APPENDIX R

Risk of Upset/Hazard Modeling Results

Table 1. Crude Oil Spill Pool Fire Frequency Rates and Modeling Results for the Project Pipelines

Pipeline Segment	*Frequency of Spill and Fire Event per year (years to event)*	*Wind Speed (m/s)*	*Distance to 1.5 kW/m^2 Radiation Level (m)*	*Distance to 5 kW/m^2 Radiation Level (m)*	*Distance to 10kW/m^2 Radiation Level (m)*	*Distance to 31.5 kW/m^2 Radiation Level [1] (m)*
Pipeline Segment 1	$5.56x10^{-7}$ (1.8 million)	1	657	310	181	64
		10	697	395	268	92
Pipeline Segment 2a	$4.85x10^{-8}$ (20.6 million)	1	475	222	129	44
		10	518	304	212	73
Pipeline Segment 2b	$4.82x10^{-8}$ (20.6 million)	1	567	267	155	129
		10	612	253	243	83
Pipeline Segment 2c	$2.69 x10^{-9}$ (371million)	1	514	41	140	48
		10	557	325	226	77
Pipeline Segment 3	$3.77 x10^{-7}$ (2.7 million)	1	783	371	217	79
		10	798	435	286	108
Pipeline Segment 4	$1.94x10^{-7}$ (5.2 million)	1	523	245	143	49
		10	567	330	229	78
Pipeline Segment 5	$7.32x10^{-8}$ (13.7 million)	1	300	138	80	26
		10	332	203	146	51
Existing Mormon Island 36" Pipeline	$5.40 x10^{-6}$ (0.2 million)	1	543	255	148	51
		10	587	341	235	80
Existing ExxonMobil SW Terminal 36"	$3.18 x10^{-6}$ (0.3 million)	1	582	274	159	56
		10	626	360	247	84

Notes:
1. Wood ignites after short exposures to the intensity of 31.5 kW/ m^2 (CCPS 1989).

Table 2. Crude Oil Spill Pool Fire Modeling Results for the Project Working Tanks

Oil Spill Scenario/ Location	*Frequency of Spill and Fire Event per year (years to event)*	*Distance to 5 kW/m2 Radiation Level (m)*
1. Pier 400 Tank Farm Site 1	$6.54x10^{-5}$ (15,300)	391
2. Tank Farm Site 2	$1.79x10^{-4}$ (5,578)	565

Notes:
1. Wood ignites after short exposures to the intensity of 31.5 kW/ m^2 (CCPS 1989).

References

Center for Chemical Process Safety (CCPS). 1989. *Guidelines for Chemical Process Quantitative Risk Analysis*. New York: American Institute of Chemical Engineers.

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