

## LIST OF FIGURES

Figure No.		Page No.
2.1	Typical Methodology adopted in QRA	30
3.1	Guidewords subcategory	57
3.2	Typical flow diagram of NG storage	61
3.3	Consequence analysis of LPG storage	67
4.1	LPG cloud height over dispersion	78
4.2	LPG concentration contour	79
4.3	Radiation heat intensity over downwind	79
4.4	Radiation over vulnerable distance jet fire	86
4.5	Radiation intensity contour	86
4.6	Maximum concentration footprint	87
4.7	Flow diagram Hydrogen unloading	89
4.8	Maximum concentration H <sub>2</sub> over downwind	93
4.9	Radiation intensity contour for tank failure	94
4.10	Over pressure distance with downwind	95
4.11	LPG unloading operation	96
4.12	Line diagram of LPG unloading operation	97
4.13	Maximum LPG concentration contour	100
4.14	Radiation heat intensity LPG BLEVE	101
4.15	Radiation intensity for fire ball	101
4.16	Maximum concentration contour LPG	102
4.17	Line diagram for Natural gas storage	104
4.18	Event tree analysis for NG pipeline	107
4.19	Stage scrubber jet fire side view	108
4.20	H <sub>2</sub> S gas dispersion from compressor	109
4.21	Individual outdoor risk contour	112
4.22	Equipment leak size contribution	119

4.23	Pump boundary	122
4.24	Compressor boundary	122
4.25	Heat exchanger boundary	123
4.26	Pressure vessel boundary	123
4.27	Valve boundary	123
4.28	Flange joint boundary	124
4.29	Piping joint boundary	124
4.30	Safety relief valve boundary	124
4.31	Bayesian network graphical model	126
5.1	Process vessel frequency comparison	129
5.2	Flange Joint frequency comparison	130
5.3	Pipeline frequency comparison	130
5.4	Road tanker frequency comparison	131
5.5	Pressure relief valve frequency comparison	131
5.6	Generic & Posterior Frequency Comparison	132
5.7	Frequency comparison of NG gathering station	133
6.1	US Fatalities in Oil rigs accident statistics	135
6.2	UK offshore industry incident analysis	136