

# Permit Variation

EPR/FP3133GL

# Garston Distillation Services

Veolia ES (UK) Limited

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**November 2022**

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## Table of Contents

<b>1. Non-technical summary</b>	<b>4</b>
1.1 Introduction	4
1.2 Recent permit history and background to variation	6
1.3 References to plant in the application	8
<b>2. Application type</b>	<b>9</b>
2.1 Background	9
2.2 Summary of permit changes and application type	9
<b>3. Operating techniques</b>	<b>10</b>
3.1 Current and proposed activities	10
3.2 Waste Types	14
3.3 Process Flow	14
3.4 Management System	15
3.5 Waste Tracking	16
3.6 Operational Hours	16
<b>4. Environmental risk assessment</b>	<b>17</b>
4.1 Technical standards	17
4.2 Avoidance of waste production from the facility	18
4.3 Technical competence	18
4.4 Habitats assessment	18
4.5 BAT assessment	19
4.6 Emissions to air	19
4.7 Emissions to sewer	21
4.8 Emissions to surface and groundwater	21
4.9 Emissions to land	22
4.10 Noise	22
4.11 Odour	22
4.12 Site Condition Report	22
4.13 Flood Risk Assessment	23
4.14 Monitoring and measurement	23
4.15 Energy efficiency	23
4.16 Raw Material Usage	24

<b>5. Assessment of change</b>	<b>25</b>
<b>6. Application contact information</b>	<b>27</b>

**Included:**

Site Plans and Drawings  
EMS summary and SOP Matrix  
Environmental Risk Assessment and Ecological Assessment  
COTC  
BAT Assessment  
AEmissions: H1 and AQA  
Noise Assessment  
End of Waste report

## 1. Non-technical summary

### 1.1. Introduction

Veolia Garston is a solvent recovery facility that separates mixtures of waste solvents into pure streams either by fractional distillation, or thin film evaporation which is used to treat solvent streams with higher solids content. Once the solvent has been processed it can either be returned to the original customer for reuse, sold to chemical distributors, or, used as a secondary fuel either in the on site boilers or elsewhere.

This non-technical summary supports the application for a variation to the environmental permit held by Veolia ES (UK) Limited 'Veolia', referenced FP3133GL. The application seeks to do two things;

- to increase the processing capacity of the site by 28,000 tonnes per annum through the addition of two new fractional distillation columns.
- to modify an existing steam boiler so that it can operate using a process generated distillate 'PGD' fuel which will be produced from the solvent recycling process operated at the Facility. This will be an additional fuel so that the boiler will be able to operate using natural gas, gas oil or PGD.

The increase in capacity is in response to a higher demand from one of the Facilities main customers, a microchip manufacturer who are in the process of a major expansion at one of their fabrication facilities and as a result will be producing much larger volumes of used solvent.

In 2021 / 2022 the permit for the Facility was varied to add two distillation columns in order to meet the expected new demand. Following recent developments with our customer, as well as more up to date production forecasts, the amount of waste solvent the Facility will need to process from 2023 will now be higher than originally expected. We therefore propose to install a further two distillation columns. These represent a third and fourth new column to the two which were included in the permit in 2021 / 2022.

The two new fractional distillation columns which are the subject of this application are of the same design to those that were added in during the previous variation and will be situated directly adjacent. The previous variation also included new site infrastructure such as storage tanks, cooling plant and steam boilers which have the necessary capacity to and were specified to accommodate this proposed expansion. The new columns being added in this application will therefore not require any increases to the supporting infrastructure.

The two new columns will be heated using steam from the two steam boilers which were added to the permit in 2022, there are no new boilers being added to the permit as part of this application. As part of this application however the existing already installed boiler at the site will be fitted with a new burner which will allow the unit to operate using multiple fuels

including PGD which will be produced on site. This is an extension from the previous application in which the new boilers have already been permitted to use the same distillate fuel.

The increased throughput represented by the new columns will mean that the Facility will use more of the site's available heating and cooling capacity. Emissions to air resulting from the increased distillation capacity have been modelled cumulatively and in relative terms to account for an increase in the load on the two newer boilers from the higher steam demand and also the change in emissions associated with use of PGD in the existing boiler. The modelling work concludes that there will not be a significant impact to local air quality for either human or ecological receptors. Process cooling demand for the expansion will be met by the two evaporative cooling towers which were added in the previous permit variation. The impact of this change to noise emissions has also been modelled cumulatively with the previous expansion including the increased load on the cooling towers and the additional pumps and motors mounted on the new columns. In the remodelling exercise we have been able to consider load specific manufacturers noise data for the cooling towers which was not available at the time of the previous application. When accounting for the load specific cooling data the results of the noise assessment show a lower impact than previously modelled even with the additional equipment, and that the impact of the overall change remains low and is not expected to be noticeable at the closest locations residences. There is predicted to be no impact from noise to local bird populations.

This application does not result in any other changes to environmental emissions including surface water, the sewer network or to land.

The two additional columns are situated directly adjacent to the recently permitted columns of the same design and are within the footprint of the permit boundary so there will be no additional land included as part of this application.

The site is located at:

**Garston Distillation Services**, King Street, Garston, Liverpool, L19 8EG

The site is centred on National Grid Reference (NGR): SJ 40040 83568 and the specific location of the new infrastructure described above is as follows:

- Two new distillation columns centred on NGR: SJ 39993 83565 directly adjacent to the two permitted in 2022.
- The existing boiler which will be refurbished to burn process generated distillate is located at SJ 40094 83535

The existing installation consists of a waste solvent distillation facility which has numerous distillation columns fed from bulk tanks and a smaller system fed from drums. The processes can run independently or concurrently depending on the material being processed. The

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systems operate with a variety of columns, packing, condenser systems and vacuum ability to allow a wide range of materials to be processed efficiently. Non-recyclable solvent residues are despatched from site and processed with additional material at other Veolia facilities.

The site includes the following listed activities within the Environmental Permitting Regulations:

- Section 5.3 A(1)(a)(v) – Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day: solvent reclamation or regeneration.
- Section 5.6 A(1)(a) – Temporary storage of hazardous waste.

The additional infrastructure added as part of this application will increase the throughput of hazardous waste by greater than 10 tonnes per day and will therefore be a 'substantial' variation.

However, the current application is effectively an extension to the immediately previous 2021 / 2022 application (ref 'V006') and will simply add two identical columns and convert the existing (older boiler) to have the same multi fuel options as the newer boilers. The areas of change due to increased load i.e. steam and cooling demand, have been modelled and due to availability of more detailed data to be included with model inputs the revised impacts are lower than previously expected.

Due to the similarity and timing of V006 (previous application) and V007 (this application) we have followed exactly the same application structure for ease of review by relevant stakeholders.

## **1.2. Recent permit history and background to variation**

The Facility was built in 1991 as a joint venture between Hays and Speichim, primarily to service the pharmaceutical industry, and was designed to recover products of very high purity from essentially clean feedstock. In 1997, Hays bought out Speichim and eventually sold the business to Albion Chemicals in 2002. Brenntag then purchased the Facility in 2006 and Veolia Environmental Services (UK) plc finally acquired the Facility in 2008.

The activities carried on at the Facility are authorised under the Environmental Permitting Regulations via Environmental Permit reference EPR/FP3133GL. The Facility is also subject to control under the Control of Major Accident Hazards (COMAH) Regulations as a Lower Tier site due to the presence of hazardous substances classified generically as toxic and very toxic at quantities above the qualifying thresholds.

The Facility occupies a parcel of land covering an area of approximately 2.5 hectares located on the northern bank of the River Mersey.

The permit for the Facility was first issued to 'Albion Distillation Services Limited' under the Pollution Prevention and Control Regulations (2000) on 25<sup>th</sup> May 2006, with permit number

BS5410IG. This was varied on 7<sup>th</sup> October 2008 to formalise the surface water management arrangements for the site.

The permit was then transferred to Veolia shortly after, on 9<sup>th</sup> October 2008, and became permit reference FP3133GL. The permit has been subsequently varied on six occasions: The first variation (V002) was determined on 16<sup>th</sup> November 2009 to include an extension to the site boundary to incorporate the new tank farm and regularise the surface water discharge arrangements. The second variation (V003), issued on 6<sup>th</sup> July 2012, was made to include a waste to energy facility in the form of a co-incineration plant, but this has never been commissioned and was removed from the permit during the latest variation. V004, determined on 3<sup>rd</sup> October 2013, consolidated the permit and included the addition of two thin film distillation columns and associated plant for the treatment of an additional 20,000 tonnes of solvent-based wastes. This variation also implemented the requirements of the Industrial Emissions Directive 'IED'. Variation V005 was issued on the 8<sup>th</sup> July 2016 to reflect a new step in the solvent recovery process. This step involves the pre-treatment of waste solvent in a dedicated vessel using an acid or alkali (as appropriate) to react with certain components in a complex organic solvent mixture, to facilitate their removal in a separate settled aqueous phase. The remaining organic phase continued to be processed via the standard distillation process as already permitted. The latest variation, V006, was submitted in May 2021 and has been in determination throughout 2022 and includes the addition of two fractional distillation columns, associated tankage and infrastructure, two new multi fuel boilers and two new cooling towers. The application also increased the volume of effluent that could be discharged to water from 35m<sup>3</sup> per day to 100m<sup>3</sup> per day.

### **Facility Current Capability and Operations**

The Facility offers a service for the handling, cleansing, purification and recycling of a wide range of solvents. Solvent laundering and recovery is achieved through a distillation process that separates the pure solvent from contaminants. This is accomplished either by thin film evaporation (removal of paints, oils and resins), or by fractionation, which separates mixed solvents into clean, purified products.

The plant as currently recently re-permitted has the capacity to process circa 58,000 tonnes per annum of solvents.

### **Further Expansion of the Facility**

The addition of two distillation columns will add 28,000 tonnes of processing capacity to the Facility making the total capacity 86,000 tonnes per annum. The expansion is in response to a higher than initially expected demand from one of the Facilities main customers, a microchip fabricator.

The two additional columns will be of exactly the same design and configuration as the two permitted in the previous application V006. It is also proposed to integrate the option for the existing boiler on site to operate using PGD.

### 1.3. References to plant in this application

The following section clarifies the language used throughout this application to avoid ambiguity and ensure consistency and clarity throughout.

There was a permit application made in 2021 and determined during 2022 which included two new boilers, two new fractional distillation columns and associated infrastructure such as tanks and bunds. The new boilers were permitted as multifuel being able to use natural gas, gas oil and process generated distillate (solvent). This infrastructure is due to be installed during 2023. This is referred to as the V006 application.

- **'V006 boilers'** - the two new 9.9MWth boilers added in permit variation V006 which are activity reference 'AR5' and relate to emission points 8a and 8b.
- **'Existing boiler'** - the 6MWth boiler which predates the V006 application which is activity reference 'AR4' and relates to emission point A5.
- **'V006 columns'** - the two fractional distillation columns added as part of permit variation 'V006'
- **'New columns'** - the two new fractional distillation columns added as part of the subject permit variation i.e. 'V007'



## 2. Application type

### 2.1. Background

This application relates to the expansion of the solvent recovery activities at the Facility by 28,000 tonnes per annum with the installation of two new columns and conversion of the existing boiler to use an additional fuel (PGD) which is a solvent distillate fuel which will be produced by the recycling process carried out at the Facility.

The new plant will be efficient in the recovery of material from the waste inputs and will be designed to maximise the value of the recovered material and minimise the use of raw materials and production of wastes from the process. The operation of the existing boiler using PGD which is a secondary fuel will mean the operation of the plant will rely less on primary fuels such as natural gas and gas oil.

This application seeks to increase the plant capacity from 58,000 tonnes per annum to 86,000 tonnes per annum.

### 2.2. Summary of permit changes and application type

- A substantial variation to a Section 5.3 A(1)(a)(v) activity to add two new columns with an individual capacity of 14,000 tonnes per annum which are of the same design and configuration as the V006 columns.
- The refurbishment of the existing boiler to use solvent distillate fuel which will result in it becoming a new medium combustion plant 'MCP' as a Schedule 25A activity. The plant will remain a directly associated activity 'DAA' to the solvent recovery installation activity. Emission limits for gas, gas oil and PGD and associated monitoring will be included in the permit.
- Minor changes to the site general arrangement drawing restricted to the location of two new distillation column. There are no new emissions points being added as part of this variation.

## 3. Operating techniques

### 3.1. Current and proposed activities

#### 3.1.1 Current extent of activities (including those permitted but not yet installed in variation V006):

The solvent recovery plant offers a service for the handling, cleansing, purification and recycling of a wide range of solvents. Solvent laundering and recovery is achieved through a distillation process that separates the pure solvent from contaminants. This is accomplished either by thin film evaporation (removal of paints, oils and resins), or by fractionation, which separates mixed solvents into clean, purified products.

The Facility mainly processes waste solvents from the following industries:

1. Chemical and pharmaceutical;
2. Paints and coatings;
3. Chemical distributors; and
4. Electronics.

The plant currently has the permitted capacity to process circa 58,000 tonnes per annum of solvents; approximately 20,000 tonnes per annum via four older operational fractional distillation columns, 10,000 tonnes via the process of thin film evaporation (TFE) and a further 28,000 tonnes via the yet to be installed V006 columns.

Relevant site capabilities / aspects are summarised below:

- Six distillation columns, four existing columns and two yet to be installed from the V006 application.
- The existing boiler - a dual fuel natural gas / gas oil fired unit with a net rated thermal input of 6MWth which will remain the Facilities main boiler until the V006 boilers are installed.
- The V006 boilers - two 9.8MWth input multi fuel natural gas / gas oil / process distillate fired units (these are due to be installed at the Facility in 2023).
- 55 steel storage tanks varying in capacity from 30m<sup>3</sup> to 100m<sup>3</sup>, with a total storage capacity of circa 2,500 m<sup>3</sup>. In 2017 the site lost storage capability due to a number of tanks (12 x 60m<sup>3</sup> carbon steel and 4 x 30m<sup>3</sup> stainless steel) failing integrity testing. In late 2018, 5 new tanks were installed (1x 30m<sup>3</sup>, 2 x 60m<sup>3</sup> and 2 x 100m<sup>3</sup>).

- The site is lower tier COMAH and this limits the type and volume of crude wastes which can be stored at the facility, as some potential enquiries would take the site above the upper tier COMAH threshold.
- The site has no waste water discharge consent and uses external outlets for waste water. This is a notable limitation as the disposal of water waste is a significant cost for the site.
- The site also acts as a base to a North West area transport depot for the wider business, accommodating 13 drivers and 2 Veolia personnel who are responsible for the depot.

The distillation columns are fitted with condensers supplied with cooling water on a recirculation system passing through forced air fed water cooling towers.

Heat for the distillation processes is supplied in the form of steam at around 10 bar pressure from three steam boilers (1no. existing 6MWth installed, 2no. 9.8MWth due to be installed in 2023), a condensate return system and make-up water supplied by the potable mains water supply to the site.

Boiler blow down water, cooling water and small amounts of uncontaminated surface water may be discharged to the River Mersey (identified as discharge point W1 in permit FP3133GL) at a rate of up to 100m<sup>3</sup> in a 7 day period (an increase from the previously permitted 35m<sup>3</sup>). Uncontaminated surface water runoff may be discharged to the River Mersey (identified as discharge point W3 in permit FP3133GL). All waste water intended for discharge via W1 and W3 is held in storage, and sampled and analysed prior to discharge to ensure that it meets the quality requirements specified in the permit. All contaminated waste water, including waste water found to be unsuitable for discharge on analysis is held in separate storage pending removal from site by road tanker for third party disposal. Waste distillation residues are shipped off site in bulk road tankers and occasionally in IBC's for third party disposal.

The distillation processes operate 24 hours per day seven days per week with a planned annual maintenance shutdown programme of around two weeks duration.

### 3.1.2 Proposed activities:

#### Overview

The expansion will not involve any land outside of the current permit boundary as the only addition to the facility footprint will be two new columns which will be identical in design and will be situated directly adjacent to the V006 columns. The expansion will add 28,000 tonnes of processing capacity to the site. The new columns are of the same design as in the previous application (V006) and as such will be of the same efficiency in the recovery of material from the waste inputs and will be designed to maximise the value of the recovered

material and minimise the use of raw materials and production of wastes from the process.

The two additional columns will be heated by the V006 boilers. There is no change to the fundamental operation of these boilers as they were specified to accommodate site expansion. The two new columns will represent an increase in the annual load of the boilers and this change has been assessed as part of this application.

The existing boiler is a dual fuel appliance which can operate using natural gas or gas oil. This boiler will be refurbished with a new burner to enable it to operate using PGD solvent distillate fuel. The distillate fuel used for the existing boiler will be produced from waste solvent processed on site in line with the operation of the V006 boilers which will also be able to operate using all three fuels. Veolia expects that the Environment Agency will apply the same regulatory approach to authorisation of the existing boiler to use the solvent fuel i.e. to seek a regulatory opinion from the Environment Agency in relation to the end-of-waste status of the proposed fuel. Veolia has previously carried out an assessment of the use of PGD as a fuel, the end-of-waste status.

The process cooling demand will be met by the same two evaporative cooling towers specified in the previous application (V006). There will be no changes to their fundamental operation but there will be an increase in load. The cooling towers were specified based on the demand represented by the operation of four columns and are sized to allow for redundancy e.g. during routine maintenance. Revised overall noise emissions are actually shown to be lower than previously estimated even with the additional load. This is due to load specific data about the operation of individual fans in the multicell units.

There will be no new storage tanks or fuel tanks required as part of this application.

## **Operation**

The new columns will be operated in the same way as the V006 columns. Customers generating hazardous solvent wastes submit samples of their wastes for analysis. The waste is then put through a rigorous pre-acceptance process (historically complying with Sector Guidance S5.06 and more recently the new Appropriate Measures) which speciates the waste and judges whether it is acceptable to recycle. A recycling process is then mapped utilising technical expertise and lab simulations to confirm the recovery process, outline yields and costs before the site commits to accepting the waste.

On arrival at site wastes are analysed against acceptance parameters, the material is then offloaded to storage.

The fractional distillation process heats the crude material and introduces it to the fractionation column. The column concentrates and separates different boiling point components into fractions for additional separation or products. A reaction step is used to convert some of the waste into simpler molecules to ease separation and increase recoverability of the material.

Heat is provided to the crude inputs in the form of 10 Barg steam via heat exchangers and supplemented by pre-heaters. The pre-heater exchanges energy by using the incoming crude material to cool the vapour leaving the distillation column. This is a major energy saving mechanism as it reduces steam usage and evaporative cooling demand, making the process more energy efficient.

Cooling is provided as above via cross heat exchangers and additional cooling is provided by evaporative cooling towers pumping water through additional heat exchangers.

The process will be controlled via a distributed control system (DCS) and sequence control and data acquisition modules (SCADA) via PLC, this will be supplemented by a separate Safety Instrumented System PLC, which provides a dedicated safety system operating above the process control system.

The SCADA system will allow for control over inputs, outputs, ratios, flow control, valve and pump operation from a centralised location. This will be supplemented by the use of HMI (Human Machine Interfaces) at key locations within the plant complex and local instrument displays.

The proposed layout of the new plant and associated equipment is set out in a revised site plan accompanying this application; a separate plan shows the location of emission points which remain unchanged.

### **Storage tanks and associated equipment**

There will be no new storage tanks as part of this application, the only new infrastructure will be an additional two new fractional distillation columns which will increase maximum solvent waste throughput by approximately 28,000 tonnes per annum.

### **Boilers**

There are no new boilers being added in this application, the only units on site will be those referred to in V006 as activity reference 'AR4' the existing 6MWth boiler and 'AR5' the V006 boilers previously permitted which are 9.8MWth each and are due to be installed in 2023.

The following changes will be made to the combustion activities already permitted:

- There will be an additional load on the V006 boilers resulting from the operation of two new columns. The impact of this change has been modelled to support this application.
- The existing boiler 'AR4' will be upgraded with a new burner so that it will be able to operate using natural gas, gas oil and PGD (solvent fuel). The impact of this change has also been modelled to support this application. The existing boiler will remain in operation until the V006 boilers have been commissioned and then it will be decommissioned.

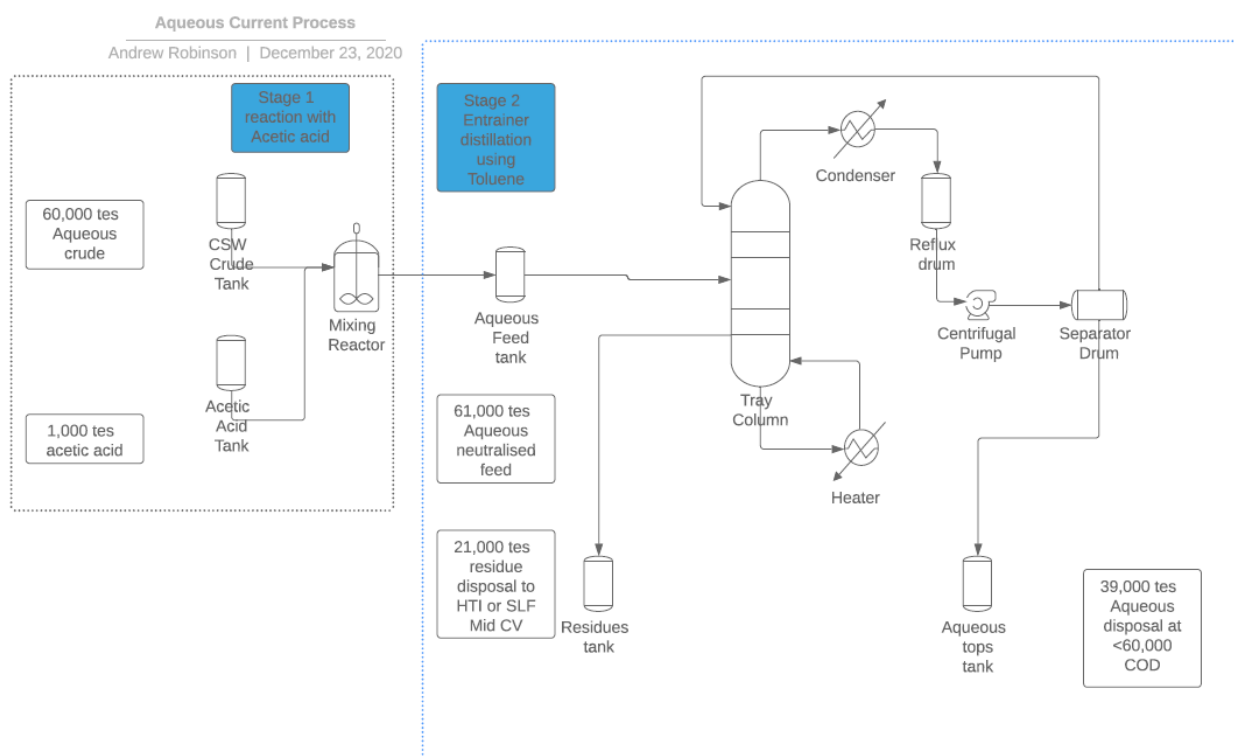
### 3.2. Waste types

There will be no change to the waste types which will be accepted to the Facility. The increased capacity represented by this application is in response to higher than previously expected demand from the same customer which formed the basis of our previous application submitted in May 2021.

The customer is a microchip fabrication company in Europe who are increasing in capacity by building new fabrication units.

### 3.3. Process flow

The process flow diagrams are set out below showing the operation of the new columns to be identical as those permitted in V006. Further details can be found in the previous application.



#### Stage 1 Neutralisation step

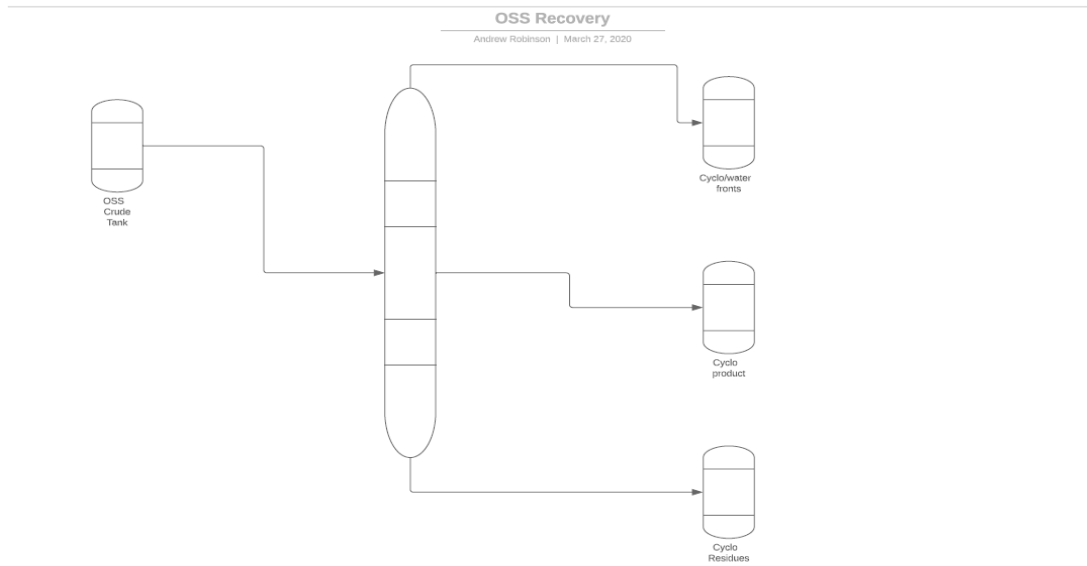
The aqueous material is high pH, due to tetra-ammonium Hydroxide, Acetic acid is used to bring the pH down to ~7 and convert the Alkali into an ammonium acetate salt. This stays with the residues in distillation.

#### Stage 2 Entrainer Distillation

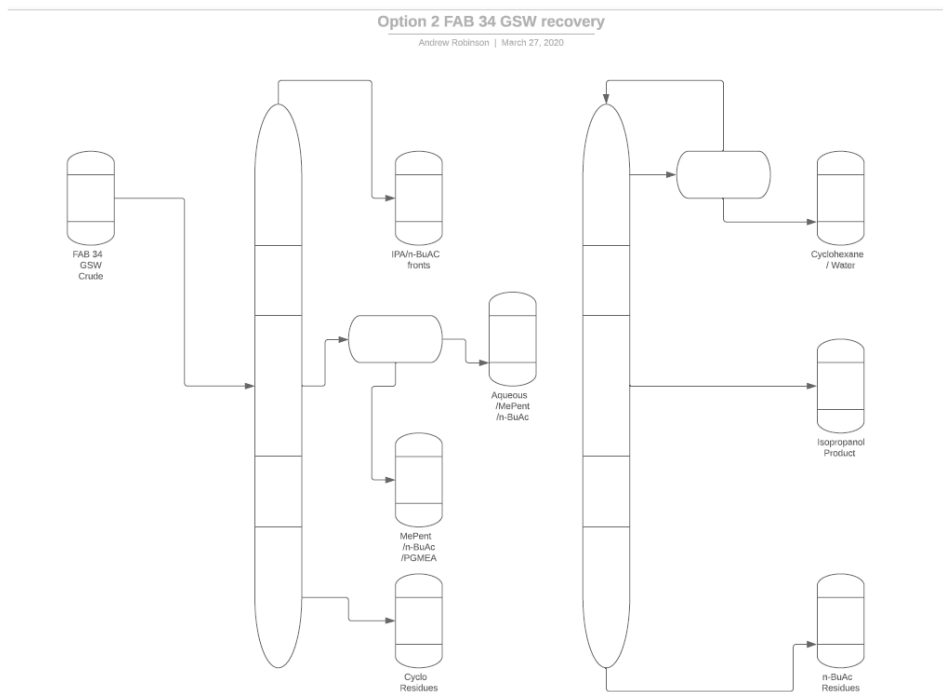
The Aqueous mixture contains Butoxy Ethanol, this forms an azeotrope with water at ~100°C. The azeotrope is broken by forming a lower boiling one with Toluene. This allows water to be extracted from the system with low COD content. The toluene instantly partitioning out after condensation for return back from the top phase of the separator drum back to the column as reflux. The lower separator drum phase is taken as the aqueous fraction for waste water treatment. The second take off from the column is the higher solvent/low water content material, this is used as low grade fuel for incineration or cement kiln fuel.

### Summary of current process flow for solvent recovery

The process flow diagrams for the expected waste streams detailed in Section 3.2 above are set out in Figure 3 (OSS) and Figure 4 (FAB 34 GSW).



**Summary of proposed process flow for OSS Stream**



**3.4. Management system**

The Veolia Management System is registered and approved to standards ISO 9001, ISO 45001 and ISO 14001. The operational, monitoring and management procedures

implemented at the subject facility, are in accordance with the Veolia Management System and have been audited against the requirements of the standards detailed previously.

The proposed operation will be covered by group level and local procedures which form part of the Company's documented management system. A summary of Veolia's Business Management System is included with this application.

Local procedures reflect the requirements of the Sector Guidance Note EPR5.06. These are under regular review and are updated as required for the proposed operation. A summary showing a list of site procedures is included with this application. This shows the Standard Operating Procedures (SOPs) that are current, under review and those that are no longer applicable and archived.

The existing procedures are still relevant as the new infrastructure uses the same technology as the current plant. A well established SOP Matrix is used to keep track of the operational procedures, both extant and superseded.

### **3.5. Waste tracking**

Waste pre-acceptance, acceptance, handling and storage procedures are in place for the existing solvent recovery operation.

Veolia uses a computerised waste tracking system to update information about the available capacity, quarantine, reception, general and bulk storage areas of the facility. The Waste Information Management System (WIMS) is a complete waste information management system designed specifically for waste treatment, storage, disposal and recycling facilities linking sales, waste approval, transportation, treatment, and disposal activities. The proposed new activity will be integrated into this existing system.

### **3.6. Operational hours**

There will be no change to the operational hours of the site resulting from the changes to the permit being requested in this application.



## 4. Environmental risk assessment

A qualitative environmental risk assessment 'ERA' for the operation has been produced to consider the risks associated with the proposed expansion. The ERA includes a habitats assessment. Due to the similarity between this application and the previous one carried out during 2022 there are no significant changes.

The new infrastructure will be subject to the relevant detailed safety assessments required by the HSE because of the site's Lower Tier COMAH status. There is no change in the COMAH status of the site resulting from the proposed increase in capacity.

### 4.1. Technical standards

Activities at the Garston Distillation Services Facility are covered by corporate and local procedures which form part of the Company's documented management system.

Local procedures reflect amongst other things the requirements of the Waste Treatment BREF and Sector Guidance Note S5.06 until recently - now replaced with Appropriate Measures guidance:

- Best Available Techniques (BAT) Reference Document for Waste Treatment
- Appropriate measures for permitted facilities that take Chemical Waste
- Relevant statutory instruments and related or supported technical guidance

A BAT review of the requirements of the Waste Treatment BREF and the Appropriate Measures was carried out as part of V006. The proposed changes in this application do not alter the BAT assessment. The only addition is that the existing boiler will now also be able to operate using solvent fuel. A minor revision to the BAT assessment with the change highlighted is included with this application.

With regards to the Medium Combustion Plant, the following key technical standards or documents apply:

- Environment Agency Guidance from the Medium combustion plant and specified generator regulations collection including:
- Medium combustion plant (MCP): comply with emission limit values (August 2019);
- Medium combustion plant and specified generator permits: how to comply (July 2019);
- Monitoring stack emissions: low risk MCPs and specified generators (February 2021; replacing TGN M5)

- Monitoring emissions to air, land and water (MCERTS) (October 2020)
- Medium Combustion Plant Directive (December 2013)

#### 4.2. Avoidance of waste production from the activity

The new columns will be of the same efficient design as those recently permitted in application V006. They will incorporate the same efficiency in the recovery of material from the waste inputs and will be designed to maximise the value of the recovered material and minimise the use of raw materials and production of wastes from the process.

The main output(s) from the plant will be of a high quality allowing recovered material to substitute virgin material in the manufacturing chain, reducing carbon load in the supply chain in two ways. The waste material will be re-used, with the recovery being at a fraction of the energy / carbon cost of producing virgin material and secondly in that this substitutes the equivalent virgin material being manufactured. In addition to waste material being recycled to replace the virgin material, some solvent waste resulting from that process can also be recycled hence avoiding waste production.

The alternative fuel produced from the process will be burnt as a direct replacement for natural gas or gas oil in the two steam generating boilers on site, subject to it achieving End-of-Waste or as a secondary liquid fuel for the kilns.

#### 4.3. Technical competence

Certificates of Technical Competence (awarded by WAMITAB) are provided to support this application.

The current COTC holder for the Garston Distillation Services Facility is set out in the table below:

Name	Type	Expiry Date	Certificate no.
Helen Milligan	TSH / TMH / TSNH	10/11/2024	5210982

#### COTC holders for the Garston Distillation Services Facility

#### 4.4. BAT assessment

A comprehensive BAT assessment was carried out as part of the previous variation 'V006' submitted in May 2021 and determined by the Environment Agency during 2022. This BAT assessment has been reviewed and as this proposal represents a capacity increase using identical technology it does not alter the conclusions relating to any of the selected key indicative criteria and therefore remains up to date.

A BAT assessment considering the use of solvent derived fuel was also completed for the V006 application considering:

- Whether burning solvents will give rise to higher emissions than burning other fuel;
- The difference in impacts on air quality resulting from higher emissions;
- Reduced fossil fuel usage from burning solvents and global warming impact;
- The costs associated with different fuel options.

The conversion of the existing boiler to operate using PGD is an extension to what has already been permitted i.e. use of the PGD within the V006 boilers. The solvent fuel for the existing boiler will be produced using the same incoming waste streams and will be combusted using the same technology which will require replacement of the burner in the existing boiler.

#### **4.5. Habitats Assessment**

Habitats may be sensitive to increases in emissions to air or noise so the impact of the proposed changes have been updated through revised air dispersion and noise impact modelling and an ecologist has reviewed the relevant outputs and conclusions.

The ecologist concludes that the proposed expansion will not have a significant impact on ecological receptors.

Evidence of the ecologist's conclusions are included with this application.

#### **4.6. Emissions to air**

##### **Emissions points**

There will be no new emission points installed as part of this application.

The plant and tank farm permitted in V006 due to be installed in 2023 will have one combined emission point (A9), which will run through a scrubber unit to capture the majority of the VOC's and then through a carbon capture unit before emission at high level to air. The emission point is set to be at the same height as the columns (30m in height from main site mean level). There will be no change to this configuration as a result of the proposed changes in this application.

The two V006 boilers discharge their emissions to air through dedicated flues (emissions points A8a and A8b) within a 16m common stack; there will be no change to the location or height of this emission point. The existing boiler discharges through a 9m stack which will remain unchanged.

##### **Emissions from V006 scrubber (A9)**

The additional two new columns will increase the flow through the scrubber. The impact of this change has been assessed using the Environment Agency's H1 screening by our third party consultant Fitchtner.

The revised parameters for the screening assessment and the predicted ground level concentration are presented in the accompanying air quality assessment. A copy of the completed screening tool is also provided as part of this application. The assessment concluded that the revised impact of emissions from the new scrubber stack are screened out as 'insignificant' considering the very low predicted ground level concentrations. As such, it was not necessary to reconsider this minor source within the dispersion modelling.

### **Boiler operational profile / commissioning and decommissioning**

We anticipate that the existing boiler will operate as the main boiler on site with the upgraded ability to operate as a multi fuel unit the V006 boilers are installed and commissioned at which point the existing boiler will be decommissioned. The impact of the commissioning has been modelled in the AQA based on the operation of the existing boiler plus one of the V006 boilers at a time. The existing boiler will be refurbished before June 2023 at which point it will then have the option to utilise PGD. There will then be no change to the operational profile and load on the existing boiler, just the change in fuel. Once the V006 boilers are installed they will take the existing site load as well as the load from the V006 and new columns.

### **Emissions from the new boilers (A8a and 8b)**

The impact of the change in emissions to air from the increased load on boilers has been assessed in the revised AQA accompanying the application. This revision was undertaken by our third party consultant Fitchtner who also undertook the previous modelling. This assessment includes a review of baseline pollution levels using updated Local Authority data, dispersion modelling of updated emissions and quantification of the impact of these changes to local air quality considering both the protection of human health and sensitive ecosystems.

In line with the previous modelling we have assumed that the boilers will operate for a maximum of 8,760 hours per year. Annual mean impacts have been assessed assuming a predicted average load of circa 65%, and short-term impacts have been conservatively assessed based on a peak load of 100%. The annual average boiler load is lower than was previously modelled and is based on more detailed data which was not available at the time of the previous application. The updated data shows the heat requirements for each distillation process that could run consecutively across all columns.

As per the previous modelling exercise, emissions limits for each fuel have been assumed to be those prescribed in the MCPD and it has also been assumed (as previously) that emissions of sulphur dioxide from the distillate fuel will be negligible as there will be a negligible quantity of sulphur in the distillate fuel. Emissions from the boilers firing distillate fuel are however anticipated to be no higher than when firing gas oil.

The contribution from the permitted but not constructed CHP plant was previously included as part of the baseline local air quality but this has now been removed from the model as the plant will not be installed and the activity has been removed from the permit.

A stack height assessment was previously undertaken to determine a suitable stack height for the V006 boilers. The conclusions in the updated air quality assessment are that this will not need to be amended and the change in emissions will not have a significant impact.

#### **Emissions from the existing boiler including solvent fuel (A5)**

The impact of operating the existing boiler using solvent fuel has been included in the revised air quality assessment. The PGD fuel used in the existing boiler will be produced using waste solvent from the same customer in accordance with the end-of-waste assessment which formed part of the application for PGD use on the V006 boilers. This includes the fact that there is anticipated to be negligible sulphur content in the specified waste inputs which would be carried through into the fuel.

The V006 variation includes a preoperational condition which lays out the process that will be required to demonstrate that use of PGD in the V006 boilers meets the end-of-waste criteria. It is expected that this pre-operational condition can be extended to the operation of the existing boiler using PGD.

The refurbishment of the existing boiler will require replacement of the burner and when operating using PGD particulate emissions are also considered. The application of Environment Agency guidance for alterations to medium combustion plants means the boiler will be reclassified to a 'new' medium combustion plant.

Recent service monitoring reports for the existing boiler indicate that, as an older plant, it is currently achieving NO<sub>x</sub> emissions approximately equivalent to the MCPD requirement for 'other liquid fuels' which is the same limit that applies when the plant is operating on PGD which is classed in the MCPD as a 'liquid fuel other than gas oil'. As a result this will only represent a small difference in ground level air quality impact. The revised emissions profile from the existing boiler will not have a significant impact on either human or ecological receptors. Full details and supporting data are contained within the accompanying air quality assessment report.

#### **4.7. Emissions to sewer**

The proposed changes in this application will not affect sewer emissions. There are currently no emissions to sewer from the foul system.

#### **4.8. Emissions to surface water and groundwater**

The pollution prevention measures currently implemented at the Garston site are set out below. They fall into two main categories, those relating to hardware designed to prevent the

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escape of potentially polluting substances to ground, groundwater or surface water, and those relating to operating techniques and operator competence. These measures will apply to the new infrastructure.

### **Primary / secondary / tertiary containment**

The supporting infrastructure for the additional two columns was integrated into the overall plant design and as a result there is no change to primary, secondary or tertiary containment. The design of the additional columns is exactly the same as the two that were recently permitted.

#### **4.9. Emissions to land**

There will be no emissions to land resulting from the proposed changes.

#### **4.10. Noise**

The installation of the proposed two additional columns will result in an increased load on the Facilities cooling towers. The additional two columns will also have the same configuration number of supporting pumps which represent additional noise sources. The noise impact report including a BS4142 assessment which supports the application has been reviewed and updated. In the revised assessment we were able to include some load specific data about the operation of the cooling towers at the sites peak demand. The two cooling towers both contain four individual cells each with an individual fan and we have been able to use data which describes the number of operational cells and the RPM of the associated fans. As a result of the updated noise emissions data the outcome of the assessment shows a lower impact than previously expected even though the number of operational columns will increase. This is because the cooling towers are the dominant noise source on site and the pumps and motors mounted on the columns have low emissions and will not have a noticeable off site impact.

The revised cooling tower noise assessment is included with the application and the conclusion remains that the impact will be low.

#### **4.11. Odour**

There will be no change in odour risk resulting from the proposed changes. The operation of the additional two distillation columns will be the same as the recently permitted columns and all waste will be stored, transferred and processed within sealed systems and in line with current appropriate measures.

#### **4.12. Site Condition Report**

There is no land being added or surrendered as part of this application and no changes to the risk to land or groundwater.

#### **4.13. Flood Risk Assessment**

An updated flood risk assessment was provided as part of the previous variation 'V006' and the footprint of the proposed new infrastructure is included. There will be no impact to flood risk from the current application.

#### **4.14. Monitoring and measurement**

The proposed upgrade to the plant will mean that the existing boiler will become a new medium combustion plant and monitoring will need to be carried out in accordance with MCPD requirements once it is upgraded.

Extractive monitoring of the emissions to air from the existing boilers at emission points A5 (existing boiler) will therefore be carried out to confirm compliance with the emission limit values as set out in the Medium Combustion Plant Directive. This will be carried out within 4 months of the boilers being upgraded (becoming new). The extractive monitoring will be carried out in accordance with the requirement of the permit. As existing equipment requirements of BS EN 15259 will be met where practicable.

There will be no other changes to emission monitoring and measurement requirements.

#### **4.15. Energy efficiency**

The Facility will use more energy as a result of the increase in material throughput, the main energy usage is steam generation for the distillation plants. The increase in steam demand will be met by increased load on the V006 boilers which were designed to accommodate plant expansion. The increase in fuel usage will be negated by using an alternative fuel generated as a product from the waste stream offsetting the amount of natural gas or gas oil that would be required to recover the material.

Measures will be implemented to optimise heat use from the V006 boilers within the site. This will include but not necessarily be limited to:

- use of economisers on both boilers to reclaim waste heat in the exhaust stream;
- use of a control system to manage boiler output depending on process heat demand.

The conversion of the new boiler to operate using PGD will reduce the reliance of the facility on primary fuels i.e. natural gas and gas oil.

In addition, whilst heat is provided to the crude in the form of 10 Barg steam via heat exchangers, it is also supplemented by pre-heaters. The pre-heater exchanges energy by using the incoming crude material to cool the vapour leaving the distillation column. This is a major energy saving mechanism as it reduces steam usage and evaporative cooling demand, making the process more energy efficient. Electricity demand will increase as a result of the



additional pumps and motors associated with the two new columns. The new equipment procured will be bought as an energy efficient design utilising inverter drives to save energy where possible. A new transformer which is due to be installed as part of the overall expansion will be able to provide electricity much closer to unity than current equipment that will provide a much better power correction factor, thus reducing the amount of current required. The supplies will be sub-metered to allow for accurate determination of energy usage.

#### **4.16. Raw Material Usage**

The newer columns will require less raw materials than the older columns. The main consumable for the current process has historically been Potassium Hydroxide (KOH) liquor (50%), this is used to react with the esters in the crude and convert them into their equivalent alcohols and the acetate/lactate salts. The reduction of KOH usage has been ongoing. This has been achieved in two parts, further segregation at the customer's site and the removal of one problematic compound from the waste mixture. Secondly by the revision of the process to utilise the materials in a different way e.g. in generating solvent fuel, or by use in paint thinners. A new raw material however is required for use as an entrainer in the production of dry Isopropanol.

The increase in annual throughput will require more steam generation and a corresponding increase in fuel usage. The increase in fossil fuel usage is however be reduced with the use of PGD from the waste solvent processed on site. In this application we are also proposing to extend the ability to operate the existing boiler on PGD. This represents an earlier shift to operation of the site using secondary fuel and brings forward the associated savings on primary fuel use.



## 5. Assessment of change

The table below provides a summary of the changes being requested by this permit variation.

Aspect	Impact
Permitted Materials	No change to waste types being received.
Releases to Air	<p>There will be an increase in emissions to air due to the increased load on the V006 boilers. The existing boiler is being upgraded so that it can use process generated distillate fuel, the impact of this change is not significant. There will be a slightly higher flow through the VOC scrubber serving the combined tank farm.</p> <p>The impact of these emissions has been considered in a revised AQA provided by Fitchner.</p> <p>In summary, the assessment concluded that the impact of emissions from the new scrubber stack could be screened out as 'insignificant' and emissions from the boilers operating with a stack height of 16 m would not have a significant impact on local air quality, the general population or the local community.</p>
Process Throughput	This application seeks to increase the plant capacity from circa 58,000 tonnes per annum to circa 86,000 tonnes per annum.
Releases to Water	No change.
Releases to Land	No change.
Energy Use	<p>The site will use more energy given the increase in material throughput, the main energy usage will be to generate steam for the distillation plants. This will be negated by using an alternative fuel generated as a product from the waste stream offsetting the amount of natural gas or gas oil that would be required to recover the material.</p> <p>Electricity demand will be for the additional pumps and motors in the new build. The new equipment procured will be bought as an energy efficient design. Utilising inverter drives to save energy where possible.</p> <p>A new transformer will be installed on site with equipment able to provide electricity much closer to unity than current equipment that will provide a much better power correction factor, thus reducing the amount of current required. The supplies will be sub-metered to allow for accurate determination of energy usage.</p>
Raw Materials Use	There will be an increase in fuel usage associated due to the increase in heat required for the process. This will be offset by the use of secondary fuels generated on site. The upgrade of the existing boiler to use process generated distillate fuel will bring forward the date by which the Facility will be using secondary fuel for steam raising.
Noise	The additional columns will result in a higher peak cooling demand. The demand will be met by the two cooling towers that were permitted in 2022. A revised noise assessment has been completed which shows the cumulative impact will be low.
Odour	No change

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<b>Permitted Processes</b>	<ul style="list-style-type: none"><li>■ A substantial variation to a Section 5.3 A(1)(a)(v) activity to add two fractional distillation columns, of the same design as those permitted in 2022.</li><li>■ The addition of a new fuel to an existing boiler which will then become a new Medium Combustion Plant Schedule 25A activity.</li></ul>
<b>Waste Hierarchy</b>	No change
<b>Waste Generation and Disposal</b>	No change

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