

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 2019

Waste Description	Disposal		Trends in Waste Disposal		
	Route	Tonnes (t)	Year	Parameter	
				Total Hazardous Wastes (t)	Total Non-Hazardous Wastes (t)
1) Hazardous Waste:			2006	185	15.6
WEEE		0.5	2007	203	10.3
Other Hazardous waste		4.18	2008	202	14.4
			2009	167	15.6
2) Non-Hazardous Wastes:			2010	170	15.0
Site Cess Pit		183.800	2011	33.72	217.25
General/Construction/Metal etc		8.482	2012	0	219.88
Non haz washings		0	2013	0	180.76
Siloxane waste (sample waste)		22.74	2014	0.5	170.32
			2015	0.05	142.84
			2016	0	161.79
Hazardous		4.68	2017	0	153.52
Non- Hazardous		215.022	2018	1.42	174.82
			2019	4.68	215.022

Operator's comments: Previously, waste silicone product (haz and non haz) was transported to customer for recovery. It has been confirmed that this material was actually being disposed of by customer. This material is now being disposed of by Navigator. 3000kg of tank washings were disposed of as hazardous waste due to a planned tank outage, 200kg of accumulated maintenance products also + 480 kg of contaminated PPE/rags etc

Signed ...A Jackson..... 
(Authorised to sign as representative of the Operator)

Date.....27/1/2020

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Reporting of Energy Usage for the year 2019

Energy Source	Energy Usage		CO ₂ Produced (t)
	Quantity	Primary Energy (MWh)	
Electricity * (MWh)	842.675	842.675	141.38
Natural Gas (MWh)	218	218	36.45
Diesel / Distillate Fuel Oil (t)	0.15	1.62	0.273
TOTAL	1060.825	1062.295	178.103

Trends in Energy Usage		
Year	Parameter	
	Primary Energy Usage (MWh)	CO ₂ Produced (t)
2006	1655	279.69
2007	1557	262.232
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

Operator's comments: Normally warm product supplied from the process is able to maintain temperatures in D4 tanks. Reduced throughputs of D4's results in need for increased heating of D4 tanks

Signed.....A Jackson
(Authorised to sign as representative of the Operator)

Date.....27/1/20

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Installation: Barry Silicon Based Manufacturing Installation

Form Number: MR1

Reporting of Mass Release for the year 2019

Mass Release		
Parameter	Medium	kg
Methanol ¹	Fugitive to air	42
Octamethylcyclotetrasiloxane (D4 Cyclics) ¹	Fugitive to air	1813.18
Decamethylcyclotetrasiloxane (D5 Cyclics) ¹	Fugitive to air	12.93

Trends in Mass Release (kg)			
Year	Parameter		
	Methanol	Octamethylcyclotetrasiloxane (D4 Cyclics)	Decamethylcyclotetrasiloxane (D5 Cyclics)
2007	153	1510	8.69
2008	43	1699	10.76
2009	100	1431	11.4
2010	55	1678	11
2011	98	1812	10
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

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.

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.

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

Date.....27/1/20.....

Permit: KP3734SH

Navigator Terminals Windmill Ltd

Annual Review (2019) of Fugitive Emission Testing.

Date: 2/1/20

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 7% of year) and as such does not form part of every quarterly programmed fugitive 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 2019 to carry out the monitoring. Monitoring performed 6 monthly in May and October.
- 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

The monitoring regime onsite has reached a mature stage, whereby most flange joints being identified as leak sources have been addressed. It is anticipated that in the future, leak sources will be related to failures of valve packing (due to wear), and due to re-jointing after

performing maintenance. In general, minimal invasive maintenance is performed so this is not expected to be a common occurrence.

In May, one valve (V0022) was found to have a leak recorded at 1843ppm. Leak not visible and due to location could not be worked on without emptying tank T103. This tank is scheduled to remove from service in January 2020 so will be addressed at this point.

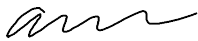
The survey was repeated in October with all 398 valves /flanges tested. V0022 was the only point recorded with an emission greater than the 500ppm threshold.

During out of service inspection of methanol tanks, it has been noted that the internal floating roof seals are nearing end of life. A program has commenced to replace these seals (T101 replaced 2018, remaining tanks being replaced as they come out for service)

The total calculated methanol emissions for 2019 was recorded as 42 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