




HAZARDOUS MATERIAL STORAGE RISK ASSESSMENT FORM

STORAGE AREA	CONTENTS	DATE:
PT A - F Bund	Unsaturated Polyester Resin (UPR)	29/02/2016

DESCRIPTION
 6 x 100m³ Storage vessels stored in a secondary containment bund. All in use tanks contain UPR. Tankers are offloaded directly into the tanks using nitrogen overpressure. Dedicated fill line for each individual tank. Each tank has an atmospheric vent installed (no abatement).

Tank	Content	Hazard	Risk phrase	LEL (% vol)	Flash point (°C)	Auto ignition (°C)	Storage Temp	Max Quantity
PT A	UPR IP13239	Flammable, Harmful, Toxic to Reproduction	H226, H319, H335, H361d, H372, H412	1.1 - 6.1	31	490	Ambient	95m ³
PT B	UPR IP66109	Flammable, Harmful, Toxic to Reproduction	H226, H319, H335, H361d, H372, H412	1.1 - 6.1	31	490	Ambient	95m ³
PT C	UPR IP61119	Flammable, Harmful, Toxic to Reproduction	H226, H319, H335, H361d, H372, H412	1.1 - 6.1	31	490	Ambient	95m ³
PT D	NOT IN USE							95m ³
PT E	UPR IP45120	Flammable, Harmful, Toxic to Reproduction	H226, H319, H335, H361d, H372, H412	1.1 - 6.1	31	490	Ambient	95m ³
PT F	UPR IP45121	Flammable, Harmful, Toxic to Reproduction	H226, H319, H335, H361d, H372, H412	1.1 - 6.1	31	490	Ambient	95m ³

PERSONS AT RISK	ENVIRONMENTAL RISKS
Employees Delivery Drivers	<ul style="list-style-type: none"> - Harmful to aquatic organisms - may be dangerous for the aquatic environment if released. - VOC air emissions if released from storage. - VOC air emissions from filling operations & breathing losses

ASSESSORS		
Name	Position	Signature
James Cribbes	HSE Manager	

REVIEW DATE
 15/03/2016

NOTES
 Note: Detailed Process Hazard Analysis (PHA) Assessment completed for this system.

Tank	Scenario	Primary Causes	Impacts	Preventative/protective measures	Sev	Prob	Risk	Notes
PT A-F	Tank Overfill	High level protection failure	Release of flammable material into the bund.	Independent high level alarms/cut-off on storage tank	2	2	1	Annual Maintenance of High level protection
				Arkema weighbridge checks of tanker contents prior to delivery.				Secondary bund containment in place
				Permission to offload procedure - includes weight checks prior to discharge				
				Daily contents checks by production				
				Trained yard operators only permitted to offload tankers - Close supervision at all times.				
PT A-F	Ignition of flammable material in bund	Failure of static earth and or unsuitable equipment installed in ATEX zoned area	Pool fire within bunded area, Environmental release to Air, Potential of explosion of tank within bund	Static earth proving system - Interlocked to tanker discharge lines.	3	2	1	
				Independent high level alarms/cut-off on storage tank				
				ATEX approved equipment used on entire system.				
PT A-F	Release of flammable liquid into bunded area	Pipe work failure, Flange Failure, Vessel rupture.	Release of flammable material into bunded area	NDT/visual integrity inspection of all storage tanks/pipes in bund - WSE in place.	2	2	1	
				Stainless steel pipework specification				
PT A-F	Release of flammable liquid external to bunded area	Tanker pull away while discharging, Hose failure, Seal failure.	Uncontained release of flammable liquid	Trained drivers only permitted to offload tankers - close supervision at all times.	2	3	1	Tanker drive away not occurred previously,
				Visual checks of hoses/seals prior to discharge				Site has tertiary bund around perimeter to prevent release off site
				Hoses fit for purpose.				All drains contained on site - no external release
PT A-F	Pump failure resulting in flammable release	Pump seal failure, Flange failure, Pipe work overpressure of pipe work through trapped solvent	Release of flammable material outside the bund.	Pressure relief valves on pumps	2	3	1	
				Mechanical seals on all pumps				
PT A-F	Polymerisation of storage tank contents	High ambient temperature (>30C)	Polymerisation in tank, tank rupture possible ignition	All tanks lagged to prevent thermal absorption	3	2	1	
				Low ambient temperatures in UK.				
				Short storage durations - regular tank re-fills				

MATRIX USED FOR PROBABILITY LEVEL EVALUATION

D-HSE 13 Edition 2

Risks Matrix						
		Level of severity				
		1	2	3	4	5
Level of probability	7	3	3	3	3	3
	6	2	3	3	3	3
	5	1	2	3	3	3
	4	1	2	2	3	3
	3	1	1	2	2	3
	2	1	1	1	2	2
	1	1	1	1	1	2
	0	1	1	1	1	1

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Any scenario resulting in a risk level 3 must be addressed as soon as possible. The Country CEO or the Business Unit Vice-president must be immediately advised. The Director of manufacturing provides written approval for continued operation and action plan.

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Scenarios resulting in a risk level 2 require an ALARP approach ("As Low As Reasonably Practicable"); it must be demonstrated that it is not possible to reduce the risk level to an economically and socially acceptable cost. The Director of manufacturing must be advised as soon as possible. The Plant Manager provides written approval for continued operation and action plan.

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The scenarios resulting in a risk level 1 with a moderate or serious severity should be reviewed as part of the workplace risk assessment (see [Directive D.HS-04](#)).

Severity

Severity	Consequences on the people	Consequences on the environment	Damages *
1 Moderate	Internal: medical treatment. External: no significant effects	Limited PSI, Single Permit Exceedance Minor Onsite Environmental Damage/Contamination (<€50K Cleanup Cost)	<€200,000
2 Serious	Internal: major injury External: reversible effects	Federal/State Reportable Quantity Release, Multiple Permit Exceedances, Significant On-site Environmental Damage/Contamination (€50K-€250K Cleanup Cost)	€200,000 - €2m
3 Extensive	Internal: multiple major injuries – fatality External: irreversible effects, public shelter in place	Major On-site environmental damage/contamination (>€250K Cleanup Cost), Limited Off-site Environmental Damage/contamination (<24 hr response)	€2m - €10m
4 Very extensive	Internal: multiple fatalities External: irreversible effects, fatality, public evacuation	Significant Off-site Environmental Damage/Contamination. Short term impact (1 day – 7 day response), Limited Fish Kill/River Impact/Ground Water Contamination	€10m - €100m
5 Catastrophic	Internal: many fatalities External: multiple fatalities	Major Off-site Environmental Damage/contamination, Long term impact (>7 day response), Significant Fish Kill/River Impact/Drinking Water Supply Impact	> €100m

Probability

- 0 "Under design limit": the likelihood is lower than 10^{-6} .
- 1 "Unlikely": the likelihood is superior or equal to 10^{-5} and lower than 10^{-3} . This level characterizes a scenario that is physically imaginable but that has never happened
- 2 "Extremely rare": the likelihood is superior or equal to 10^{-3} times and lower than 10^{-1} . This level characterizes a scenario that has already happened in our industry but that was subject to corrective measures
- 3 "Rare": the likelihood is superior or equal to 10^{-4} and lower than 10^{-2} . This level characterizes a scenario that may happen once every year for 1,000 similar units or an event that may occur once over 20 to 30 years of life cycle and this for 100 to 200 similar installations.
- 4 "Possible": the likelihood is superior or equal to 10^{-2} and lower than 10^{-1} . This level characterizes a scenario that may happen one over 20 to 30 years of life cycle and this for 10 to 20 similar installations.
- 5 "Occasional": the likelihood is superior or equal to 10^{-1} and lower than 1. This level characterizes a scenario that may happen one time over the life cycle of an installation.
- 6 "Frequent": the likelihood is superior or equal to 10^{-1} and lower than 1. This level characterizes a scenario that may happen several times over 10 years of life cycle of an installation.
- 7 "Very frequent": the likelihood is equal to 1. This level characterizes a scenario that may happen at least once a year.