point: 51°C. Env Haz
LEL: No Data
Storage Temp – Ambient. Tank Volume: 0.13m³
Concentration: CDS-16-2 (Mixture), Waste: Off Haul,
Contains:
Isopropyl alcohol CAS: 67-63-0, 50-65%,
Nitromethane, CAS: 75-52-5, 30-45%
Aluminium, CAS: 7429-90-5, 1-3%
Chromium, CAS: 7440-47-3, 1-3%

Manganese, CAS: 7439-96-5, 1-3%
Cobalt nitrate hexahydrate, CAS: 10026-22-9, 0.1-1%
WEL/STEL
Isopropyl alcohol TWA 990 mg/m3, STEL 1250 mg/m3
Nitromethane TWA 254 mg/m3, STEL 381 mg/m3
Aluminium, TWA 10 (Inhalable) & 4 (Respirable) mg/m3
Chromium (VI) TWA 0.01 mg/m3 Carc, sen, BMGV
Manganese, TWA 0.2 (Inhalable) & 0.05 (Respirable) mg/m3
Emergency Limits: TEEL-1 = No Data
Density: 2.1 Heavier than air.
Volatility: Low
DSEAR: Low Risk – Used below flash point. LEV installed. Earth bond tanks.

Tank A3 ASC-2 N/Nitric (Ntric Acid, ACS 2N Stripper, Water Mixture) (Surface Preparation) Paint Stripper, Carbon Remover
CLP Classification: (ACS2N H301, H314, H317, H412) (Nitric Acid H272, H290, 314, H331) Boiling point ACS2N 200°C, Boiling Point 122 (Nitric)
Flash Point: ACS2N 79.3°C. Env Haz
LEL: ACS2N 1%
Storage Temp - 32°C. Tank Volume: 0.13m^3
Concentration: CDS-15-1 (Mixture), Waste: Off Haul,
Contains:
ammonium bifluoride CAS: 1341-49-7, >90% (ASC2N)
pine oil, synthetic, CAS: 8002-09-3, 1-5% (ASC2N)
ammonium fluoride, CAS 12125-01-8 2% (ASC2N)
Nitric Acid, CAS: 7697-37-2, <70% (Nitric Acid)
WEL/STEL
ammonium bifluoride, TWA 2.5mg/m3
Nitric Acid STEL 2.6mg/m3
Emergency Limits: TEEL-1 = No Data
Density: ACS2N = 4.4 Heavier than air. 1.41 Nitric Acid, Heavier than air.
Volatility: Medium (at process temp & enclosed)
DSEAR: Low Risk – Used below flash point. LEV installed. Earth bond tanks.

Tank A4

ASC-2 N/Nitric (Ntric Acid, ACS 2N Stripper, Water Mixture) (Surface Preparation) Paint Stripper, Carbon Remover
CLP Classification: (ACS2N H301, H314, H317, H412) (Nitric Acid H272, H290, 314, H331) Boiling point ACS2N 200°C, Boiling Point 122 (Nitric)
Flash Point: ACS2N 79.3°C. Env Haz
LEL: ACS2N 1%
Storage Temp - 32°C. Tank Volume: 0.13m^3
Concentration: CDS-15-1 (Mixture), Waste: Off Haul,
Contains:
ammonium bifluoride CAS: 1341-49-7, >90% (ASC2N)
pine oil, synthetic, CAS: 8002-09-3, 1-5% (ASC2N)
ammonium fluoride, CAS 12125-01-8 2% (ASC2N)
Nitric Acid, CAS: 7697-37-2, <70% (Nitric Acid)
WEL/STEL
ammonium bifluoride, TWA 2.5mg/m3
Nitric Acid STEL 2.6mg/m3
Emergency Limits: TEEL-1 = No Data
Density: ACS2N = 4.4 Heavier than air. 1.41 Nitric Acid, Heavier than air.
Volatility: Medium (at process temp & enclosed)
DSEAR: Low Risk – Used below flash point. LEV installed. Earth bond tanks.

Tank A5 Cold Water (Rinse)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 0.15m^3
Concentration: CDS-24-1, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A
Tank A6 Hot Water (Rinse)
Classification: N/A. No Env Haz Classification
Storage Temp: Ambient. Tank Volume: 0.15m^3
Concentration: CDS-24-1, Trace contaminants. Waste: Rinse Transfer Tank to Effluent Plant.
WEL/STEL = N/A
Emergency Limits: TEEL-1 = N/A
Density: N/A

Tank A7 SB 300FLG

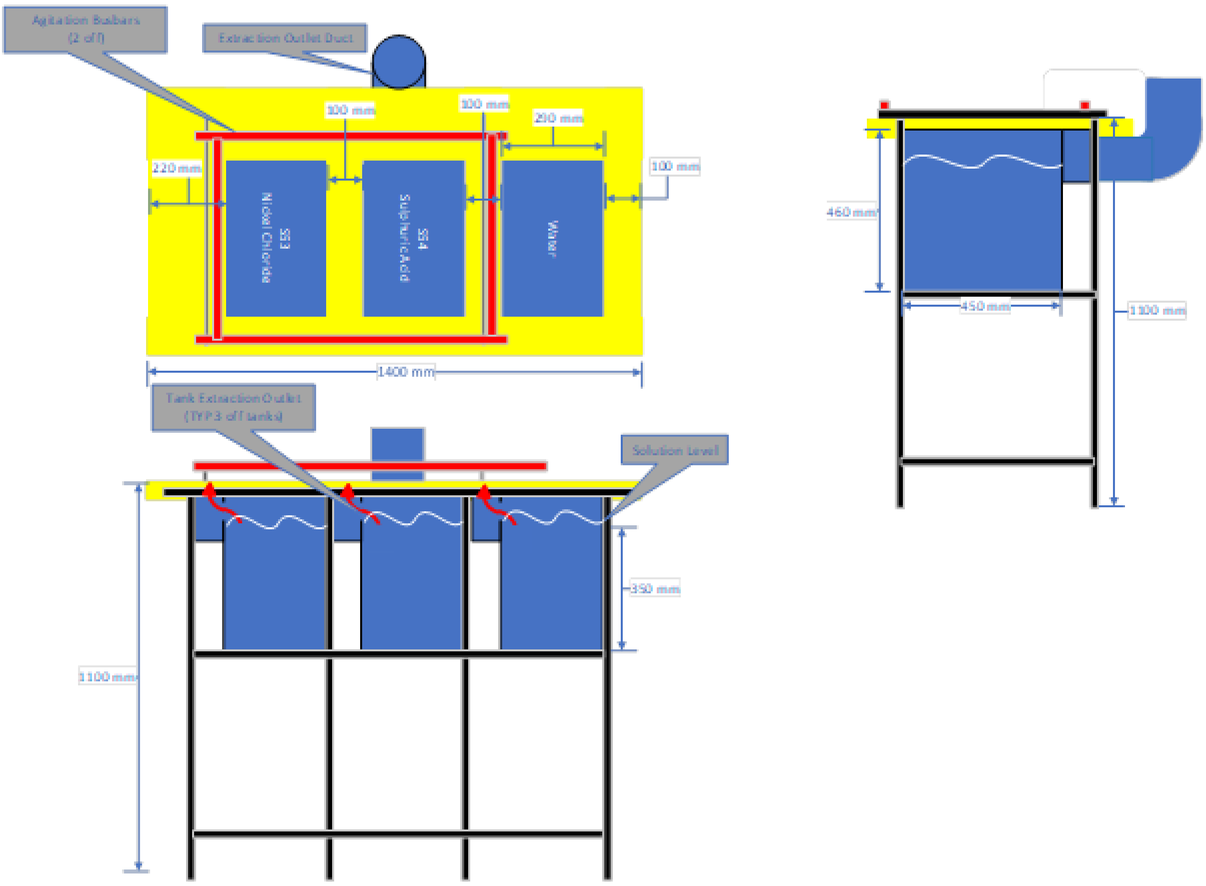
Tank A7 SuperBee 300 FLG (Surface preparation) Aqueous Degreaser
CLP Classification: H315 Irritation, H318 Eye Damage, Boiling point 100°C, Flash Point >100°C. No Env Haz Classification
LEL: No Data
Storage Temp - 66°C. Tank Volume: 0.12m^3
Concentration: CDS-11-1 (20% Vol), Waste: Off Haul,
Contains: ETHOXYLATED PROPOXYLATE FATTY ALCOHOL, 1-10%.. H318
SODIUM XYLENE SULFONATE, 1-10% CAS-No.: 1300-72-7
SODIUM METASILICATE , 1-10%, CAS-No.: 6834-92-0
SODIUM NITRITE, <1%, CAS-No.: 7632-00-0,
WEL/STEL = No Data
Emergency Limits: TEEL-1 = No Data
Density: 1.058 Buoyant, Heavier than air.
Volatility: High (at process temp)
DSEAR: Low Risk – Solution use below flash point. LEV installed. Earth bond tanks.

Tank 8 Clamca Wax (Surface preparation) Wax Mask Treatment
CLP Classification: Non Hazardous, Boiling point 300°C, Flash Point: 150°C. No Env Haz Classification
LEL: No Data
Storage Temp - 110°C. Tank Volume: (Estimate) 0.2m^3
Concentration: CDS-14-1 (100% Vol), Waste: Off Haul,
Contains:
PARAFFIN WAX, CAS-No.: 8002-74-2, 100%
WEL/STEL = Parafin Wax TWA 2mg/m3, STEL 6 mg/m3
Emergency Limits: TEEL-1 = No Data
Density: No Data.
Volatility: Low (at process temp and enclosed)
DSEAR: Low Risk – no associated flash point. LEV installed. Earth bond tanks.

Appendix C – Nickle Strike Process Building 108

The following diagram represents the summary information regarding vat construction for the nickel strike process.

NOTE: THIS DOCUMENT IS UNCONTROLLED WHEN PRINTED



The following represents the summary information regarding vat contents for the nickel strike process.

Key: Surface preparation, Surface Treatment, Rinsing, Drying
Total Volume of surface preparation tanks: 0.06 m3
Total Volume of treatment tanks: 0.12 m3
Total Volume of rinse tanks: 0 m3

Tank 1 Water Rinse (Rinse)
CLP Classification: Non Hazardous, Boiling point N/A, Flash Point: N/A. No Env Haz Classification
LEL: No Data
Storage Temp Ambient. Tank Volume: (Estimate) 0.06m^3
Concentration: Trace, Waste: Off Haul as per EWC,
Contains: Traces of chemical as per Tank 2 & 3.
Emergency Limits: TEEL-1 = No Data
Density: No Data.
Volatility: Low (at process temp and enclosed)
DSEAR: Low Risk – no associated flash point. LEV installed. Earth bond tanks.

Tank 2 S54 / Sulphuric Acid (Surface Treatment) (Anodic Etching Process)
CLP Classification: H314, H290, Boiling point 335°C, Flash Point: N/A No Env Haz Classification
LEL: No Data
Storage Temp Ambient. Tank Volume: (Estimate) 0.06m^3
Concentration: (95% Vol 300m/L), Waste: Off Haul,
Contains:
Sulphuric Acid, CAS-No.: 7664-93-9, >95%
WEL/STEL = TWA 1mg/m3
Emergency Limits: TEEL-1 = No Data
Density: No Data.
Volatility: Low (at process temp and enclosed)
DSEAR: Low Risk – not flammable.

Tank 3 S53 Nickel Chloride (Surface Treatment)
CLP Classification: Nickel Chloride H301, H331, H15, H334, H317, H341, H350i, H360D, H372, H400, H410. Boiling point N/A, Flash Point:N/A. Env Haz
CLP Classification: Hydrochloric Acid H290. Boiling point N/A, Flash Point:N/A. No Env Haz Classification
LEL: No Data
Storage Temp: Ambient. Tank Volume: (Estimate) $0.06m^3$
Concentration: Nickel Chloride 350 ±50 g/l and Hydrochloric Acid 110ml/l), Waste: Off Haul,
Contains:
Nickel Chloride, CAS-No.: 7718-54-9, 100%
Hydrochloric Acid, CAS: 7647-01-0
WEL/STEL = Nickel Chloride TWA 0.1 mg/m3 (SK, Carc), Hydrochloric Acid TWA 2mg/3, STEL 8mg/m3.
Emergency Limits: TEEL-1 = No Data
Density: No Data.
Volatility: Low (at process temp and enclosed)
DSEAR: Low Risk – no associated flash point.

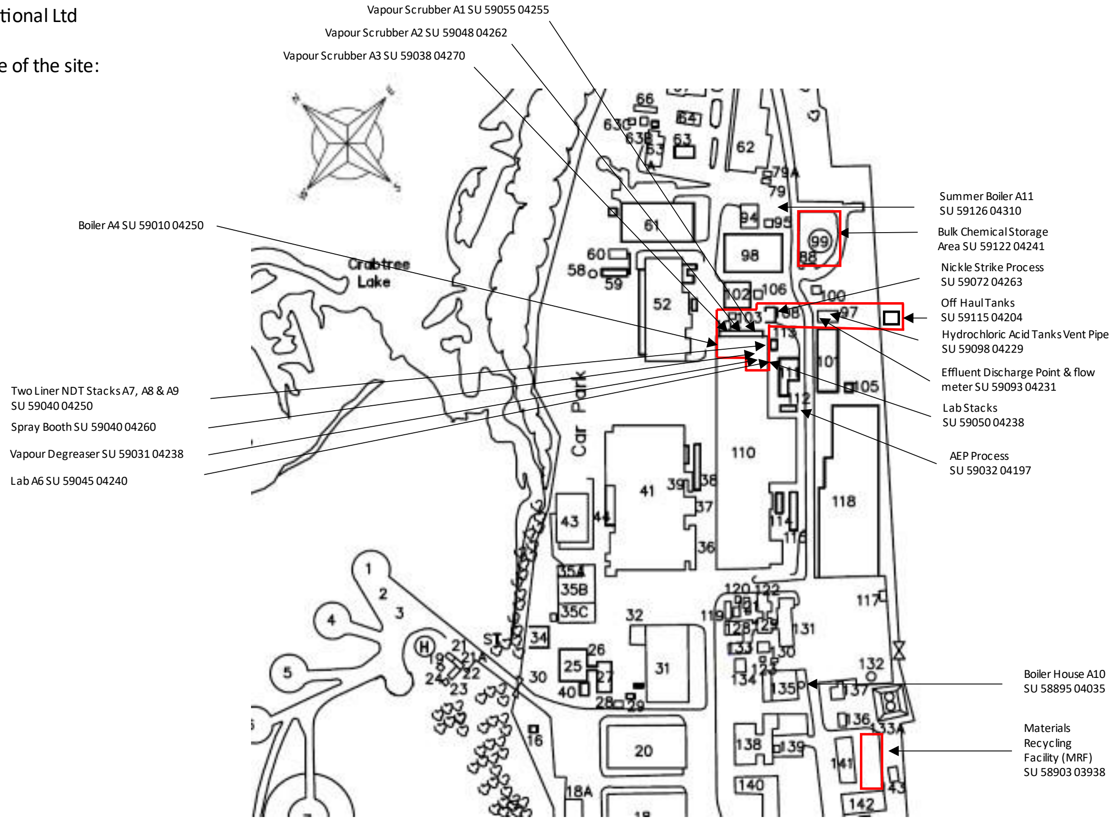
Appendix D – Vector Aerospace International Ltd Site Map Installation

The footprint below within the red lines identifies the boundary of the Vector Aerospace International Ltd permitted processes.

Operator: Vector Aerospace International Ltd
Site name: Fleetlands
National Grid Reference of the centre of the site:
SU 58875 04122

Scale: 1:2500

Date 29/10/2024



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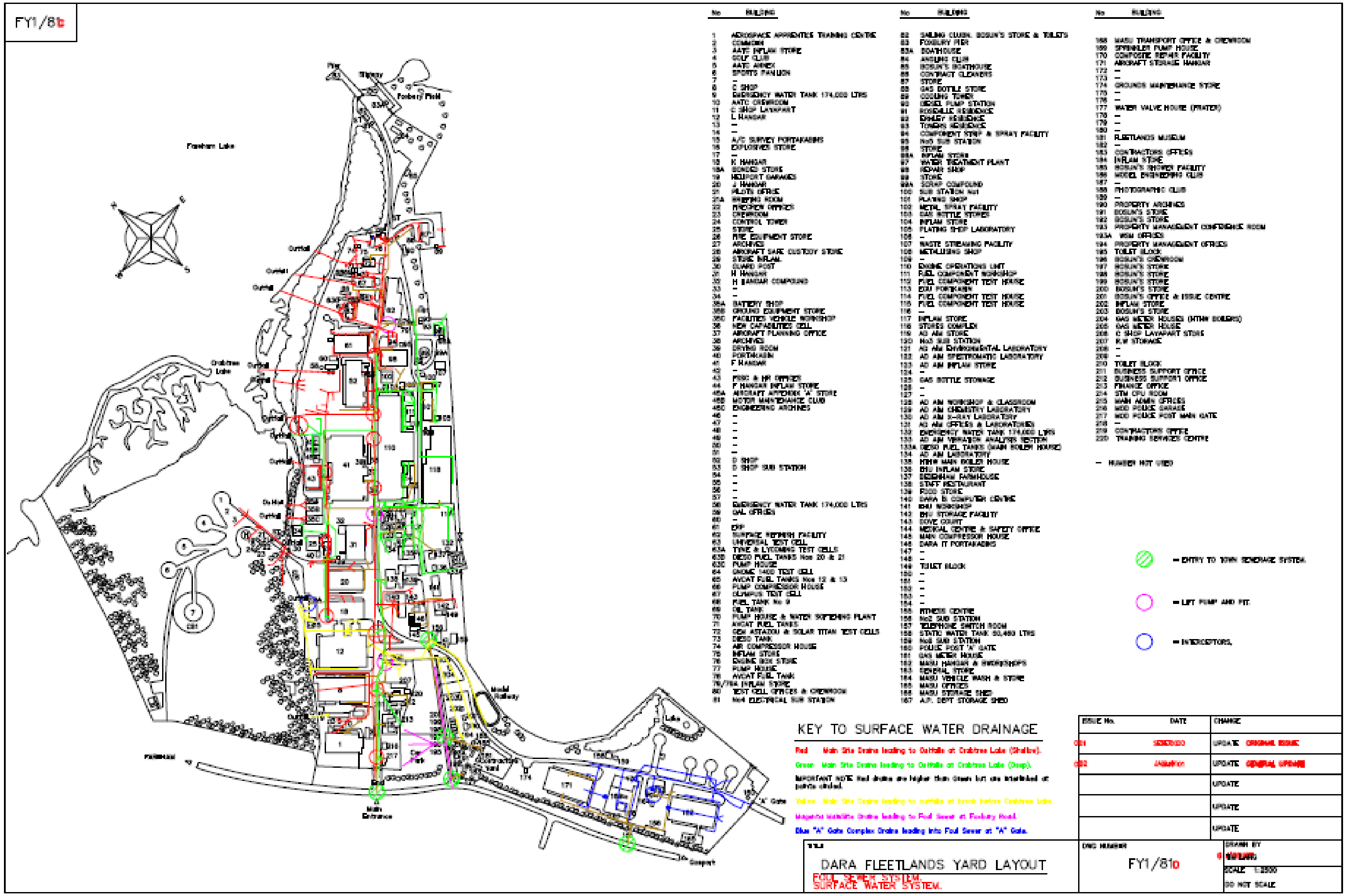
Appendix E – Site Drainage Plan



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