

Table 4C1. Operation Data provided for LPG Filling Station

Date	17-Sep-19 (phone interview)
Station Location	2K, Cheung Yip Street, Kowloon Bay
Number of storage tank in the station	2
Max Tank storage capacity	25.4 kL
Annual LPG Throughput	Information not provided
Number of LPG Tankers visiting the station	Information not provided
Average number of vehicles visiting the station	Taxi: 1500 to 1600 per day
	Public mini bus: 270 to 300 per day

Table 4C2. LPG Throughput and Number of Vehicles Visiting the Station

Tank Capacity	2 × 25.4kL
Estimated Annual LPG Throughput (tonnes) ^c	22083
Estimated Number of LPG Tankers visiting the stations (per year) ^b	2454
Number of Vehicles Visiting the stations (per day) ^a	Taxi : 1600
	Public mini bus : 300

- According to the previous EIA report (AEIAR-130/2009), the average consumption for LPG is estimated to be 50 L per taxi and the LPG consumption for public mini bus is twice as LPG taxi. The LPG density is assumed to be 0.55 kg/L.
- According to the previous EIA report (AEIAR-130/2009), each LPG tanker carries 9 tones LPG.
- Annual LPG throughput = Number of LPG taxi per year × LPG consumption per taxi + Number of LPG public mini bus × LPG consumption per public mini bus

Figure 4C1. Fault Tree Diagram for Cold Catastrophic Failure of an LPG Vessel (Updated with data in Table 4C2)

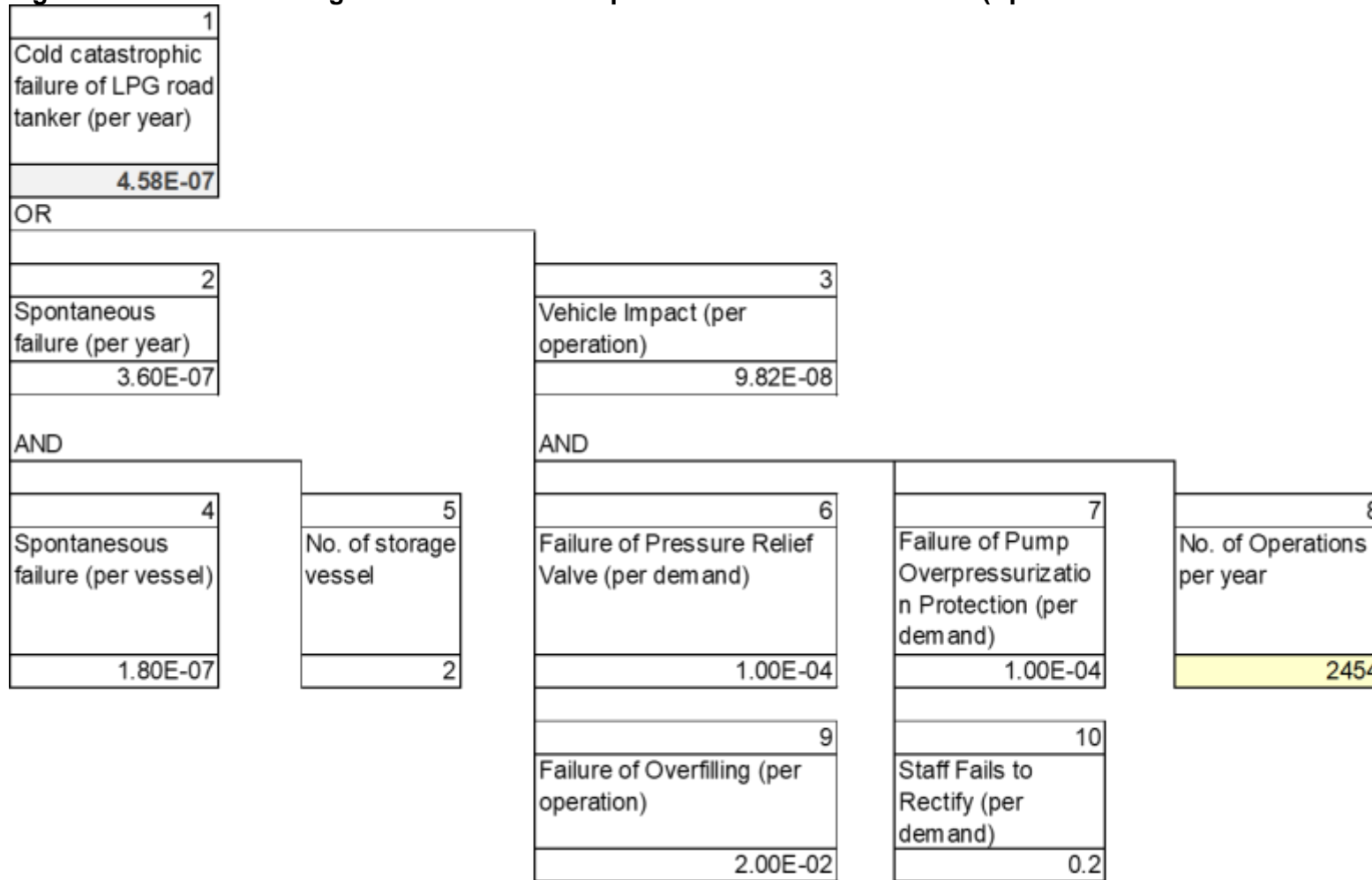
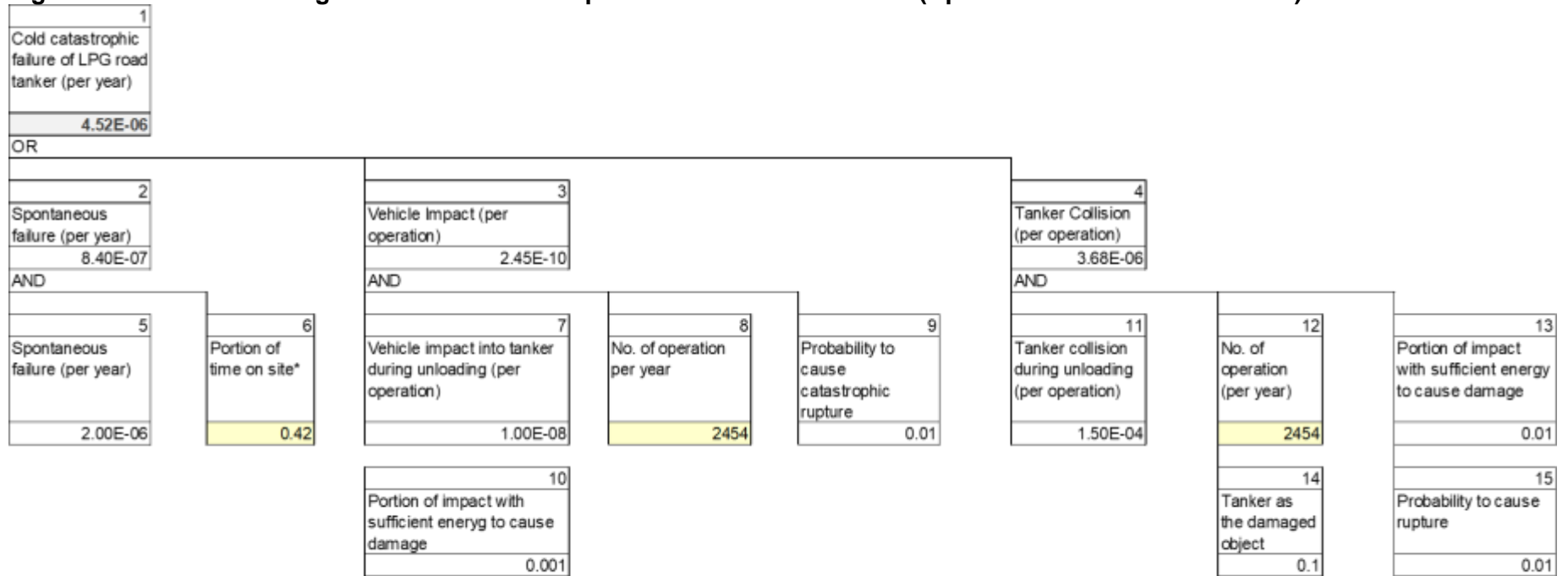


Figure 4C2. Fault Tree Diagram for Cold Catastrophic Failure of Road Tanker (Updated with data in Table 4C2)



*=(1.5 × no. of tanker delivery)/(24 × 365)

Figure 4C3. Fault Tree Diagram for Cold Partial Failure of an LPG Vessel (Updated with data in Table 4C2)

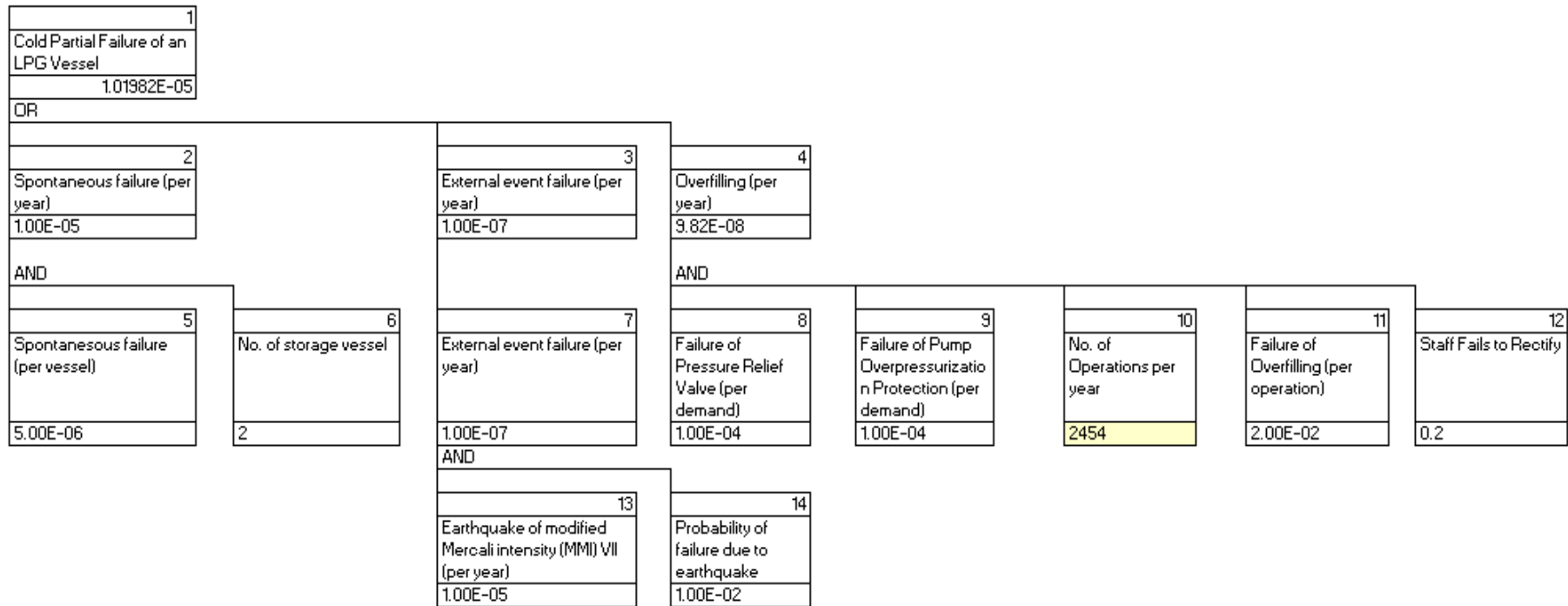
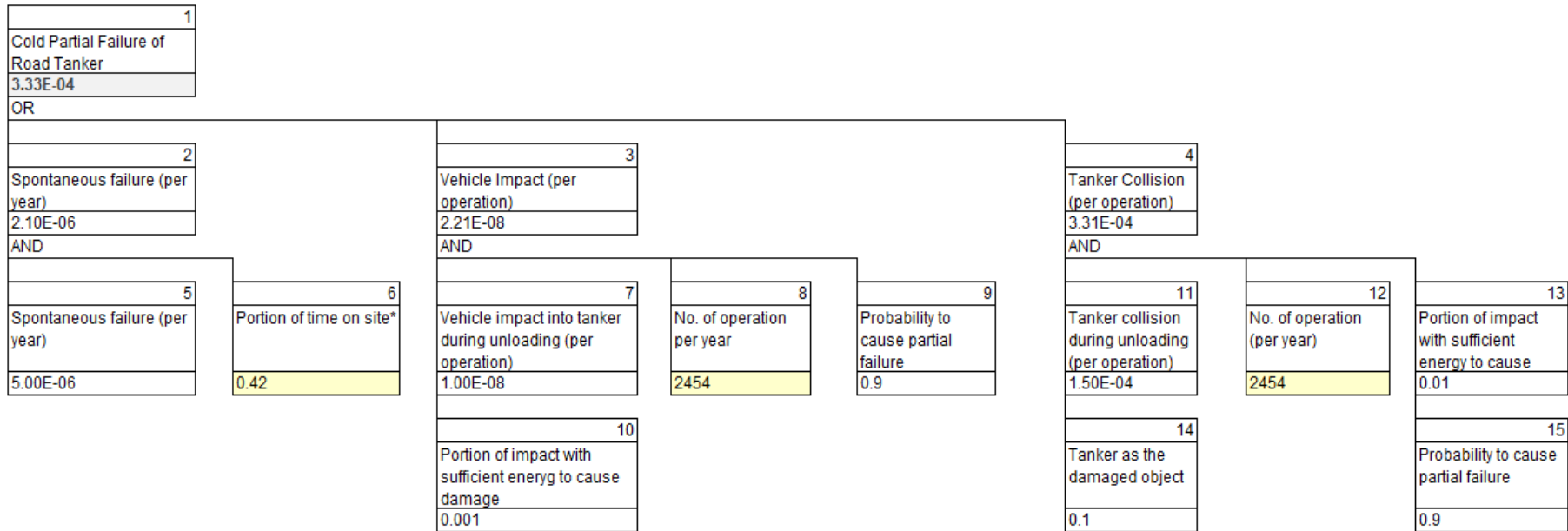


Figure 4C4. Fault Tree Diagram for Cold Partial Failure of Road Tanker (Updated with data in Table 4C2)



*=(1.5 × no. of tanker delivery)/(24 × 365)

Figure 4C5. Pump Flange Leak (Updated with data in Table 4C2)

1		
Leak from Pump Flange (per year)		
4.36E-04		
AND		
2	3	4
Flange Failure (per year)	No. of storage vessel	No. of Operations per year
1.09E-04	2	2

Figure 4C6. Guillotine Failure of Liquid Filling Line to Storage Vessel (Updated with data in Table 4C2)

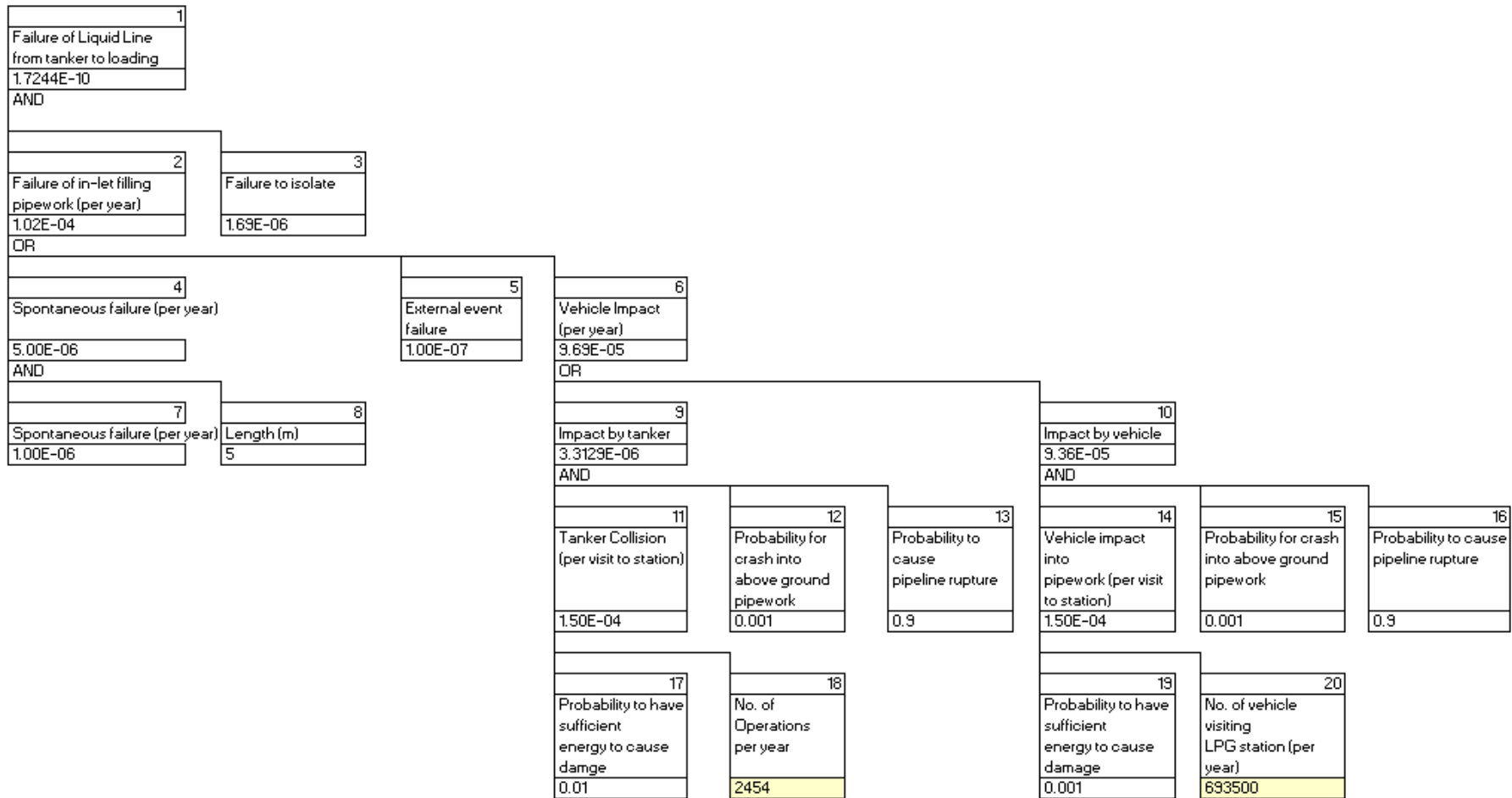


Figure 4C7. BLEVE of LPG road tanker due to fire from LPG dispenser (Updated with data in Table 4C2)

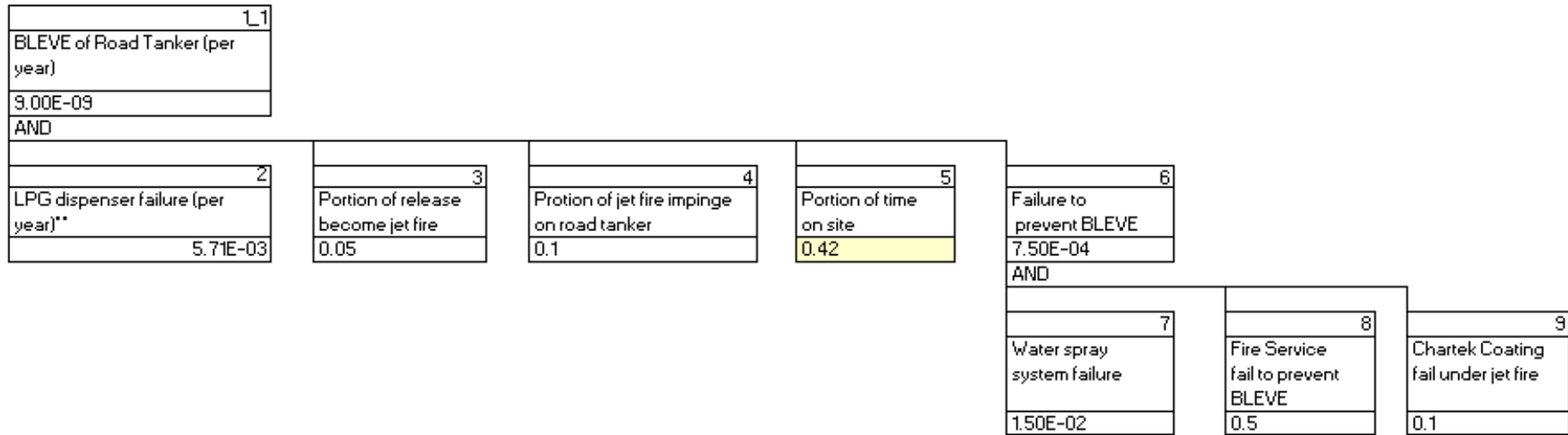


Figure 4C7. BLEVE of LPG road tanker due to fire from LPG dispenser (Updated with data in Table 4C2) (Con't)

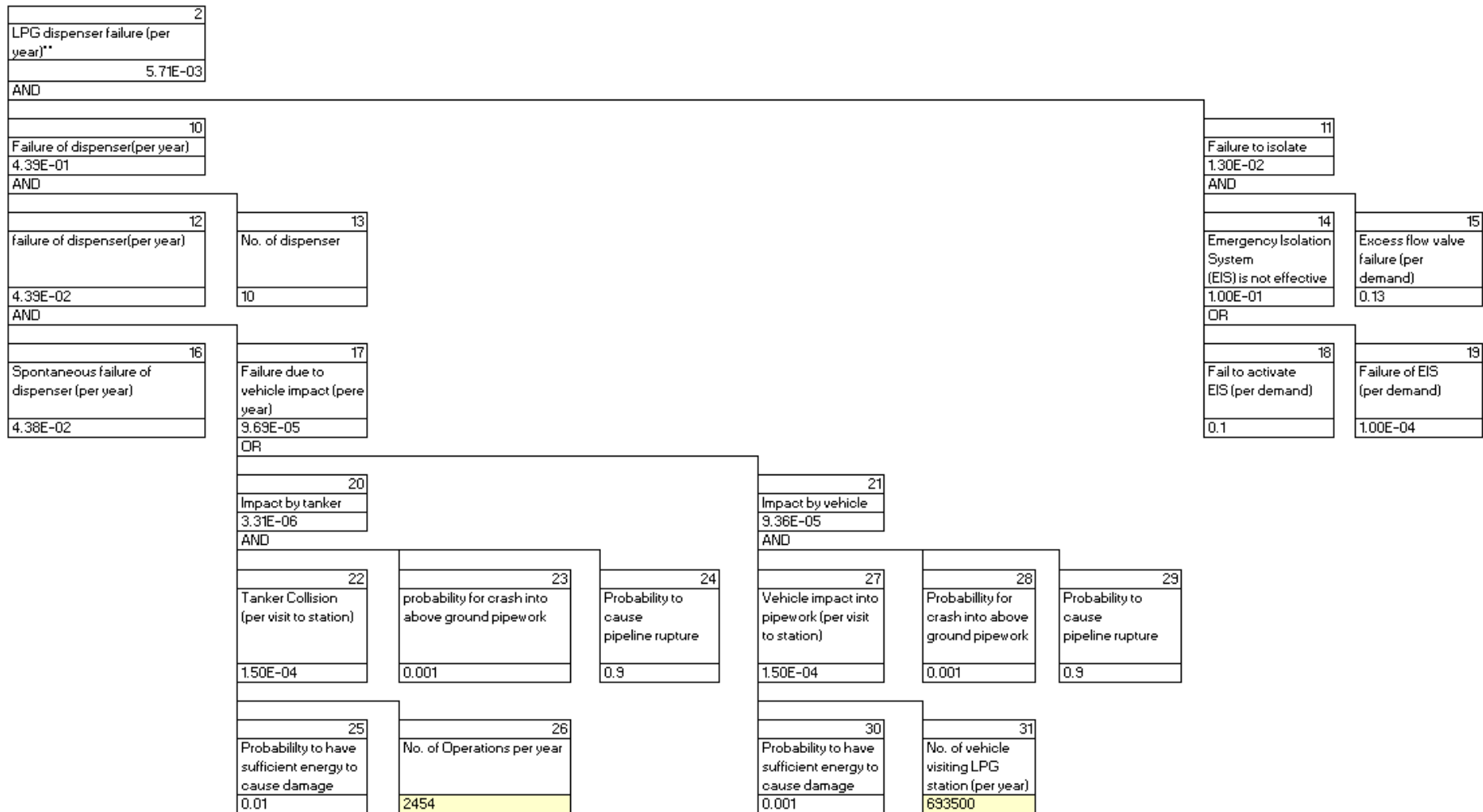


Figure 4C8. BLEVE of LPG road tanker due to fire from LPG dispenser (Updated with data in Table 4C2)

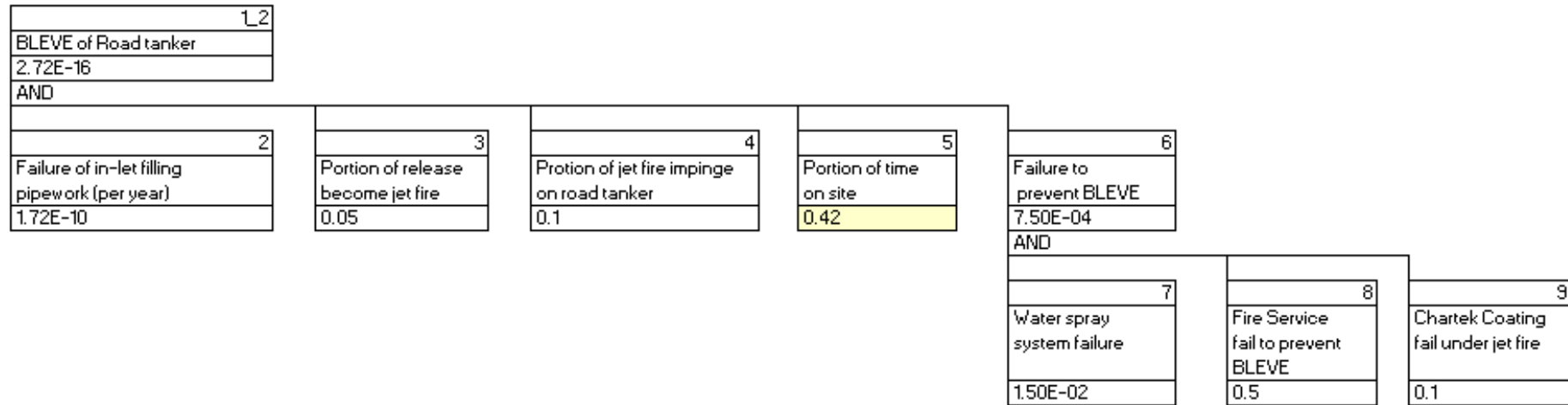


Figure 4C9. BLEVE of LPG road tanker due to fire from Liquid Supply Line to Dispenser (Updated with data in Table 4C2)

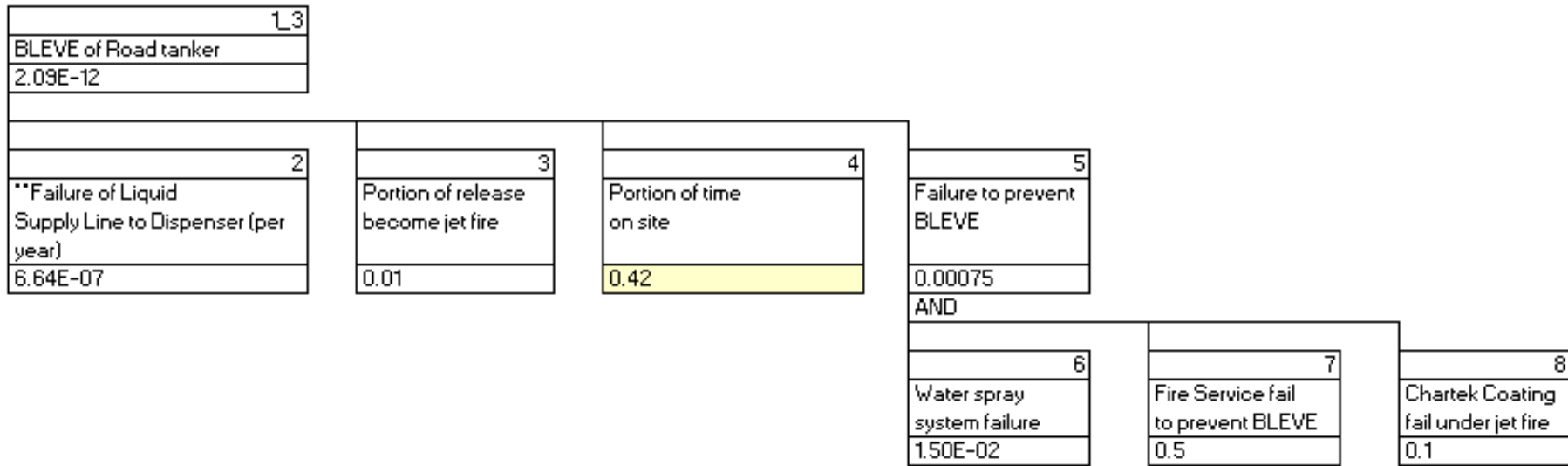


Figure 4C9. BLEVE of LPG road tanker due to fire from Liquid Supply Line to Dispenser (Updated with data in Table 4C2) (Con't)

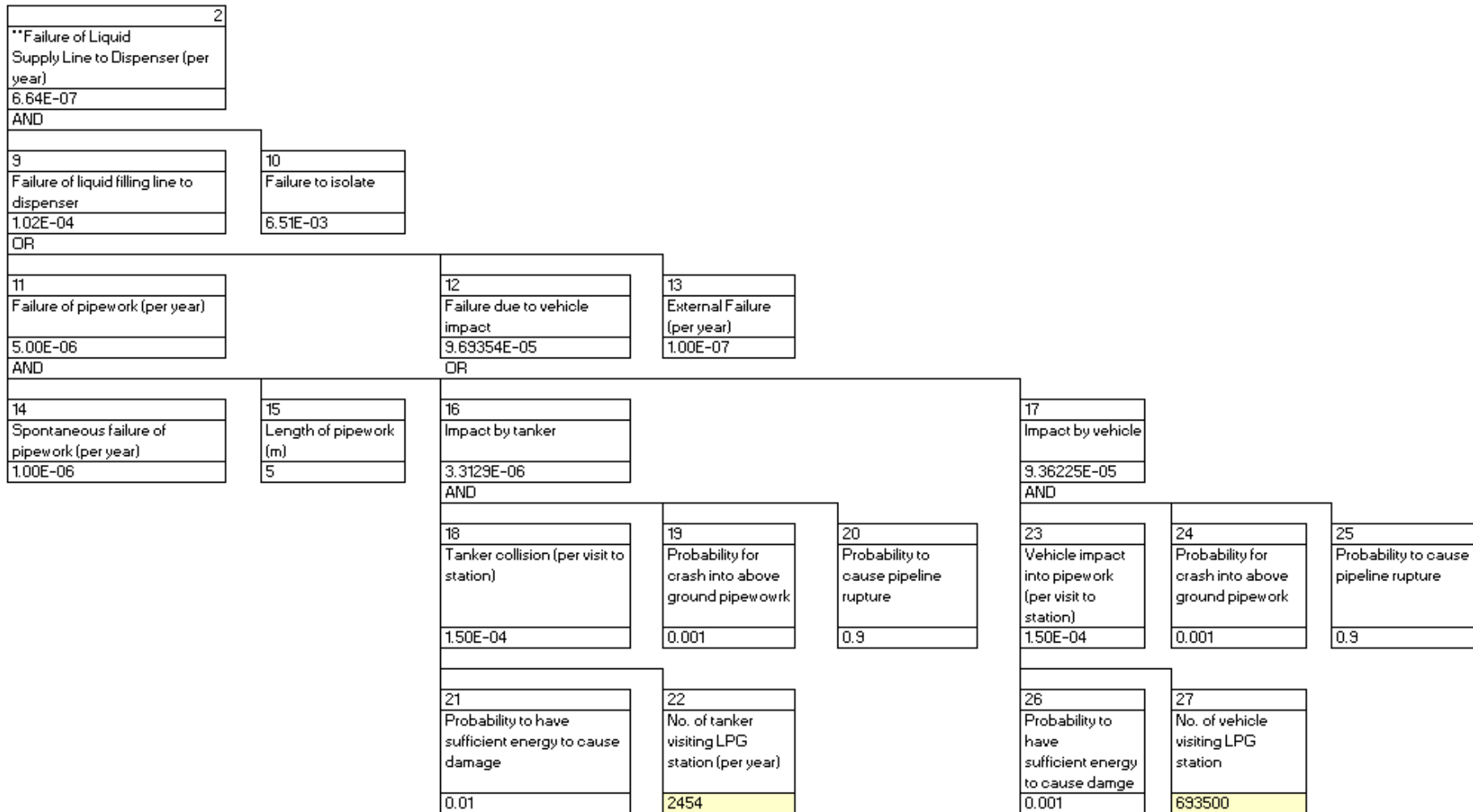


Figure 4C10. BLEVE of LPG road tanker due to fire from Flexible Hose during loading to underground vessel (Updated with data in Table 4C2)

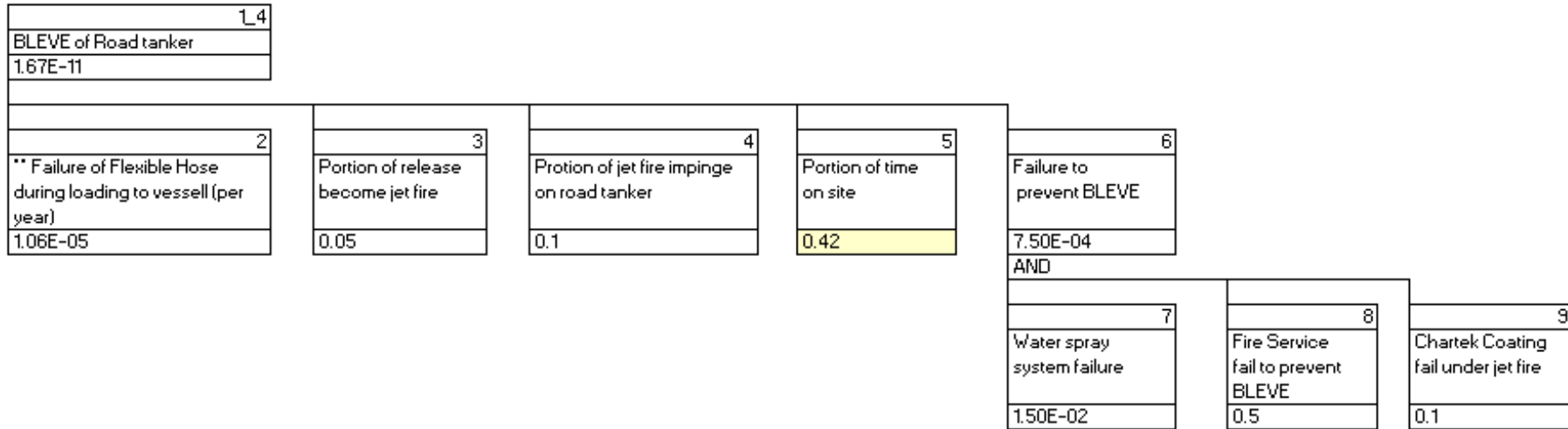


Figure 4C10. BLEVE of LPG road tanker due to fire from Flexible Hose during loading to underground vessel (Updated with data in Table 4C2) (Con't)

2									
** Failure of Flexible Hose during loading to vessell (per year)									
1.06E-05									
AND									
10		11		12					
Leaking during loading (per operation)		No. of filling per year		Failure to isolate leak from tanker					
6.65E-06		2454		6.51E-04					
OR									
13				14		15		16	
Hose misconnection (per operation)				Driver away failure (per operation)		Spontaneous failure (per operation)		Hose disconnection (per operation)	
6.00E-06				5.20E-08		1.35E-07		4.00E-07	
AND				AND		AND		AND	
		19		20		21		22	
18		Operator fails to rectify the problem		Tanker drives away (per operation)		Breakaway coupling failure (per demand)		Hose Connection (per operation)	
Hose misconnection (per operation)				4.00E-06		0.013		2.00E-06	
3.00E-05		0.2						23	
								Operator fails to rectify the problem	
								0.2	
								24	
								Vehicle impact into tanker during unloading (per operation)	
								1.00E-08	
								AND	
								25	
								# Average No. of vehicle visting the LPG station during LPG redueling	
								6.60	

= (daily no. of vehicle visit/24 hours) / 60 min * avearge time of refueling

Figure 4C11. BLEVE of LPG road tanker due to fire from Liquid Line (Updated with data in Table 4C2)

1.5									
BLEVE of Road tanker									
2.72E-16									
2		3		4		5		6	
** Failure of Liquid Line from tanker to loading hose (per year)		Portion of release become jet fire		Protion of jet fire impinge on road tanker		Portion of time on site		Failure to prevent BLEVE	
1.72E-10		0.05		0.1		0.42		7.50E-04	
AND									
7			8			9			
Water spray system failure			Fire Service fail to prevent BLEVE			Chartek Coating fail under jet fire			
1.50E-02			0.5			0.1			