

M&I Materials Environmental Permit Variation Application

Application Reference Number: BL9640IM

Prepared for: M&I Materials

Prepared by:

Steve Power

Principal Consultant

Contents

Non-Technical Summary	2
1. What activities are you applying to vary?	3
1b. About the Proposed Changes	3
2. Emissions to Air, Water and Land	10
3. Operating Techniques	11
3a1 Superseded Documents	11
3b General Requirements	11
3c Types and Amounts of Raw Materials	11
3d Management Systems	12
4. Monitoring	12
4a Describe the measures you use for monitoring emissions	12
4b Point source emissions to air only	12
5. Environmental Impact Assessment	12
6. Resource Efficiency and Climate Change	12
7. Installations that include a combustion plant (excluding waste incinerators)	13
8. Environmental Risk Assessment	13

Appendices

Appendix A – Site Plans

- i) Drawing 1 Installation Boundary, Site Layout and Emissions Points

Non-Technical Summary

In order to increase the production capacity and improve the operational effectiveness of the permitted synthetic ester production installation at Trafford Park, the operator is proposing minor changes to the site. In response to changing demands, the operator is installing a further reactor to Line 3 that will increase its production capacity and a distillation column to Line 1 to increase the range of products it can manufacture. The Line 3 alterations were originally scoped and part of the design of the original plant which was first installed in 2016/17. Furthermore, in agreement with the local inspector, the quality control laboratories which serve the activity have been brought within the installation. These changes require a minor modification to the installation permit boundary to incorporate a small mezzanine area above the Apiezon production area and the extended Amid QC laboratory area.

There are no new process emission points introduced as part of this variation. Due to the existing controls and batch sequencing of the production process, the profile of the emissions from the installation will not change. All process emissions have been previously assessed, which has found the impact to be insignificant on surrounding human and ecological receptors. This has been accepted by the EA and no material changes will occur as a result of this variation application. The addition of the QC laboratory within variation includes three small vents associated with the QC fume cupboards which vent externally to comply with CoSHH.

There are no changes to the type of raw materials to be used on site as a result of this variation, but the operator may opt to change how the existing bulk tanks within the installation are deployed for raw material and/or product storage in response to demand.

The variation is not expected to give rise to additional risks in relation to fugitive emissions to air, odour or noise. Existing provisions for managing these risks will continue to operate and are considered adequate including planned preventative maintenance (PPM) and active measures to control noise including equipment housing and specification and site transport controls.

The site will continue to operate an environmental management system (EMS) certified to ISO14001:2015. The operator will also continue with the monitoring schedule as set out in the existing permit and does not propose any further monitoring. As part of the EMS, the operator closely monitors utilities use and waste arisings, constantly working to increase efficiency on site. There will be no new waste streams as a result of the variation.

A risk assessment is provided and concludes that the changes to the installation will be managed sufficiently so as to present a low ongoing risk to the environment.

1. What activities are you applying to vary?

Table 1a Types of Activities

Schedule 1 listed activities						
Installation Name	Schedule 1 References	Description of the activity	Activity capacity	Annex IIA or IIB (disposal and recovery) codes	Hazardous waste treatment capacity	Non-hazardous waste treatment capacity
Hibernia Way Speciality Chemical Manufacturer	S4.1A(1)(a)(ii)	Producing organic Chemicals. Production of synthetic esters	█ tonnes per day	N/A	N/A	N/A
Directly associated activities						
Name of DAA	Description of the DAA (please identify the schedule 1 activity it serves)					
Raw Materials and Product Storage	Bulk/IBC raw material and product storage, decant and loading filling operations					
Waste Storage pending Disposal	Storage of process wastes pending collection and disposal off site.					
Treatment of Spent Midel	Return of spent synthetic ester from customers for re-processing.					
Generation of process heat	Operation of 4 x thermal oil boilers					
Process Cooling	Operation of evaporative cooling equipment					
Laboratory QC Testing	Operation of QC labs in support of the manufacturing of synthetic esters.					
For installations that take waste	Total storage capacity			30 tonnes		
	Annual throughput (tonnes each year)			200 tonnes		

1b. About the Proposed Changes

The operator is proposing to make a number of small changes to the installation, through the following modifications to its overall process and operating techniques. Additionally, point (iii) below seeks to normalise the installation boundary by incorporating the QC labs as a directly associated activity to the installation at the request of the local inspector. There are no additional risk to ground and groundwater by the modification to the installation boundary and the Site Condition Report submitted with the last permit variation is representative of the marginally increased footprint.

The changes to the installation described below should be read in conjunction with the revised installation boundary plan (Drawing 1), manufacturing and process flow diagrams (Figures 1-3).

i) Line 3 Reactor 3

[REDACTED], a third reactor will be installed on line 3. The reactor was accounted for in the original design and installation expansion undertaken in 2016/2017 therefore no further modifications to the utilities (electrical, thermal oil heating or water cooling) are required. The additional reactor will ultimately facilitate a [REDACTED] increase in production capacity for Line 3.

For the upgrade, no modifications to the external building are needed other than installing a newly constructed external bund within the existing permit boundary for the of [REDACTED]-tank [REDACTED]. An internal wall will be moved, (which will involve taking additional space from the adjacent manufacturing area). Reactor 3 will be installed adjacent to reactor 2 [REDACTED]

With the exception of a new dedicated acid loading system, which is being installed to increase the efficiency of operations, the process will remain the same as that of the existing two reactors with batches being loaded in turn and transferred down the production line. Reactor 3 will be served by the existing scrubbing system serving this line and there are no additional release points to atmosphere. Due to the activity being a sequenced batch production process, the profile and loading of the emissions from the installation will therefore remain the same. There is no increase in effluent discharges, however the amount of waste generated will increase in line with the capacity uplift.

[REDACTED] product storage capacity requirement is provided within the existing tank farm, however the operator retains the option to re-allocate the use of existing bulk tanks within the installation for storage of product and/or raw materials in line with the needs of the business

ii) Line 1 Distillation Column

The operator is incorporating additional distillation capacity within Line 1. By improving the ability of this line to separate the ester from the excess acid this will provide greater flexibility to its operations and increase the range of product types (synthetic esters) that can be manufactured.

Vapour exiting the current evaporator enters the distillation column in the vapour phase. A new ~~4m~~ high-packed condenser will now condense the acid leaving the top of the still and residue falling from the bottom of the still which will be pumped back into the main (existing) evaporator. The vessel will be heated via external heating coils using the existing thermal oil system. There are no additional effluent discharges and reclaimed acids will be recycled as part of the [REDACTED]-recovery system. Further downstream processing of the products that can be manufactured via the distillation column will utilise the existing manufacturing infrastructure.

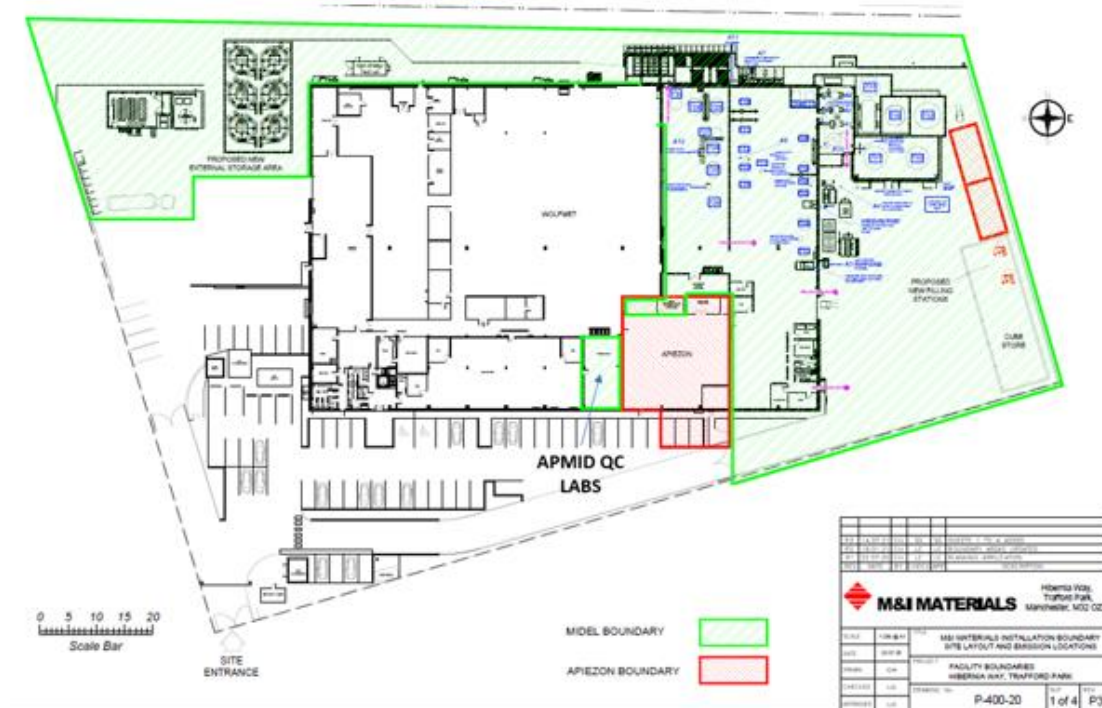
The modification to the line allows the operator to potentially utilise a different range of alcohol feedstock from the bulk raw materials currently used. [REDACTED]

[REDACTED]

The new distillation column is an add-on to the existing unit and will be installed between the existing evaporator and treatment vessel. Only minor internal modifications to support the mezzanine steelwork are required and the moving of some stairs. There will be [REDACTED] [REDACTED] no change to the installation boundary [REDACTED]

iii) Apmid Quality Control Laboratory

The Apmid Quality Control Laboratory is located adjacent to Midel and Apiezon manufacturing areas.



The labs are currently outside of both of these permitted installations and not regulated under the Environmental Permitting Regulations (2016). Upon review at the last inspection the operator agreed with the local officer that as the Apmid labs are used for two functions: Quality Control testing of MIDEL and Apiezon production samples and product development that these activities meet the criteria for it to be determined as being a Directly Associate Activity (DAA) of either the Midel (EPR/BL9640IM) or Apiezon (EPR/BS4952) Stationary Technical Units (STU). As there is a direct link and technical connection between the labs and both permitted activities and the activities of the labs is capable of having an effect on emissions by giving rise to controlled waste, the 'Principal User' test has been applied.

The Apmid labs provide the QC testing of both raw materials and products associated with Midel and Apiezon. Additionally, they support the testing and development of new synthesised esters associated with Midel range of products. Midel is the most dependent single user of the laboratory with ca. 90% of the throughput of materials and activities associated with this product range. The local inspector has agreed that the Apmid labs should form part of the synthetic ester permit (EPR/BL9640IM).

Product development projects require that very small volumes of esters are synthesised in the lab using two fume cupboards. This activity can periodically give rise to small quantities of low concentration medium chain fatty acid vapours that are removed via the extraction hoods to protect

the workforce and comply with CoSHH. The operator is proposing to install a further fume cupboard that will result in there being three engineered release points associated with this facility.

The changes highlighted in points (i) and (iii) will necessitate an alteration in the installation boundary (Appendix A Drawing 1).

For completeness, Figure 1 below has been updated to show the overview of the synthetic ester manufacturing process and detailed process flow diagrams of Lines 1 (Figure 2) and 3 (Figure 3) reflecting the changes outlined in points (i) and (ii) above. For reference, an updated plant inventory describing the capacities and venting arrangements for all tanks is given in Table 2.

Figure 1 – Synthetic Ester Production Manufacturing Routes – Lines 1, 2 and 3 (L1, L2 & L3)

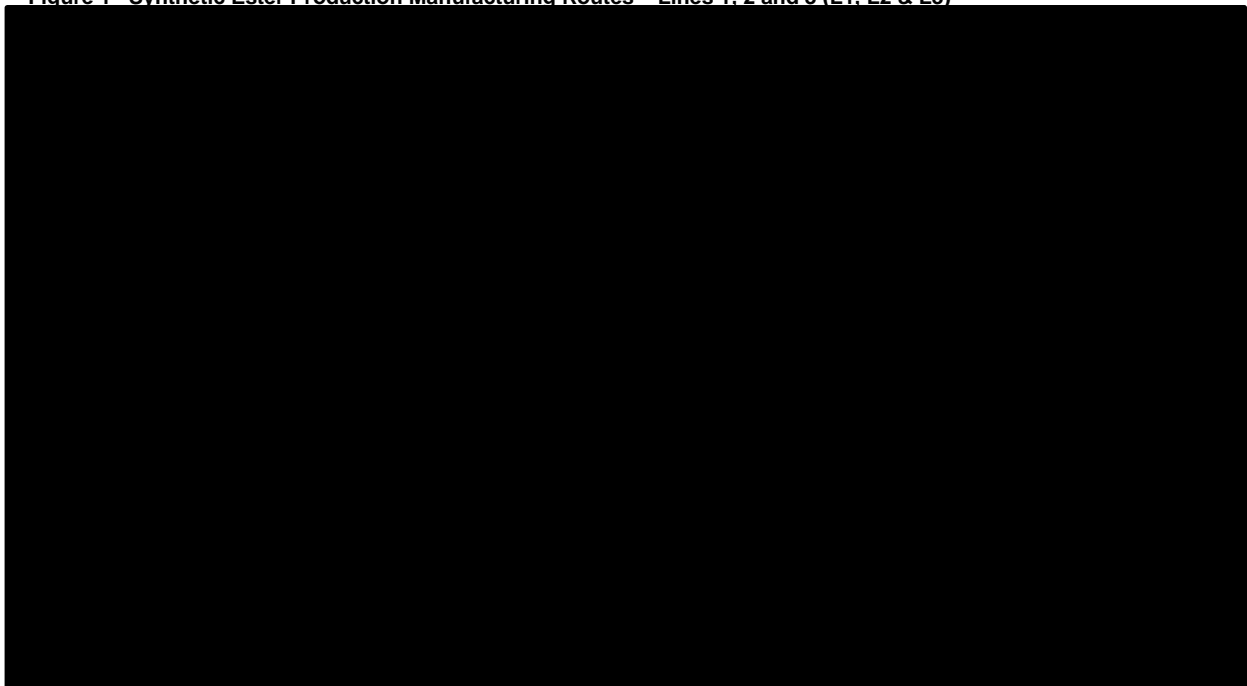


Figure 2 – Updated Process Flow Line 1

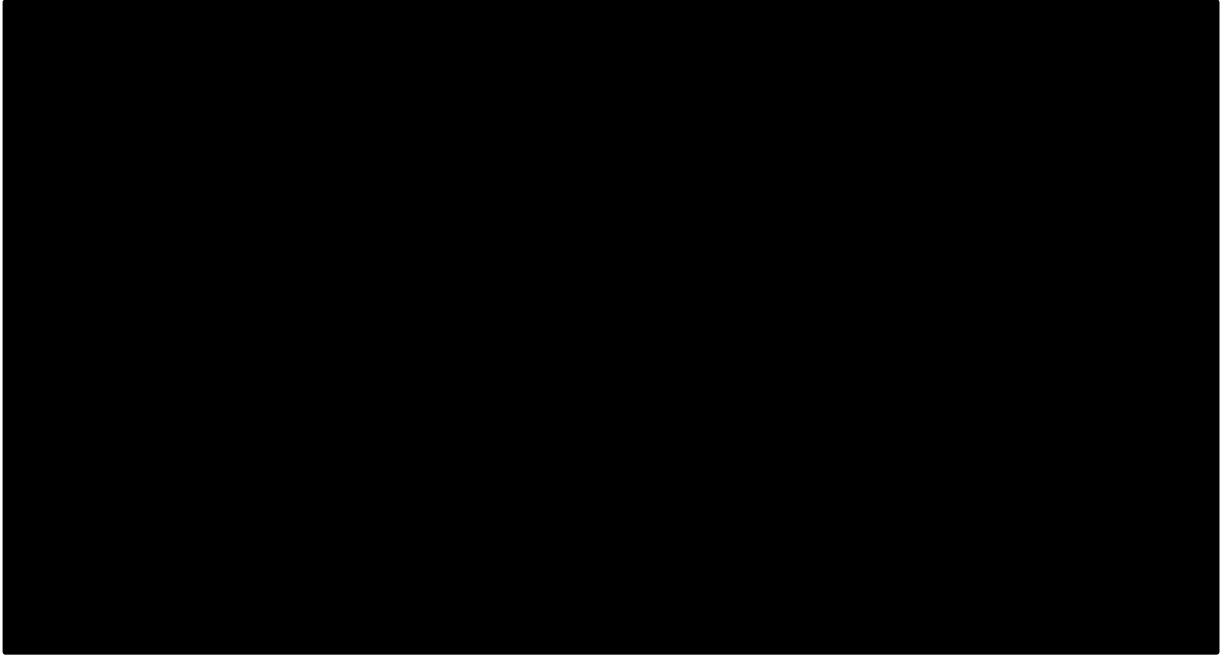


Figure 3 – Updated Process Flow Line 3

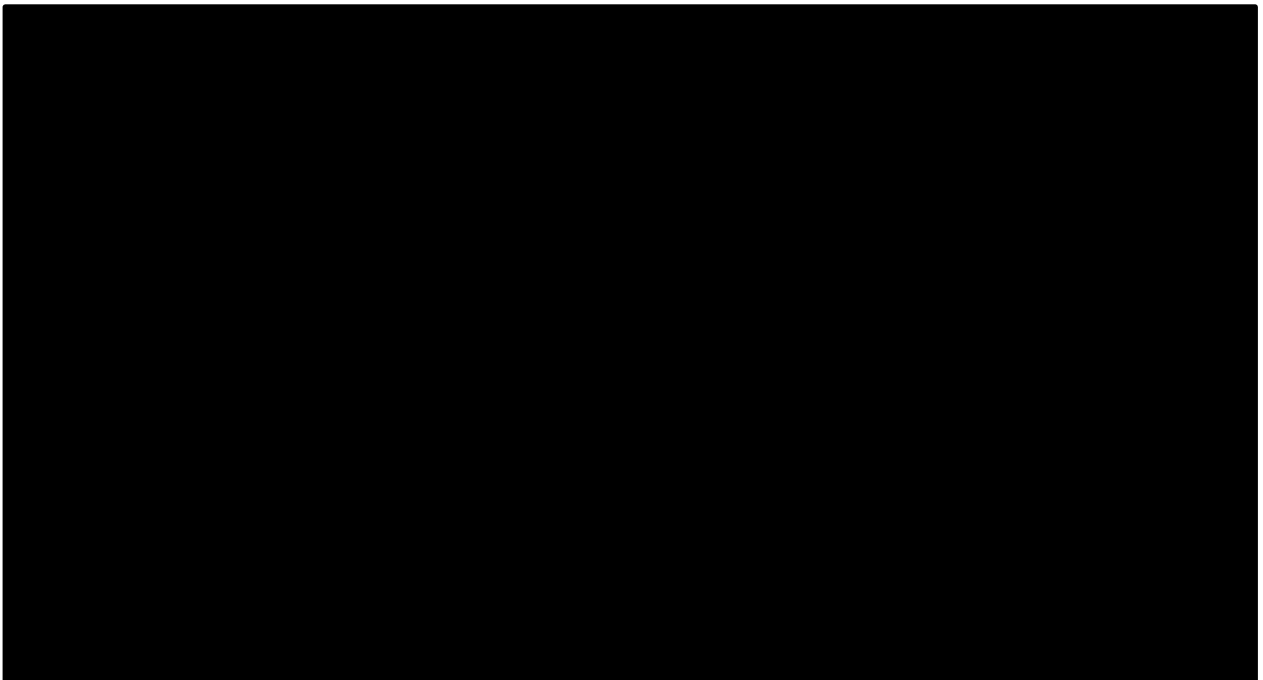


Table 2 Bulk Tank Inventory – See Drawing 1

Ref	Purpose	Location	L1 / L2 / L3 Shared	Potential Emissions & Control Technique
T1	Fatty acid Storage	External	Shared	Passive breathing via vent
T2	Fatty acid Storage	External	Shared	Passive breathing via vent
T3	Fatty acid Storage (2 tanks)	External	Shared	Passive breathing via shared vent
T4	Fatty acid Storage	Internal	M1	Passive breathing via vent
T5	Recovered Acid	Internal	M1	-
T6	Reactor	Internal	M1	Emission to atmosphere via condenser
T7	Evaporator Holding Tank (EHT)	Removed in 2015 and replaced by ref T18		
T8	Evaporator	Internal	M1	Emission to atmosphere via condenser and vac pump
T9	Purification	Internal	M1	Emission to atmosphere via vac pump
T10	Holding Tank	Internal	M1	-
T11	Recovered Acid	Internal	M2	See T5
T12	Reactor	Internal	M2	Emission to atmosphere via condenser
T13	Evaporator	Internal	M2	Emission to atmosphere via condenser and vac pump
T14	Purification	Internal	M2	Emission to atmosphere via vac pump
T15	Holding Tank	Internal	M2	-
T16	Reactor	Internal	M2	Emission to atmosphere via condenser
T17	Fatty acid storage	Internal	M2	Passive vent internal bund
T18	Reactor	Internal	M1	Emission to atmosphere via condenser
T19	Bulk FG Storage 1	External	shared	Passive vent external bund
T20	Bulk FG Storage 2	External	Shared	Passive vent external bund
T22	Bulk FG Storage	External	Shared	Passive vent external bund
T23	-	-	-	-
T24	Reactor	Internal	M3	Emission to atmosphere via condenser & scrubber
T25	Reactor	Internal	M3	Emission to atmosphere via condenser & scrubber
T26	Evaporator	Internal	M3	Emission to atmosphere via condenser and vac pump
T27	Recovered Acid	Internal	M3	-
T28	Purification	Internal	M3	Emission to atmosphere via vac pump

T29	Holding Tank	[REDACTED]	Internal	M3	-
T30	Fatty acid Storage	[REDACTED]	External	M3	Passive breathing via vent
T31	Bulk FG Storage	[REDACTED]	External	Shared	Passive vent external bund
T32	Bulk FG Storage	[REDACTED]	External	Shared	Passive vent external bund
T33	Bulk FG Storage (new)	[REDACTED]	External	Shared	Passive vent external bund
T34	Bulk FG Storage (new)	[REDACTED]	External	Shared	Passive vent external bund
T35	Bulk FG Storage (new)	[REDACTED]	External	Shared	Passive vent external bund
T36	Bulk FG Storage (new)	[REDACTED]	External	Shared	Passive vent external bund
T37	Bulk FG Storage (new)	[REDACTED]	External	Shared	Passive vent external bund
T38	Bulk FG Storage (new)	[REDACTED]	External	Shared	Passive vent external bund
T39	Reactor	[REDACTED]	Internal	M3	Emission to atmosphere via condenser & scrubber
T40	Distillation Column	[REDACTED]	Internal	M1	No Vent

2. Emissions to Air, Water and Land

There are no changes to the emissions to air, water and land from the changes proposed. Table 3 has been updated to reflect the inclusion of the laboratory fume cupboards as engineered releases, however due to the nature and small scale of these releases they are not considered further.

Table 3 Emissions

POINT SOURCE EMISSIONS TO AIR				
<i>Emission Point Ref. And Location</i>	Parameter	Concentration	Unit	Source
A1	NOx	No limits set	mg/m ³	Boiler
	CO		mg/m ³	
A2	NOx	No limits set	mg/m ³	Boiler
	CO		mg/m ³	
A4	Fatty Acids (VOC)	No limits set	mg/m ³	Evaporator Vacuum Pump Line 1
A5	Fatty Acids (VOC)	No limits set	mg/m ³	Evaporator Vacuum Pump Line 2
A6	Fatty Acids (VOC)	No limits set	mg/m ³	Reactor Scrubber Line 1
A7	Fatty Acids (VOC)	No limits set	mg/m ³	Reactor Scrubber Line 2
A9	NOx	No limits set	mg/m ³	Boiler
	CO		mg/m ³	
A10	NOx	No limits set	mg/m ³	Boiler
	CO		mg/m ³	
A11	Fatty Acids (VOC)	No limits set	mg/m ³	Reactor Scrubber Line 3
A12	Fatty Acids (VOC)	No limits set	mg/m ³	Evaporator Vacuum Pump Line 3
A13	Fatty Acids (VOC)	No limits set	mg/m ³	Laboratory QC Fume Cupboard 1 (existing)
A14	Fatty Acids (VOC)	No limits set	mg/m ³	Laboratory QC Fume Cupboard 1 (existing)
A15	Fatty Acids (VOC)	No limits set	mg/m ³	Laboratory QC Fume Cupboard 1 (new)
POINT SOURCE EMISSIONS TO WATER (OTHER THAN SEWERS)				
N/A				
POINT SOURCE EMISSIONS TO SEWERS, ETP'S OR OTHER TRANSFERS OFF SITE				
S1	Daily allowable volume 20m ³ . No changes to emissions parameters.			
POINT SOURCE EMISSIONS TO LAND				
N/A				

3. Operating Techniques

Process Overview Synthetic Ester Production

See section 1b for the changes to the operating techniques introduced by this variation. All information previously submitted at the last variation remains unchanged.

3a1 Superseded Documents

Table 2.1.1 Operating Techniques in the current permit refers to responses provided in the last variation (2020); these have been supplemented by this variation application.

3b General Requirements

Fugitive Emissions to Sewer, Surface Water and Groundwater

There is no change as a result of the proposed changes.

Odour

No change as a result of proposed changes.

Noise

No change as a result of proposed changes.

3c Types and Amounts of Raw Materials

There is no change in the three primary material types used in the manufacturing process, however the introduction of the Line 1 distillation column will allow a greater range of alcohol feedstocks to be substituted to produce a wider range of synthetic esters. These materials will be smaller volumes than the existing bulk feedstocks and will be delivered to site as 1 tonne bags, by tanker or subject to the existing control measures in place at the installation.

Schedule 1 Activity	Material	Maximum amount stored on site (tonnes)	Annual throughput (tonnes per annum)
4.1 A(1) (a) (ii) Production of Esters	██████████	█	█
"	██████████	█	█
"	██████████████████	█	█
"	██████████████████	█	█
"	██████████	█	█
"	██████████	█	█
"	██████████	█	█
"	██████████	█	█

3d Management Systems

The site operates an environmental management system that has been certified to ISO14001:2015.

4. Monitoring

4a Describe the measures you use for monitoring emissions

Parameters will be monitored as required in the current permit.

4b Point source emissions to air only

Parameters will be monitored as required in the current permit.

5. Environmental Impact Assessment

5a Have your proposals been the subject of an EIA under Council Directive 85/337/EEC?

No

6. Resource Efficiency and Climate Change

6a Describe the basic measures for improving how energy efficient your activities are?

No change as a result of proposed changes.

6b Provide a breakdown of any changes to the energy your activities use and create

No change as a result of proposed changes.

6c Have you entered into, or will you enter into, a climate change levy agreement?

No change as a result of proposed changes.

6d Tell us about, and justify your reasons for, the raw and other materials, other substances and water you will use

No change as a result of proposed changes.

6e Describe how you avoid producing waste in line with Council Directive 2008/98/EC on waste

No change as a result of proposed changes.

7. Installations that include a combustion plant (excluding waste incinerators)

The aggregated net thermal input of the combustion plant is less than 20 MW(th).

8. Environmental Risk Assessment

This variation seeks to account for the limited changes as described. Due to the nature of the changes proposed and activities described above, the change to the installation is assessed as having an intrinsically low risk. No additional impact to the environment is anticipated than has previously been assessed in preceding variations to this permit. Specifically, attention is drawn to:

- The change will not result in there being any releases to ground, groundwater or surface water.
- There are no additional releases from the process to atmosphere.
- The impact of releases from the cumulative impact of the operations has been previously demonstrated to be acceptable.
- The addition of the releases to atmosphere from small scale laboratory fume cupboards are considered insignificant with extraction systems installed to comply with CoSHH.
- There is no change to the type of solid or aqueous waste generated as a result of the proposed changes.
- The power demand of the additional pumps is considered insignificant.
- Adequate containment measures to prevent fugitive emissions to surface water, sewer or land has been previously demonstrated and will be adequately maintained at all times in line with existing management arrangements.
- All site activities are covered by a certified EMS.
- There is no increased potential for causing offence due to noise beyond the installation boundary. There is no history of noise complaints arising from the installation.
- There is no potential for fugitive odour emissions. There is no history of odour complaints for M&I's wider operations at Trafford Park.

Impact of Emissions to Air

The principal emissions to atmosphere from the process are identified in Table 3. Due to the existing controls and batch sequencing of the production process, the profile of the emissions from the installation will not change. The assessment of the impact of the emissions on these receiving environments has been presented in previous variations. These assessed the impact of emissions of products of combustion from the four boilers and the cumulative releases of emissions of fatty acids associated with Lines 1-3 over the short and long term. The small-scale operation of the QC labs is not considered to be significant and has not been assessed further.

Impact of Noise

There are no significant sources of noise arising from the new process. No formal complaints relating to noise have been received. Noise is not considered a significant issue.

Odour

There are no significant sources of odour arising from the new process. Odour is not considered a significant issue.

Emissions to Sewer

There are no changes to effluent discharged from the installation. The site will continue to be able to operate within the parameters of its discharge consent. Compliance with the discharge consent is considered mitigation of the risk.

Emissions to Land, Surface Water and Groundwater

There is no change to the risk to land, surface water and groundwater as a result of this variation. The Site Condition Report submitted as part of the 2020 variation will apply to the modified footprint of the installation covered by this variation.

Conclusion

The impact of the extension to the installation has been summarised in Table 4. The following categories have been used to assess the likelihood of each scenario and the severity of the consequence; a score above 10 presents an unacceptable risk that must be mitigated. There is no change to this assessment as a result of this variation.

Severity Categories

Classification	Impact classification			Business Impacts
	Impact Severity	Scale e.g. amount of resource use/waste generated	Reputation	
Category 1 Insignificant	No damage	Negligible	Short term dissatisfaction; occasional community complaints	<100k impact on profit; line out of use p to 3 days
Category 2 Minor	Negligible Damage; no remedial activities or regulatory involvement	Minor	Local news coverage; local complaints/regular complaints by individuals	Up to £1mill impact on profit; line out of use for 1 week
Category 3 Moderate	Short term environmental damage which can be remedied; some remedial activity and regulatory involvement	Moderate	Regional level media coverage; brand damage; low community pressure	Up to £2 mill impact on profit; line out of use up to 2 weeks
Category 4 Major	Serious long term damage; regulatory restrictions/possible prosecutions.	Significant	National media coverage; high profile community pressure; brand damage	Up to £5 mill impact on profit; Site out of use up to 2 weeks
Category 5 Devastating	Permanent damage; high profile prosecution	Excessive	High profile, international coverage	>£5 mill impact on profit; site out of use over 2 weeks

Likelihood Categories

Classification	Likelihood	%Assessment	Explanatory Notes
Almost Certain	Daily occurrence	>95% Chance	Regularly happens or is likely to occur
Likely	Monthly occurrence	61-95% Chance	Has happened before recently or will probably occur
Possible	Yearly occurrence	21-60% Chance	History of it happening here or elsewhere occasionally
Unlikely	10 year occurrence	5-20% Chance	History of it happening elsewhere occasionally. Do not expect it will happen
Rare	Occurs once every 100 years	<5% Chance	No known history, but conceivable. Do not believe it will ever happen

It is concluded that the extension to the installation will be managed sufficiently so as to present a low ongoing risk to the environment.

Table 4 Environmental Risk Assessment

Hazard	Receptor	Pathway	Probability of Exposure	Consequence Unmitigated (Severity)	Risk Management Technique	Consequence Under Normal Operations (Severity)	Overall Residual Risk
Emissions to air	Human & Ecological	Air dispersion	5 - Emissions during hours of operation	3 - Breach of local EAL's	Burner controls	1 – No impact	5 - Low - Air Quality Assessment undertaken as part of previous variation.
Emissions of trade effluent to sewer from discharge point S1	Waste Water Treatment Works	Sewerage drainage system	5 - Emissions during hours of operation	3 - Breach of effluent discharge consent; problems treating effluent at WWTW.	Compliance with trade effluent discharge consent	1 – No impact	5 - Low – site will continue to be able to operate within existing consent levels.
Odour	Human Receptors	Air dispersion	2- Unlikely	1- Complaints of odour	No further management required	1 – No impact	2- Low – controls in place will be adequate to minimise potential for odour nuisance complaints.
Noise – processing activity	Human Receptors	Airborne	3 - Emissions during hours of operation; restrictions on vehicle movements at unsociable hours.	3 - Complaints of noise	PPM for all equipment; Housing for noisy equipment; Engines switched off during loading/unloading; Enclosed loading bay	1 – No impact	3 - Low – no complaints received.
Fugitive Emissions to Air – dust, litter etc.	Human & Ecological	Air dispersion	2 - Low – no dusty wastes	3 - Complaints of nuisance	Site inspections	1 – No impact	2 - Low – no complaints received.
Fugitive emissions to air – processing e.g. tank breather vents	Human & Ecological	Air dispersion	2 - Potential for emissions during filling operations	3 - Release to atmosphere	Nitrogen blanket employed. SOP's in place for materials handling operations.	1 – No impact	2 - Low –no complaints received.
Fugitive Emissions to surface water, sewer and groundwater – accidental minor	Waste Water Treatment Works	Drainage system; overground;	3 – Low – no records of reported non-conformances	4 - potential to disrupt WWTW	Plc control system; Tank integrity checks; High level alarms; Delivery procedures;	2 – minor impacts with no pollution occurring	6 - Low – minor leaks and spills routinely cleared up with no impact.

leaks and spills – bulk raw materials and product tanks					Spill procedures and training; Drain detector system envirovalve; Whole site containment approach.		
Fugitive Emissions to surface water, sewer and groundwater – accidental minor leaks and spills – IBCs/chemical containers	Waste Water Treatment Works	Drainage system; overground;	3 – Low – no records of reported non-conformances	4 - potential to disrupt WWTW	Operational control on IBC storage and handling; Delivery procedures; Spill procedures and training; Drain detector system envirovalve; Whole site containment approach.	2 – minor impacts with no pollution occurring	6 - Low – minor leaks and spills routinely cleared up with no impact.
Fugitive Emissions to surface water, sewer and groundwater – catastrophic failure – bulk tanks	Treatment Works	Drainage system; overground;	1 - Low	5 -potential to disrupt WWTW	Plc control system; Tank integrity checks; High level alarms; Delivery procedures; Spill procedures and training; Drain detector system envirovalve; Whole site containment approach.	5 – whole site containment system sufficient containment capacity.	5 - Risk still considered very unlikely.

Appendices

Appendix A – Site Plans

i) Drawing 1 Installation Boundary, Site Layout and Emissions Points