

Permit Reference Number: KP3734SH

Operator: Navigator Terminals Windmill Limited

Installation: Barry Silicon Based Manufacturing Installation

Form Number: R1

Reporting of Waste Disposal and Recovery for the year 2021

Waste Description	Disposal		Trends in Waste Disposal		
	Route	Tonnes (t)	Year	Parameter	
				Total Hazardous Wastes (t)	Total Non-Hazardous Wastes (t)
1) Hazardous Waste:			2008	202	14.4
WEEE	Recycling	2.78	2009	167	15.6
Other Hazardous waste	Incineration /energy recovery	2.420	2010	170	15.0
Tank washings	Treatment	9.340	2011	33.72	217.25
2) Non-Hazardous Wastes:			2012	0	219.88
Site Cess Pit	Treatment	51.34	2013	0	180.76
General/Construction/Metal etc	Recycling	8.710	2014	0.5	170.32
Non haz washings	Treatment	0	2015	0.05	142.84
Siloxane waste (sample waste)	Treatment	18.58	2016	0	161.79
			2017	0	153.52
			2018	1.42	174.82
Hazardous		14.54	2019	4.68	215.022
Non- Hazardous		78.63	2020	22.26	249.129
			2021	14.54	78.63

Operator's comments: 1 x methanol tank (Tk102) outage accounts for majority of hazardous waste. Tank cleaning method uses water to dilute methanol prior to tank entry (diluted approx. 90% water /10%methanol). Still handled as hazardous waste however.

Terminal is still handling sample waste and linear's water drains waste generating around 1.5 tns per month

There has been a reduction in cess pit waste collections. It was identified in August that cess pit waste collections were reduced. After a period of monitoring, the cess pit was emptied and inspected revealing a crack to the fibreglass floor. This was repaired by

specialist contractors, however following subsequent monitoring, the cess pit level was still not rising. Since October the site has been hiring an external toilet block, and not using the cess pit.
Advice from drainage specialists is not to repair again; Navigator engineering staff are progressing a project to remove and replace the cess pit asap.

Signed.....A Jackson

Date.....24/1/2022

(Authorised to sign as representative of the Operator)

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Operator: Navigator Terminals Windmill Limited

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Form Number: E1

Reporting of Energy Usage for the year 2021

Energy Source	Energy Usage		CO ₂ Produced (t)
	Quantity	Primary Energy (MWh)	
Electricity * (MWh)	787.522	787.522	132.126
Natural Gas (MWh)	205.191	205.191	34.308
Diesel / Distillate Fuel Oil (t)	0.18	1.944	0.327
TOTAL	992.893	994.657	166.761

Trends in Energy Usage		
Year	Parameter	
	Primary Energy Usage (MWh)	CO ₂ Produced (t)
2008	1521	256
2009	1532	261
2010	1466	249
2011	1392	237
2012	1476	249
2013	1389	234
2014	1280	216
2015	1310	220.6
2016	1059	179
2017	956	161
2018	1011	169
2019	1060.825	178.103
2020	1012.322	170.183
2021	994.657	166.761

Operator's comments: Slight reduction in energy usage. Electricity is lower due to a month shutdown in September, ongoing programme to upgrade lighting to energy efficient LED, and milder weather resulting in less demand on electrical trace heating systems.

Natural gas usage also lower, due to running site on 1 D4 tank for prolonged period rather than the potential for 3 tanks (lower customer stock levels). This impacts the heat input required to maintain product temp.

SignedA Jackson
(Authorised to sign as representative of the Operator)

Date.....24/1/2022

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Operator: Navigator Terminals Windmill Limited

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Form Number: MR1

Reporting of Mass Release for the year 2021

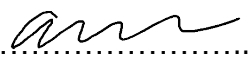
Mass Release		
Parameter	Medium	kg
Methanol ¹	Fugitive to air	51.5
Octamethylcyclotetrasiloxane (D4 Cyclics) ¹	Fugitive to air	1549.07
Decamethylcyclotetrasiloxane (D5 Cyclics) ¹	Fugitive to air	8.58

Trends in Mass Release (kg)			
Year	Parameter		
	Methanol	Octamethylcyclotetrasiloxane (D4 Cyclics)	Decamethylcyclotetrasiloxane (D5 Cyclics)
2012	70	2170	10
2013	125	2445	11
2014	121	2530	13.7
2015	85	3298	12.96
2016	100	2559	14.71
2017	34.4	2165.25	14.12
2018	92.4	2351.83	8.59
2019	42	1813.18	12.93
2020	72	1930.51	11.92
2021	51.5	1549.07	8.58

Operator's Comments:

The Methanol mass (air emission) release was calculated by averaging the results obtained from the fugitive emission surveys carried out by LDAR Envolve Ltd. The program to replace methanol tank IFR seals has now completed (4 tanks seals replaced)

D4 and D5 Cyclic products mass emissions are calculated from ideal gas laws in conjunction with Raoult's law using vapour pressure, the final calculated figure is directly related to the tank throughputs. Throughputs of all grades are all significantly reduced (approx. 20%). This is due to the planned closure of Dows Dragon production plant, and various reliability issues experienced by the customer.

SignedA Jackson
(Authorised to sign as representative of the Operator)

Date.....24/1/2022.....

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Navigator Terminals Windmill Ltd

Annual Review (2021) of Fugitive Emission Testing.

Date: 24/1/2022

Objective

To review the fugitive emission testing at the Windmill Site regarding the application of Best Available Techniques. Permit Condition 4.1.4

Scope

All equipment utilised in the storage and handling of methanol on the Navigator Site, including tank vents, pipelines, pumps, filters, flanges, seals and glands.

Exceptions

The ship unloading system is only full during ship off loading operations (less than 15% of year) and as such does not form part of every 6 monthly fugitive emissions test. Visual checks on the shipping pipelines and fitments are carried out at the commencement of every shipping operation and logged. The pipeline is fully welded from the site to the berths.

Test Methods Adopted

US EPA “Method 21” using a flame ionisation detector (Foxboro TVA 1000B)

Monitoring

- LDAR Envelope retained for 2021 to carry out the monitoring. Monitoring performed 6 monthly.
- All valves, pumps, filters and flanges (398 points) tested each visit.
- The four methanol tanks tested at 16 circumferential vent positions to monitor the performance of the internal floating roof seals.
- Monitoring results used to pinpoint any deterioration of seals, flange joints and glands etc, and prioritising of maintenance activities. (Action level >500ppm)
- Results obtained used to estimate the methanol fugitive emissions for the annual reporting.

Conclusions

Since the last monitoring visit in 2020, 2 valves which were previously leaking above the threshold of 500ppm, have had corrective maintenance (valve glands tightened). Measurements taken during the first LDAR visit in April 2021 showed emissions from these valves have reduced below the 500ppm threshold.

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During the second LDAR visit in December 2021, we provided a mechanical fitter to accompany the LDAR technician. This allowed any flanges /glands identified above 500ppm to be adjusted at the time.

5 points were initially leaking, 3 of which were adjusted at the time. Results below:

- F0156 - Tk102 tank side flange. Initially 4560ppm. Nipped up now 1330ppm
- F0171 – Tk102 tank side flange. Emissions of 760ppm
- V0006 – Tk 101 east side. Initially 2470ppm. Nipped up now 380ppm
- V0022 – Tk103 west side. Initially 1330. Nipped up now 1026ppm
- V1104 - Tk104 west side. Emissions of 988ppm

Tk102 was taken out of service during September for replacement of the internal floating roof seal. This involves removal of all tank side valves. 2 of the new leaking valves are on the tank side flanges. This supports our previous view that releases are most likely after disturbing flanges. Unfortunately, in this case, it is not possible to test the connections until product is reintroduced to the tank by importing at least 600 tns.

The program of tank roof seal replacements is now complete, as is the current round of methanol tank inspections. The next methanol tank due for inspection will be in 2025.

The total calculated methanol emissions for 2021 was recorded as 51.5 kgs based on the LDAR monitoring results.

The LDAR programme still is regarded as an effective means of monitoring for potential methanol leakage.

Best Regards



Andy Jackson