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Dear Madam

### **MHI IMPLICATIONS OF FLAMMABLE STORE EXPANSION**

This letter serves to indicate that based on the inventories of hazard materials currently on site (i.e. 192 000l in the flammable store and 60 tons of bulk flammables either underground or above ground) the classification of the FCC site under the proposed new DRAFT MHI Regulations will likely be as a Low Hazard Establishment.

This Low Hazard Establishment classification will require that FCC have an MHI QRA completed by an AIA to SANS 1461 (last done 2018) and an Emergency Response Plan according to SANS 1514 (current plan will largely comply – may just need to be checked and re-arranged).

Table 1 below shows various materials, various different storage options and the classifications.

From this analysis it is clear that the expansion of the flammable store does not change the classification of the site, it will remain a Low Hazard Establishment.

However, what is critical to retaining the Low Hazard classification is that none of the flammable materials should be classified as extremely flammable.

So, for example, if extremely flammable di-ethyl ether is brought on site in bulk, as was considered at some stage, then the site will likely become a Medium Hazard Establishment. Alternatively, if the amount of any solvents at high temperatures (i.e. above their boiling points) in any one of the processing building increases above 7 tons, then the site might also shift to a Medium Hazard Establishment.

Should FCC become a Medium Hazard Establishment then FCC will also need a Major Incident Prevention Policy in place (this is essentially a Process Safety Management System - PSM). In terms of MIPP, FCC have most of the elements in place but this is not formalized or structured specifically as a PSM.

From the time the new regulations come into effect FCC will have 1 year to get the updated QRA and ERP in place and 2 -3 years to get the MIPP in place.

In summary, as the installation is today and with a full bulk tank farm and expanded flammable store, it is will likely be classified as a Low Hazard Establishment. However, if extremely flammable materials are handled/processed, the site could move to a Medium Hazard Establishment.

In terms of paving the way to compliance with the proposed new MHI Regulations, FCC should ensure their Emergency Plan complies with SANS 1514. Further to that, it would be good practice to begin to implement a process safety management system.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'D. Mitchell', written in a cursive style with a horizontal line underneath.

Debra Catherine Mitchell Pr.Eng  
ISHECONcc Member and Technical Signatory

**TABLE 1 – DIFFERENT FLAMMABLE STORAGE OPTIONS AND THE RESULTANT MHI CLASSIFICATION OF THE SITE**

Material	Current Stock	Current Fraction of Medium Threshold	Future Stock Option 1	Future Option 1 Fraction of Medium Threshold	Future Stock Option 2	Future Option 2 Fraction of Medium Threshold	Future Stock Option 3	Future Option 3 Fraction of Medium Threshold	Future Stock Option 4	Future Option 4 Fraction of Medium Threshold
Chlorine	1	1/10 = 0.1	1	1/10	1	1/10	1	1/10	1	1/10
Anhydrous ammonia	5	5/50 = 0.1	5	5/50	5	5/50	5	5/50	5	5/50
Hydrogen	0.025	0.025/5=0.005	0.025	0.025/5	0.025	0.025/5	0.025	0.025/5	0.025	0.025/5
Petroleum based fuels	40	40/2500=0.016	40	40/2500	40	40/2500	40	40/2500	40	40/2500
<b>SUB-TOTAL</b>		<b>0.221</b>		<b>0.221</b>		<b>0.221</b>		<b>0.221</b>		<b>0.221</b>
Highly flammable – store	155		310		310		155		310	
Highly flammable – bulk tanks	60		60		400		400		370	
Highly flammable – total	215	215/5000	370	370/5000	710	710/5000	555	555/5000	680	680/5000
Ex flammable hot solvents in reactors/columns Domino effects limited	4	4/10	4	4/10	4	4/10	4	4/10	4	4/10
Extremely flam (Diethyl ether)									30	30/10
<b>SUB-TOTAL</b>		<b>0.443</b>		<b>0.474</b>		<b>0.542</b>		<b>0.511</b>		<b>3.536</b>
<b>TOTAL SUM OF FRACTIONS</b>		<b>0.664</b>		<b>0.695</b>		<b>0.763</b>		<b>0.732</b>		<b>3.757</b>
<b>POSSIBLE FUTURE MHI CLASSIFICATION</b>		<b>Low MHI</b>		<b>Low MHI</b>		<b>Low MHI</b>		<b>Low MHI</b>		<b>Med MHI</b>

**TABLE 2 – MATERIALS ON SITE AND CLASSIFICATION UNDER THE NEW DRAFT MHI REGULATIONS**

Material	CASRN (UN)	SANS10228 Classification	Annual Consumption t / a	Maximum Inventory t	Maximum Single Storage Unit t	Potential MHI Material	Flash Point and Boiling Point Deg C	Future MHI Group	Future MHI Thresholds
Liquefied chlorine	7782-50-5	2.1	3	1	1	Yes		Named	1, 10, 25
<b>UNDERGROUND SOLVENTS (2018)</b>									
Methanol	67-56-1	3	120	18	18	Yes	12 & 118	Highly Flam	
Acetone	67-64-1	3	120	18	18	Yes	-18 & 56	Highly Flam	
<b>TOTAL</b>			<b>240</b>	<b>36</b>					<b>500, 5000, 50000</b>
<b>ABOVE GROUND SOLVENTS (2019)</b>									
Methanol			-	30	30	Yes	12 & 118	Highly Flam	
Acetone			-	30	30	Yes	-18 & 56	Highly Flam	
Possible future solvents				410				Highly Flam	
Possible future Diethyl ether				30			-45 & 35	Ext Flam	1, 10, 50
<b>TOTAL</b>			-	<b>Current 60 Future 150</b>					<b>500, 5000, 50000</b>
<b>FLAMMABLE STORE (typical materials)</b>									
Toluene	108-88-3	3	110		0.2	Yes, as part of flam store	4 & 110	Highly Flam	500, 5000, 50000
Methylene chloride	75-09-2	3	90	-	0.2	As above	No FP		
Chloroform	67-66-3	3	40	-	0.2	As above	No FP		
Acetic acid	64-19-7	3	20	-	0.2	As above	39 & 118	Flam	500, 5000, 50000
Acetic anhydride	108-24-7	3	20	-	0.2	As above	49 & 139	Flam	500, 5000, 50000
Acetonitrile	75-05-8	3	40	-	0.2	As above	6 & 82	Highly Flam	500, 5000, 50000
Di-isopropyl ether	108-20-3	3	10	-	0.2	As above	-28 & 69	Highly Flam	500, 5000, 50000
Ethyl acetate	141-78-6	3	50	-	0.2	As above	7 & 77	Highly Flam	500, 5000, 50000
n-Heptane	142-82-5	3	10	-	0.2	As above	-4 & 98	Highly Flam	500, 5000, 50000
Dimethyl-formamide	68-12-2	3	10	-	0.2	As above	58		
Others (e.g. aniline)		3	460	-	0.2	As above			
<b>TOTAL</b>				<b>Current 155</b>					

Material	CASRN (UN)	SANS10228 Classification	Annual Consumption t / a	Maximum Inventory t	Maximum Single Storage Unit t	Potential MHI Material	Flash Point and Boiling Point Deg C	Future MHI Group	Future MHI Thresholds
				<b>Future 310</b>					
<b>RM STORE (typical materials)</b>									
Hydrochloric acid	7647-01-0	8	25	85	0.05	Yes, as part of RM store fire, but not on its own, but part of			
Hydrobromic acid	10035-10-6	8	1	-		As above			
Sulphuric acid	7664-93-9	8	5	-		As above			
Ammonia solution (25%)	1336-21-6	8	40	-	0.2	As above			
Dimethyl oxamide	615-35-0	-	1	-	0.05	As above			
Chloro-sulphonic acid (97%)	7790-94-5	8	5	-	0.2	As above			
Charcoal	7440-44-0	4	5	-		As above			
Phosphorous pentachloride	10026-13-8	6.1	5	-		As above			
Others			13	-		As above			
TOTAL			100						
<b>UTILITIES</b>									
Thermal oil	-	3	Neg	26	8	Unlikely			
Diesel	UN 1202	3	9	9	9	No	52 & 171		250, 2500, 25000
Fuel Oil	-	3	800	30	30	No	70 & 200		250, 2500, 25000
Nitrogen	7727-37-9	2.2	550	20	20	Unlikely			
Hydrogen				<0.1		Unlikely			0.5, 5, 50
Ethylene oxide				<0.1		Unlikely			0.5, 5, 50
Hydrogen chloride				<0.1		Unlikely			2.5, 25, 250
Anhydrous ammonia	7664-41-7	2.1	Neg	5	1.5	Yes			5, 50,200
Paints, oils, cleaners etc		3		<1	Negligible	No			
<b>PRODUCTION AREAS</b>									
Methanol / acetone (outside drums)	-	3	240	1	0.2	No	12 & 118	Highly Flam	
Misc solvents (inside buildings)	-	3	240	1	0.2	No	12 & 118	Highly Flam	
Pharmaceuticals (typical)	-	-		2	0.05	No			
<b>PRODUCT STORE (typical materials)</b>									
Pharmaceuticals (typical)	-	-	800	100	0.05	Yes, as part of product store fire, but not on			

Material	CASRN (UN)	SANS10228 Classification	Annual Consumption t / a	Maximum Inventory t	Maximum Single Storage Unit t	Potential MHI Material	Flash Point and Boiling Point Deg C	Future MHI Group	Future MHI Thresholds
						its own, but part of			
<b>TOTAL SITE</b>				~ 1000 - 1500 tons					