Mogas Export Project
Permit Application – Supporting Evidence

1. Introduction

This application relates to the proposed solution for Essar Oil UK's derogation to BAT 52 (Gasoline loading). This solution is planned to be implemented by 31st August 2024 in line with the derogation issued in EPR/FP3139FN/V011.

This document details the proposed arrangements for gasoline loading at Tranmere, and how this will affect the emissions from the Tranmere and Stanlow sites. This document contains information required for questions 2, 3, 5 and 6 of form C3.

2. Summary

Essar Oil UK Ltd export a significant volume of gasoline and gasoline component produced at the Stanlow Oil Refinery by ship. This material is currently loaded onto ships at the White Oil Docks (also called Stanlow Island Berths) which are located on the north bank of the Manchester ship canal (on Shell Island) opposite the Layby berth at the Stanlow Manufacturing complex. There are two berths; numbers 1 and 3, used for importing/exporting white oils and components.

Loading/unloading operations for sea-going vessels at these berths are > 1 million m3/yr, therefore BAT52 applies. However, there is no vapour recovery at the White Oil Docks.

Although the loading/unloading rates at White Oil Docks are above the 1M m^3/yr threshold a project will reduce loadings at this location to < 1M m^3/yr by moving shipments to Tranmere. The project includes the construction of a BAT 52 compliant vapour recovery unit (VRU) at Tranmere. A time-limited derogation to 31/08/2024 was granted in FP3139FN/V011 on this basis.

The proposed solution to meet the BAT-AEL is to implement a project which will move some product loading from White Oil Docks to Tranmere by the end of August 2024. This will reduce loading / unloading operations of volatile liquid hydrocarbons at White Oil Docks to < 1 M m^3/a, therefore a VRU will not be required at this location to meet BAT AELs.

The scope of this project is, in broad terms:

- Reroute volatile liquid hydrocarbons to Tranmere, using a mixture of existing and new linework;
- Install new linework at Tranmere to load the gasoline onto ships;
- Install a VRU at Tranmere.

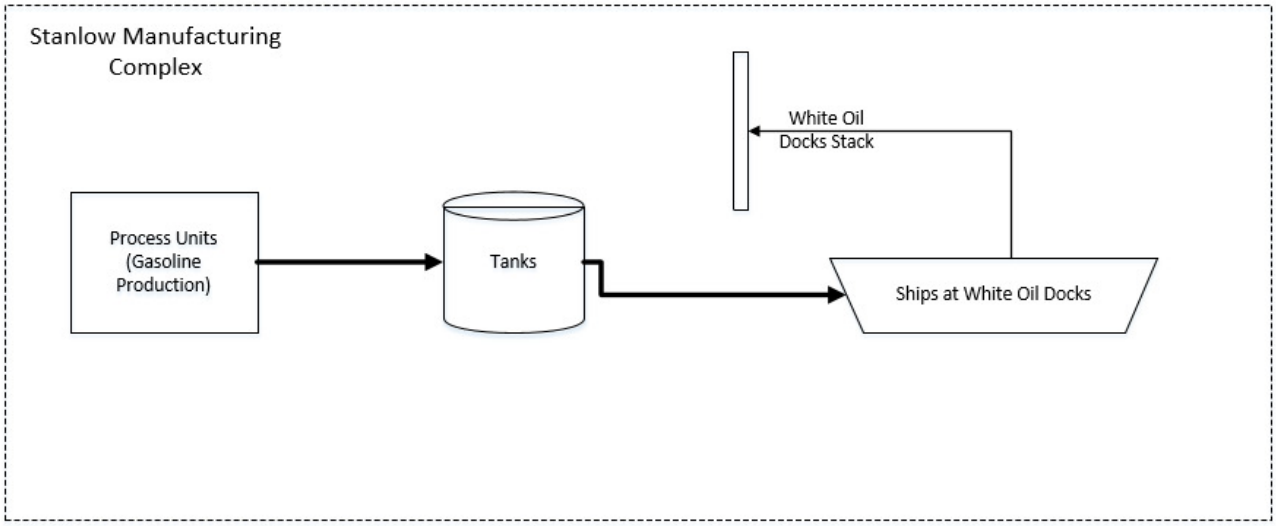
In addition to this project it is proposed to remove a redundant interceptor – 'Tranmere South Interceptor' and the associated emission point 'W2' from the permit as part of this application. The interceptor has been isolated since September 2020 and all water previously routed to the interceptor has been routed to the Tranmere North Interceptor and through the associated emission point W1.

3. Current and Proposed Situations

3.1. Gasoline Loading

Gasoline and gasoline components are currently loaded to ship from the White Oil Docks at the Stanlow refinery. The gasoline and components are blended in tankage at Stanlow and routed via pipeline to the White Oil Docks. This is detailed in the diagram below:

Current Situation



Under the scope of the current project:

- Gasoline and gasoline components will be blended in tankage at Stanlow.
- The majority of the gasoline and some gasoline components will be routed via YP3460 (TEP - Tranmere Eastham Pipeline) pipeline to Tranmere.
- Gasoline routed to Tranmere will be routed directly onto a ship at Tranmere South Jetty via a Marine loading arm.
- Vapours from the loading at Tranmere South Jetty will be routed to the vapour recovery unit (VRU).
- Emissions from the vapour recovery unit will be in line with the BAT 52 requirements.

BAT 52. In order to prevent or reduce VOC emissions to air from loading and unloading operations of volatile liquid hydrocarbon compounds, BAT is to use one or a combination of the techniques given below to achieve a recovery rate of at least 95 %.

Technique	Description	Applicability (1)
Vapour recovery by: i. Condensation ii. Absorption iii. Adsorption iv. Membrane separation v. Hybrid systems	See Section 5.20.6	Generally applicable to loading/unloading operations where annual throughput is >5 000 m^3/yr. Not applicable to loading/unloading operations for sea-going vessels with an annual throughput <1 million m^3/yr
(1) A vapour destruction unit (e.g. by incineration) may be substituted for a vapour recovery unit, if vapour recovery is unsafe or technically impossible because of the volume of return vapour.		

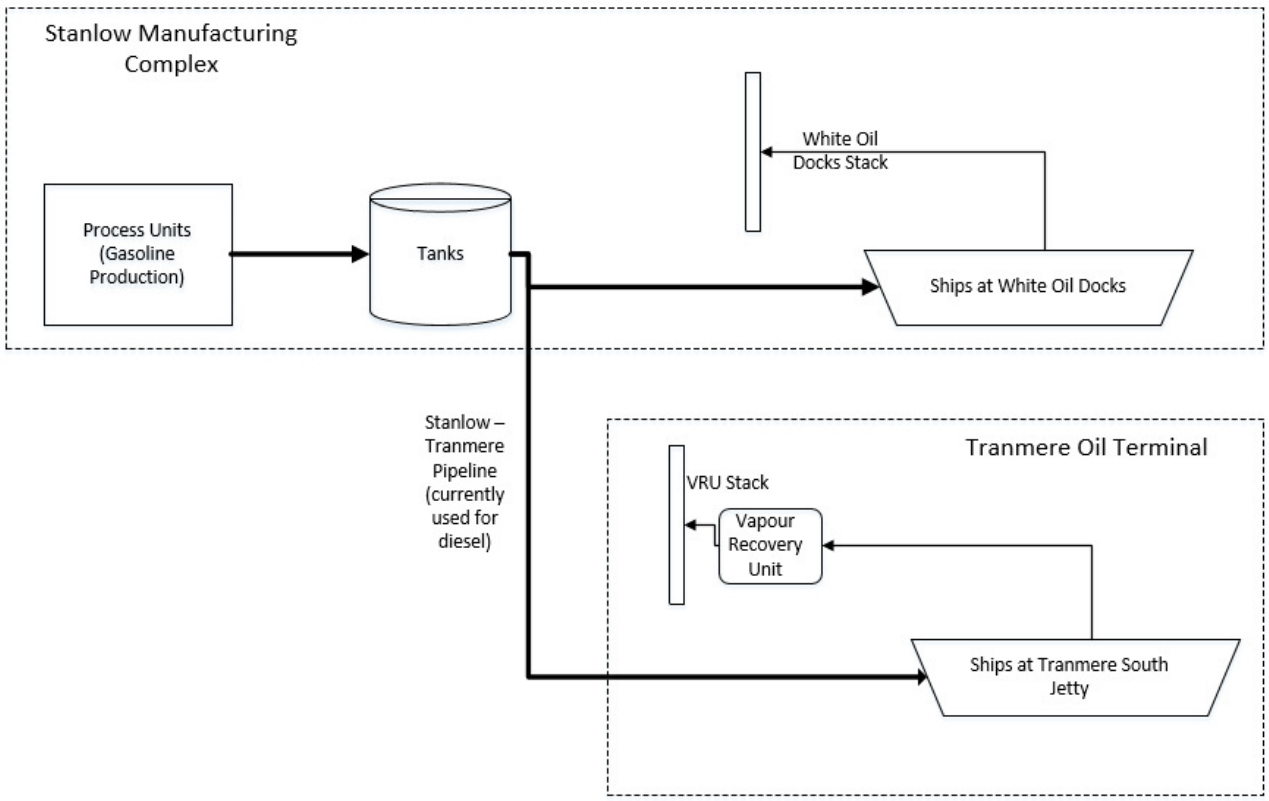
Table 5.16: BAT-associated emission levels for non-methane VOC and benzene emissions to air from loading and unloading operations of volatile liquid hydrocarbon compounds

Parameter	BAT-AEL (hourly average) (1)
NMVOC	0.15 – 10 g/Nm^3 (2) (3)
Benzene (3)	<1 mg/Nm^3
(1) Hourly values in continuous operation expressed and measured according to European Parliament and Council Directive 94/63/EC (OJ L 365, 31.12.1994, p. 24). (2) Lower value achievable with two-stage hybrid systems. Upper value achievable with single-stage adsorption or membrane system. (3) Benzene monitoring may not be necessary where emissions of NMVOC are at the lower end of the range.	

The VRU process flow diagram (Attachment C2_5) details the guarantees made by Aereon (VRU manufacturer) regarding the VRU to be installed at Tranmere which demonstrate that emissions will remain within the BAT Limits.

The future arrangement is detailed in the diagram below:

Future Situation



The VRU will be located within the current 'South Interceptor' bund at Tranmere terminal.

Tranmere Oil Terminal

The linework for the VRU will be routed as per attachment C2_8.

As part of the mogas export project a new stack will be installed at Tranmere. The new stack, which will be 6.808 m above the road level, has been designed using design standards for vents. The new stack will be made of metal and will be painted white. Given the other items located in the vicinity of the new stack (tanks and lampposts) it is not anticipated that the stack will have a significant visual impact.

Drawings showing the future visual impact are attached as Attachment C2_9.

Reports detailing the progress of the furnace project have been submitted to the Environment Agency as part of the conditions detailed within EPR/FP3139FN IC 54, 55, 56 & 57. These reports are attached as Attachments C2_10-13.

3.2. Removal of South Interceptor

There are currently two release points to controlled waters detailed within the Tranmere Terminal EPR permit.

Table 2.2.2.1 Release Points to Controlled Waters

Release Point	Alternate Release Point Identifier and Contributing System	Treatment and Minimisation Methods	Receiving Water
TRA-W-1	Tranmere North. Surface water, north area of Installation	Interceptor Installed with three gravity settling bays	Mersey Estuary
TRA-W-2	Tranmere South. Surface water, south area of Installation	Interceptor installed with single parallel plate pack separator	Mersey Estuary

The Tranmere North interceptor is significantly larger and better equipped to remove oil from effluent water than the Tranmere South Interceptor. The Tranmere North Interceptor serves the majority of the Tranmere site, and the Tranmere South Interceptor has historically served a smaller area comprising two tank bunds and the bund in which the interceptor itself is located. The areas served by each interceptor are detailed in the attached drainage drawing Attachment C2_14.

In September 2020 there was a release of Crude Oil from T6017, which was reported to the Environment Agency by Part A notification. This tank bund is one of those which is served by the Tranmere South Interceptor. Following this release, it was identified by Essar that the South Interceptor would not have sufficient infrastructure to effectively treat contaminated water from the T6017 and all effluent discharge from W2 was stopped and the interceptor pumps electrically isolated. Since September 2020 all water from the South Interceptor catchment area has been routed to the Tranmere North Interceptor by a mobile pump and temporary hose arrangements.

Essar have agreed a remediation scope for the T6017 affected area with the Environment Agency. Within this scope this includes a permanent re-routing of the water drainage from the South Interceptor catchment area to the North Interceptor drainage. The new drainage arrangement is shown on the attached drawing Attachment C2_15 T6017 & T6018 Proposed Compound Scheme.

4. Permit Changes

The changes to Table S4.1 'Point source emissions to air' from Essar Tranmere Terminal EPR permit (EPR/TP3301MD/T002) for new emission point A2 resulting from this permit application are summarised in Table 2 below.

The changes to Table S4.2 ' Point Source emissions to water (other than sewer)' and to Table 5.1 'Reporting of monitoring data' from Tranmere Terminal EPR permit (EPR/TP3301MD/T002) are red-lined on the copy of the permit attached as Attachment C2_4.

Table 2 – Changes to Table S4.1(a) 'Point source emissions to air' from Essar Tranmere Terminal EPR permit (EPR/NP3437LX) for new emission point A2 resulting from this permit application

Table S3.1(a) Point source emissions to air – emission limits and monitoring requirements						
Emission point ref. & location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring Frequency	Monitoring standard or method
A2 VRU Vent Stack	Tranmere gasoline loading Vapour Recovery Unit (VRU)	NMVOC	10 g/Nm^3	Hourly values in continuous operation	Continuous	
		Benzene	1 mg/Nm^3	Hourly values in continuous operation	Continuous	

5. Emissions and Environmental Impact Assessment

5.1. Emissions to Air

5.1.1. Emissions to Air Resulting from Vented Gases during Marine Loading

Overall VOC emissions to atmosphere due to marine gasoline loading by Essar will be reduced following the installation of the project. However, the current emissions due to marine gasoline loading by Essar are emitted at the White Oil Docks and the project will introduce a new emission point at Tranmere in the form of the VRU stack. It was therefore identified as a requirement to carry out dispersion modelling for the emissions from the VRU stack in order to identify any environmental impact.

Dispersion of four NMVOC components were modelled: butane, butane, pentane and pentene.

Dispersion modelling of VOC emissions to air from the White Oil Docks vent stack was carried out by Cambridge Environmental Research Consultants Ltd (CERC). The modelling was carried out using ADMS 5 software and uses the same methodology as used to model the environmental impact of the emissions from the loading at the White Oil Docks in EPR/FP3139FN/V011. The report for the Dispersion Modelling is attached as Attachment C2_6.

The dispersion modelling considered the impact of emissions of four NMVOCs when loading gasoline at Tranmere: butane, butane, pentane and pentene

The dispersion model used meteorological data for the years 2016 to 2020.

Two scenarios were modelled:

1. A long-term annual scenario (based on long-term throughput) – with concentrations being compared against annual emission limits.

2. A short-term maximum scenario – with concentrations being compared to the short-term emission limits.

As described in Attachment C2_16, where possible EALs were taken from the values shown in:

https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit

If no EALs were available, EALs were derived using Derived No-Effect Levels (DNELs), based on the REACH process described in Section 8 of:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/914697/Derivation_of_new_EALs_to_air.pdf

The EALs used were the same as those used in the significant variation application EPR/FP3139FN/V011.

The maximum concentrations for each of the scenarios above were calculated. As detailed in EA guidance 'Air emissions risk assessment for your environmental permit' process contributions (PC) were screened out as insignificant if the long-term PC was less than 1% of the objective value (either EAL or DNEL), and PCs were screened out as insignificant if the short-term PC was less than 10% of the objective value (either EAL or DNEL).

Sensitive human health receptors were identified in the vicinity of the Tranmere VRU stack. These have been chosen as representative receptors in each wind direction from the White Oil Docks stack. These are detailed in the modelling report (Attachment C2_6). For all scenarios maximum annual and hourly average offsite concentrations of all four modelled hydrocarbons were screened out, as they were less than 1% and 10% of the respective EALs. Concentrations at the modelled receptors were even lower, 0.1% or less of the EALs.

Results of the dispersion modelling of all emitted NMVOCs from the Tranmere terminal stack show that for all long and short-term cases the process contributions at sensitive receptors are below the levels defined as insignificant.

Based on these modelling results Essar Oil UK do not consider that the proposed change would cause any significant pollution to the environment at Tranmere and would have a beneficial impact on the environment due to the reduction in NMVOC emissions from the Stanlow site.

5.1.2. Emissions to Air Resulting from Maintenance Activities

Maintenance activities will take place on the gasoline loading system which have the potential to result to emissions to air. The existing Essar management system includes processes and procedures in order to ensure Safe Isolation of Plant and Equipment for maintenance activities. These processes and procedures will ensure that emissions to air as a result of maintenance activities are minimised.

The cumulative total marine loading of gasoline across Stanlow (White Oil Docks) and Tranmere will not change as a result of this project and therefore overall maintenance requirements are not expected to increase.

5.2. Emissions to Water

5.2.1. Removal of W2

As the proposed change combines two current discharges into a single discharge, the volume and quality of the total water emitted to the Mersey estuary will not change as a result of the proposed change. Essar have been operating the proposed change as a temporary arrangement since September 2020 and during this time there have been no measured exceedances of any of the ELVs for emission point W1.

Tranmere North interceptor has a greater level of infrastructure for oil removal than Tranmere South interceptor, therefore it is expected that a greater level of effluent treatment will be applied to the water re-routed from the Tranmere South catchment by processing it through the Tranmere North interceptor.

Based on these factors Essar Oil UK do not consider that the proposed change would cause any significant pollution to the Mersey Estuary.

5.2.2. Addition of Gasoline Loading at Tranmere

The proposed change moves gasoline loading activities which currently occur at Stanlow White Oil Docks to the Tranmere terminal. There are environmental risks associated with marine loading activities, these are assessed as part of the COMAH site risk assessment. Tranmere is located on the River Mersey, in an area with a number of sensitive local receptors. Stanlow White Oil Docks is located on the Manchester Ship Canal, however this discharges to the River Mersey and will therefore also impact the same receptors.

Tranmere is an existing marine loading facility and therefore the management system already includes the required elements for marine loading (such as: operator training and competency, inspection practices for marine pipelines, oil spill response plans and emergency exercises). These will be updated to include the gasoline loading activities as part of the project.

The new gasoline loading arrangement has been designed in line with relevant good practice (RGP), this includes design and operating features as detailed in attachment ‘Additional questions Q1.4’.

The new gasoline loading arrangement at Tranmere will load larger parcel sizes than at Stanlow, which will reduce the overall number of gasoline loading activities between the two sites. There is a proportion of the risk of release associated with the starting and stopping of the loading activities, which will decrease due to the decrease in the number of gasoline loading activities between the sites.

5.3. Emissions to Land

The proposed change includes gasoline linework at Tranmere. The majority of the linework and equipment will be located in the South Interceptor bund. There are no planned drainage activities as part of the operation and any maintenance activities will be conducted as per Essar’s management system to contain any liquid releases.

All equipment and linework associated with the MoGas Export project has been designed in line with Relevant Good Practice and will be operated and maintained in line with the Essar management system. Releases due to leaks will

be captured within the South Interceptor bund. The bund drains to the adjacent T6017/6018 bund from where it is then pumped to the North Interceptor. This drainage arrangement would ensure that any release was captured and could be recovered. The South interceptor and T6017/18 bunds are currently in the process of being remediated and as part of the remediation process and impermeable membrane will be installed in the bund floor. This would prevent any gasoline released from entering into the ground.

Any linework at Tranmere outside of the bund will be located above a concrete surface, from where any leak could be contained.

5.4. Summary

Based on the above demonstrations Essar Oil UK do not consider that the proposed change would cause any significant pollution to the environment at Tranmere and would have a beneficial impact on the environment due to the reduction in NMVOC emissions from the Stanlow site and the reduction in the overall number of gasoline export activities between the two sites.