Appendix 1 – Research of Methods and Gaps

Segment	**Details**	**Inference**	**Gap**
Process safety and major accident hazard	Marshall and Ruhemann (2001)	Collection of safety measures concerned with control of accidents relevant to the process industries	
	OGP (2011)	Structured discipline for handling the integrity of operating processes and systems managing hazardous substances	
	Turk and Mishra (2013)	Process safety is a combination of management and engineering skills focused on preventing catastrophic accidents specifically damaging releases, explosions and fires related with loss of containment	
	BP (2015)	Corporations handle the integrity of hazardous processes and operating systems to prevent spills and accidents	
		Major accident hazards in process safety are infrequent hazards but can outcome in serious damage to environment and people	
	Walters and Ross (2011)	The process safety hazards, irrespective of the catastrophic nature, can result in more opportunity or capacity losses than unplanned and planned downtime from all other combined sources	

	Hamilton and Ramsden (2014)	Process safety barriers are the measures of control that helps to solve or prevent a potential accident	
Barrier performance parameters	Sklet, S (2006)	Five (5) aspects related to barrier performance was identified on the basis of Norwegian Offshore industry	Weightage of the variables on evaluating overall barrier performance is not listed.
	PSA (2002a)	Seven (7) aspects related to barrier performance are identified related to general petroleum activities	
	PSA (2002b)	Three (3) aspects related to barrier performance are identified related to operations in Norwegian continental shelf	
	Neogy, P et al (1996)	Two (2) aspects related to barrier performance was identified specific to hazard protection	
	Hollnagel, E (2004)	Three (3) aspects related to barrier performance are identified specific to operations	
	Hollnagel, E (1995)	Eight (8) aspects related to barrier performance are identified specific to hazard protection	
	Andersen et al (2004)	Three (3) aspects related to barrier performance are identified	
	Rollenhagen,C (2003)	Four (4) aspects related to barrier quality are identified	

	Vinnem, JE et al (2003)	1. Barrier performance indicators have an effect on the process risk of the installation 2. Process risk provides an estimate of the current safety status of the organization and estimate risk of future injury and losses	1. The indicators identified are specific to offshore operations and are activity related. 2. Barrier performance indicators are not studied with respect to risk evaluation.
	Oien, K et al (2001)	1. Risk indicators express changes in risk in relative terms; it cannot be used to measure the risk level in absolute terms 2. Methodology for development of risk indicators is generic and can be applied to any petroleum platform and may also be applied in other similar industries	Risk indicators are identified for only offshore petroleum installations.
	Kim, J,W (2003)	A set of Performance influencing factors for human error analysis has been explored based on review of current taxonomies	The factors have been identified for the nuclear industry case study. The factors could be modified during human error analysis of operations in oil and gas industry.

Barrier failure and risk impact	OGP (2011)	a. Barrier strength is identified as a leading KPI b. Number and size of holes in the barriers - Lagging KPI	Linkage between barrier strength and risk estimation is not established.
	OGP (2008)	Near miss events used as an indicator for barrier weakness (Leading)	
	Turk, MA et al (2013)	Barrier assessment to detect holes should be considered as an active monitoring method to identify potential major accident hazard	
	Hamilton, WI et al (2014)	Human factors related to barrier performance must be monitored and managed to reduce risk of major incident	Impact of barrier related human factors on control of risk is not evaluated.
	Todinov MT (2006)	Covers Failure probability specific for structures and localized component failure based on design errors	Risk evaluation does not consider failure of safety barriers due to operational errors.
	Gowland, Richard (2011)	Identify inactive safety barriers and deterioration in the performance of the safety barriers	Linkage between barrier failure and major accident hazard risk estimation is not established.

	Linda, J Bellamy (2013)	Barrier failure was attributed to loss of containment scenario in the Dutch Seveso plants	Pattern of technical safety barriers failure resulting in loss of containment events were not studied for process plants.
	Okoh, P et al (2013)	Maintenance is therefore a key activity to reduce the risk of major accidents	No major accident hazard risk evaluation framework to consider maintenance of barrier.
	PSA (2013)	Requirement for clarity of Operational barriers in risk assessments	Failure or weakening of barrier is not currently related to risk assessments.
	Ognedal, M (2013)	The paper broadly speaks about barrier management and its relationship with barrier function	Relationship between barrier failure or weakness and its impact on risk assessment is not defined clearly.
	Gustafson, S (2014)	Definitions of operational and organizational barriers are unclear to many players, as well as the link between risk assessment and barriers	

	Pitblado, R , Bjerager, P (2013)	1. Barriers degrade over time 2. Barrier degradation can be identified through inspection, preventive maintenance and audits	
	RPS Energy (2010)	Framework to assess adequacy of controls is discussed as part of overall risk management of major accident	1. Method to evaluate barrier effectiveness is not available. 2. Impact of risk due to barrier unavailability or ineffectiveness is not discussed.
	Landucci, G et al (2015)	Probabilistic assessment of fire escalation leading to domino scenarios was developed taking into account the role of safety barriers	Failure of the safety barriers was not evaluated to assess the impact of major accident hazard.

	Hayes, J (2012)	1. For operational managers, “safe” means all safety barriers (or temporary alternatives) are in place. For organizations, “safe” means that the risk associated with the situation is tolerable 2. Risk assessment is not updated based on the operational state of the barrier. Therefore, barrier state is preferred by operational managers as a decision making frame	Lack of a framework to integrate the concept of barrier impact on risk assessment.
	Khan, F et al (2002)	Risk assessment was conducted at the design stage to identify design stage risks for ethylene oxide plants	Lack of a dynamic risk assessment during the operations stage to evaluate the risk reduction due to safety barrier effectiveness.
	Sherman, Robert (2015)	Major incidents occur because of failure of design (poor design) and failure of operational barriers	The linkage between failure in operational barriers and process safety risk is not clearly established.

	Leger,A et al (2008)	Operational availability of barriers is calculated based on organization factors and human factors	1. Safety barrier is only considered as equipment having influences from organization and human factors 2. Model only studies preventive barriers, mitigative barriers are not studied. 3. Equipment availability is not linked with loss of containment frequency.
Barrier based framework (qualitative and quantitative)	Trost W et al (1995)	Qualitative barrier inefficiency categorization method	Linkage between barrier strength and risk estimation is not established.
	Flitchy, P et al (2014)	Barriers related to process instrumentation (precursor detection) are monitored and actions taken based on the barrier specific workflows	

	Jacinto, C et al (2010)	Bow-Ties need to be broken down based on accident pathways	Contribution of individual accident pathways and barriers to the overall risk is not established.
	Reason, J (2000)	Understanding active and latent barriers in the context of Swiss cheese model	Failure of active and latent barriers with associated risk impact is not discussed.
	Pitblado, R., & Nelson, W. (2013)	1. Human and organizational factors have overarching influence on technical, administrative and procedural controls 2. Audits and incidents can be used to evaluate Barrier status 3. Highlights the need to focus on process safety 4. Conclusions of this model are not derived or verified against real data	The barrier models do not evaluate risk considering the “accident pathway” or the “failure path”.

	Terje, A et al (2006)	BORA method calculates hydrocarbon release frequency considering the effect of safety barriers	1. The BORA method only evaluates likelihood of hydrocarbon release. It does not evaluate risk considering mitigative barriers. 2. There is no clarity on the scoring of the Risk influencing factors (suggested to use Bayesian Networks to model the inter-relationship).
	Lewis, S et al (2010)	Limitations of Bow-Tie: 1. Cannot be used to quantify risk based on the barrier failure 2. Does not model the inter-dependency of the barrier	1. Barrier presence or absence is not evaluated for risk impact. 2. Inter-relationships between barriers are not modelled.

	Weber, P. et al (2012)	1. BN in reliability, risk and maintenance areas are chosen since they are easy to use with domain experts 2. BN are particularly suitable for collecting and representing knowledge on uncertain domains but also enable to perform probabilistic calculus and statistical analyses in an efficient manner	The gaps of fault trees, Markov chain and Petri nets are highlighted in the context of Bayesian Networks
	Ringdahl, L (2009)	Accidents were evaluated based on the identification of safety function. The safety barriers have been replaced with the concept of safety web due to overlapping nature of safety function	This approach does not establish a linkage or relationship between safety barriers/web and risk
	Dujim, NJ et al (2009)	Safety barrier diagrams are similar to fault tree and event trees. The difference being that the AND, OR gates are transformed to block diagrams	Safety barrier diagrams are static models and do not function as a dynamic risk predictive tool.
	Handal, A., et al (2013)	Highlights the importance of safety critical equipment for Managed Pressure Drilling operations	Risk approach through fault tree is a static approach and does not include adaptation.

Scope of risk assessments	Vinnem, J et al (2006)	Current scope of Risk analysis - utilizing the precursors of accidents—unplanned events, faults/failures, and putting these together with our knowledge of the physical phenomena that occur (e.g. spills/leaks, gas dispersion, ignition, fire), we have a basis for expressing risk	Risk analysis is static and does not account for barrier failures.
	Sklet, S et al (2006)	1. BORA-Release was used to analyze three hydrocarbon release scenarios on an offshore oil and gas production platform on the Norwegian Continental Shelf 2. The frequency calculated through the tool is higher than the industry average. Increase is attributed to the uncertainty in risk influencing factor	1. The model is considered to be static since the tool is not a dynamic tool to be considered as a risk prediction tool. 2. The current model only focusses on loss of containment frequency, and does not evaluate consequence.

Drilling and H2S related risk assessments / related paper on H2S hazards - barrier related approaches	Khakzad, N et al (2013)	1. Use of Bayesian model to model barrier dependency and common cause failures 2. Accident precursors are used for probability updating via sequential learning	1. Effect of safety barriers on blowout risk is not evaluated. 2. The current model based on Object Oriented Bayesian Network is considered to be abstract in definition.
	Ramzali,N (2015)	1.Reliability Block diagram (RBD) is a more efficient tool to calculate Failure probability of systems 2. Primary and secondary barriers in operations phase of drilling are identified	This was a static approach; a dynamic ETA approach/ Bayesian Network could be considered.
		3. The proposed approach does not predict the barrier FP based on a particular condition 4. IE probability was referred to the MMS report because of data limitation	

	Abimbola, M et al (2015)	1. Safety of drilling operation is represented through risk 2. Limitation of Fault tree and other conventional risk analysis techniques - lack of accuracy, assumption of independency and static modeling 3. Bayesian Networks used for predictive analysis and diagnostic analysis (forward and backward)	Study calculates consequences of possible pressure regime in managed pressure drilling operation - a. Frequency of loss of containment in is not evaluation b. Consequence is not evaluated for fire and toxic impacts.
	Skogdalen, JE et al (2012)	Current QRA's do not consider human and organizational factors	Risk assessment does not account for technical, human and organizational barriers.
	Danielsson F et al (2009)	Acidification of sulfide in cleanup process causes H2S releases contributed in half of the releases	

	CW Energy (2013)	1. Sour gas, or Hydrogen sulfide, is a flammable colorless gas that is toxic at extremely low concentrations 2.Being heavier than air, it can accumulate in low-lying areas creating serious RISKS for human exposure	
	Book,G et al (2012)	1. Conventional Quantitative Risk Assessments (QRA) show a snap-shot of what can happen but does not demonstrate how the risks are managed in order to prevent the „one in a million" event from happening 2. The assessment evaluated absolute risks from the facility during onshore drilling process considering that all safety barriers are active	Impact of failed or deteriorated safety barriers on risk is not considered.
	Risktec (2009)	1. Around one-third of the world's gas fields contain 'sour gas', contaminated by sulfur compounds including hydrogen sulfide 2. Effective risk management strategies are required to prevent leaks of H_2S and protect workers and the public from its lethal effects 3. Future would require more sour wells to be drilled	Impact of safety barriers on H2S risk exposure to workers and public need to be evaluated.

	Rezaei, C et al (2001)	1. Operational barriers are introduced to reduce the frequency of well incidents 2. Hydrogen sulfide (H2S) is a highly toxic, colorless, flammable gas. The major hazard of H2S is its ability to cause sudden death due to accidental exposure	Impact of barrier failure on risk is not discussed.
	Leo, G. (2015)	H2S release is a serious concern for human and animal impact	
	Al-Abri, A. A.et al (2009)	Incremental risk should be evaluated during the asset lifecycle	Currently incremental risk is not evaluated considering the failure of safety barriers.
	Xue L et al (2013)	1. Blowout is one the most serious accidents to a drilling rig and its crew 2. Macondo blowout resulted in 11 fatalities and a lost drilling rig. 3. Definition of Well barrier and categorization of well barrier is provided (2 barrier principle) 4. Three level well control theory is described (primary, secondary and tertiary) 5. Comparison of two barrier principle with three level well control theory	Systematic and quantitative analysis of the barrier failure on risk is to be evaluated.

	Xu, J et al (2014)	1. An individual risk assessment framework, considering underlying uncertainties based on accident probability and accident consequence 2. Individual risk of a high pressure sour gas well in China is assessed and minimum proximity between gas well and building is suggested	Risk assessment considering failure of safety barriers and its impact on risk is not discussed.
	Jianfeng, Li et al (2009)	Barrier performance and failure was linked to each stage of the blowout accident	In this paper barrier failure has been studied to identify the root cause of the Blowout accident. The relationship between barrier failure and the blowout accident is not established.
Dynamic risk assessment models	Meel, A et al (2007)	Statistical models to analyze accident precursors in the NRC database have been developed	The model calculates only capital value at risk (VaR). Dynamic risk model does not account for safety risk.
	Zadakbar, O et al (2013)	1. The risk is evaluated based on the fluctuation of process parameters 2. Case study application to Continuous Stirred Tank Reactor (CSTR) and a distillation column	Risk is not calculated considering the effectiveness of the safety barriers during operation.

	Kalantarnia, M et al (2010)	1. Dynamic failure assessment is a new approach that enables the real time failure analysis of a process 2. Dynamic risk assessment is an important learning tool but is can also be used as a predictive tool to estimate accident likelihood within the next time interval 3. Beta distribution is used for modeling the failure of hardware safety barriers	1. Risk is not calculated considering the effectiveness of the safety barriers during operation. 2. Effect of human and organizational factors are not considered in the dynamic risk assessment.
	Walters, Ross (2011)	1. Oil, gas and chemical companies face immediate risk of major catastrophic incidents and need to evaluate underlying risk factors and predictors of catastrophic incidents 2. Risk prediction of a facility has a direct correlation with process safety risk	Factors impacting the process safety risk are not discussed.

	Abimbola, M et al (2014)	Dynamic risk model only considers the consequence updating as a dynamic component. The frequency is calculated using fault trees	1. Risk to people impact is not calculated 2. Model uses fault tree and therefore the assessment is considered to be static. 3. Only fire and explosion is considered as a consequence. Toxic is not considered as a consequence.
	Khakzad , N et al (2012)	1. Usage of generic data prevents the analysis to be case-specific and introduces uncertainty to the results 2.Use of Bayes' theorem to update safety barriers of BT, directly affecting the probability of consequences and the estimated risk as a result	The study has been conducted based on an accident in a sugar refinery explosion. Moreover, the risk profile is correlated as a function of belt speed velocity, not for a drilling case.

	Meel,A et al (2006)	Bayesian Networks can be used to predict the probabilities of accidents	The results were tested against an exothermic reactor case, not for a drilling case.
	Kalantarnia, M et al (2009)	The comparison between conventional QRA and the results from dynamic failure assessment approach shows the significant deviation in system failure frequency throughout the life time of the process unit	1. Conventional QRA does not address the risk profile during the operation of a process unit. 2. The current model does not account for the safety barriers in the dynamic risk model.

Appendix 2 – Results of Expert Interviews

Variable number	Variable	Variable definition	Interviewee #1	Interviewee #2	Interviewee #3	Interviewee #4	Interviewee #5	Interviewee #6	Interviewee #7	Interviewee #8	Interviewee #9	Interviewee #10	Interviewee #11	Interviewee #12	Interviewee #13	Interviewee #14	Interviewee #15	Agreement (Total out of 15 respondents)
1	Functionality/ Reliability	Extent to which barrier performance measure yields the same results on repeated trials	YES	YES	YES	YES	YES (Consider re-wording to reliability)	YES (Consider definition modification- performance on repeated trials during operations through planned maintenance)	YES (Consider definition modification to fulfill the	YES	YES	YES	YES	YES	YES	YES	NO	14
2	Response time	Length of time taken for a barrier to react to a given stimulus or event	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES (modify definition to include system or equipment level)	14
3	Robustness	The ability of a safety barrier to perform effectively even when the underlying variables or assumptions are altered	YES	NO	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES (modify definition in the context of safety allowance)	YES	YES (modify definition even beyond design specification)	13
4	Triggering Event	A tangible or intangible barrier or occurrence that once breached or met, causes another event to occur	NO	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	NO	NO	NO	10
5	Capacity	Maximum limit to which the barrier can perform	YES	YES	YES	YES	YES	YES (Consider definition modification to how many times the task can be performed within the limit)	NO	YES	YES	YES	YES	YES	YES	YES	YES	14
6	Efficiency	Ratio of the useful work performed by a barrier to the total energy input	NO	NO	NO	NO	YES	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES (modify definition in the context of safety)	6
7	Ability to withstand loads	Ability to execute the safety function intended by the barrier without being destroyed	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES (Consider renaming to Fitness)	13
8	Integrity	Defined as a state of the barrier being whole or undivided	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO	YES	YES	13
9	Implementation delay	Delay in execution of an idea, it may refer to the process of setting up a new hardware / software after purchase is made	NO	YES	YES	NO	YES	YES	YES	NO	NO	NO	NO	YES	YES	NO	NO	7
10	Adequacy	Adequacy defines the extent to which a properly functioning Barrier will interrupt a particular scenario.	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	14
11	Safety critical tasks applicability	Defines the applicability of safety critical tasks for successful barrier performance	YES	YES	YES	YES	YES (suggest deletion of applicability word)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	15
12	Human dependance	Dependence on human action for barrier performance	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES	NO	YES	YES	YES (Consider renaming to Human factors)	13
13	Availability	Percentage of time a barrier is considered ready to use when tasked.	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES (modify definition- Percentage of time a barrier is available for use)	14
14	Validity	Refers to whether or not it measures what it is supposed to measure (execute the objective function of the safety barrier)	YES	YES	NO	YES	YES	YES	YES	NO	YES	YES	YES	NO	YES	NO	NO	10
15	Completeness	Having all the required characteristics to fulfil the function of safety barrier	YES	YES	YES	NO	YES	YES	NO	YES	YES	YES	YES	YES	YES	NO	NO	11
16	Maintainability	Measure of the ease and rapidity with which a safety barrier can be restored to operational status following a failure.	YES	YES	YES	YES	YES	YES (Consider definition modification- Following a failure or usage)	YES	YES	YES	NO	YES	YES	YES	YES (Redefine maintainability in the context of availability)	YES	14
17	Lagging indicators	Measure of past performance of the safety barriers	YES (definiton to include consideration of audit and past performance results)	YES	YES	YES (to consider results from previous drills conducted)	YES (Combination of near misses and failure events)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES (search for functional safety definition)	15
18	Effectiveness	Degree to which a barrier is successful in producing a desired result	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	13
19	Level of confidence during operation	Percentage of all possible safety barriers that can be expected to include the true population parameter (of a safety barrier)	YES	YES	YES	NO	YES	YES	YES	NO	NO	YES	YES	NO	YES	NO	NO	9

Appendix 03 - 200 inputs - Factor Analysis

Respondent details:	Company	Reliability	Response Time	Robustness	Triggering event	Capacity	Barrier Fitness	Integrity	Adequacy	Safety-Critical Tasks	Human Factors	Availability	Validity	Completeness	Maintainability	Lagging Indicators	Effectiveness	Barrier Level of Confidence During Operations	Error Promptness	Operational Complexity of the Barrier	Barrier Reputation	Barrier Test Simulation	Barrier Inter-Dependency	Barrier Redundancy	Impact of Safety Critical Tasks on Barriers	Survivability
Abdulla Humaid Al mheiri	GASCO	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Mohammed Al Ali	GASCO	Neutral	Agree	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Obaid Ahmed	ZADCO	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Neutral	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Neutral	Neutral	Agree	Disagree	Disagree	Strongly Agree	Strongly Agree
Meerah Al Mulla	Al Hosn Gas	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Neutral
Zeina A	ZADCO	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Neutral	Neutral	Strongly Agree
Mustafiz	QP	Neutral	Neutral	Agree	Neutral	Agree	Neutral	Neutral	Agree	Strongly Agree	Agree	Agree	Neutral	Neutral	Neutral	Agree	Agree	Agree	Neutral	Neutral	Neutral	Agree	Neutral	Agree	Neutral	Neutral
Noah al Hammadi	GASCO	Neutral	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Neutral	Strongly Agree	Agree	Strongly Agree	Neutral	Strongly Agree
Vugar Mursalov	GASCO	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Agree
Stephen Owens	GASCO	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
S. Ganesan	GASCO	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Agree	Agree	Neutral	Agree	Agree	Disagree	Disagree	Agree	Agree	Disagree	Disagree	Agree
Brian Henry	ZADCO	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Disagree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Neutral	Strongly Agree	Strongly Agree
Joseph Tubil	ESNAAD	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Mohammed Meheisen	Honeywell Industrial Safety LLC	Agree	Strongly Agree	Neutral	Agree	Neutral	Strongly Agree	Neutral	Disagree	Strongly Agree	Agree	Neutral	Strongly Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Neutral	Agree	Strongly Agree	Neutral	Disagree	Agree	Neutral
Ammar Maarouf	Al Masoud LLC	Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree
Ammar Maarouf	Al Masoud LLC	Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree
Katja Franz	Drager Safety	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Neutral	Neutral	Agree	Agree
Chris Aspeg	Intertek	Agree	Agree	Neutral	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Disagree	Neutral	Strongly Agree	Disagree	Neutral	Strongly Agree	Agree
Masoud Abdulla	Honeywell Industrial Safety LLC	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Disagree	Neutral	Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Neutral	Disagree	Neutral	Disagree
Muthu G.	Bin Saud LLC	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Ahmed Zabzala	3M LLC	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Disagree	Neutral	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Disagree	Agree
Ali Abu Saleek	ADNATCO	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree
Michael H	Intertek	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Neutral	Agree	Disagree	Agree	Neutral	Strongly Agree	Disagree	Agree	Strongly Agree	Strongly Agree	Disagree
Mina Aziz	NDC	Strongly Agree	Agree	Agree	Agree	Disagree	Disagree	Disagree	Disagree	Disagree	Agree	Agree	Neutral	Neutral	Neutral	Agree	Disagree	Agree	Agree	Agree	Agree	Agree	Agree	Disagree	Strongly Agree	Agree
M. Belacruz	Takreer	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Neutral	Neutral	Agree	Agree
Mohammed Yousef	3M LLC	Agree	Strongly Agree	Neutral	Agree	Neutral	Strongly Agree	Strongly Agree	Neutral	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Neutral	Disagree	Agree	Neutral	Agree	Strongly Agree	Agree	Strongly Agree	Neutral	Disagree	Agree	Neutral
Santhosh S	GASCO	Neutral	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Neutral	Agree	Agree	Agree	Agree
Nishum Bera	Blue Sea Consultants	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Agree	Agree	Neutral	Strongly Agree	Strongly Agree	Agree	Agree	Agree
Vanice N.	Blue Sea Consultants	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Nagabhushanam	Worley Parson	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Neutral	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Strongly Agree	Neutral
Svein Hillesland	Hothed ME	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Agree	Neutral	Agree	Agree	Agree
R N Seshan	GASCO	Agree	Strongly Agree	Agree	Neutral	Neutral	Agree	Strongly Agree	Agree	Agree	Disagree	Agree	Strongly Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Disagree	Strongly Agree	Agree	Neutral	Strongly Agree	Strongly Agree
Najeeba Hasan	PI	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Ahmed Alkhayyat	GASCO	Agree	Agree	Neutral	Agree	Neutral	Disagree	Agree	Disagree	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Neutral	Neutral	Agree	Agree	Agree
Arwa Mohammed Ghannam	PI	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
Prasad Shetty	PI	Agree	Strongly Agree	Neutral	Agree	Agree	Neutral	Neutral	Agree	Agree	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Neutral	Agree	Agree	Agree	Agree	Neutral	Agree
Moustafa Mohamed	ZADCO	Strongly Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Neutral	Strongly Agree	Strongly Agree	Disagree	Neutral	Strongly Agree	Agree	Neutral	Neutral	Strongly Agree	Agree	Neutral	Strongly Agree	Neutral	Agree	Neutral	Strongly Agree	Strongly Agree	Agree
Amna Hassan Ali	ADCO	Neutral	Neutral	Neutral	Neutral	Agree	Neutral	Neutral	Agree	Neutral	Agree	Neutral	Neutral	Agree	Neutral	Neutral	Agree	Agree	Neutral	Neutral	Agree	Neutral	Neutral	Neutral	Neutral	Agree
Salama A. Mazrouei	ZADCO	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Neutral	Neutral	Agree	Disagree	Neutral	Agree	Agree	Agree	Neutral	Strongly Agree	Neutral	Neutral	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Agree
Omar Abdullah	ZADCO	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Mohamed A. Ali	GASCO	Agree	Agree	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Sumayya Alhadhrami	ZADCO	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Neutral	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Strongly Agree
Obaid Al Matroosi	GASCO	Neutral	Neutral	Neutral	Neutral	Neutral	Agree	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
Salman A. Al Mazrouei	ZADCO	Neutral	Agree	Neutral	Agree	Agree	Neutral	Agree	Neutral	Agree	Agree	Neutral	Agree	Agree	Neutral	Agree	Neutral	Neutral	Agree	Agree	Agree	Neutral	Agree	Disagree	Agree	Neutral
Sudip	XXX	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Mordjani Abdesslam	NDC	Agree	Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Disagree	Strongly Agree	Agree	Agree	Agree	Neutral	Neutral	Strongly Disagree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree
Rubin	NDC	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
ibrahim rawashdeh	NDC	Agree	Agree	Neutral	Agree	Agree	Neutral	Disagree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree
Zaina Al Hashemi	ZADCO	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Disagree	Agree	Agree	Agree	Agree	Neutral	Agree	Strongly Disagree	Agree	Neutral	Disagree	Agree	Agree	Disagree	Neutral	Neutral
Mona Esmael	ADCO	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Ismael AlMarzooqi	ADGAS	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Rajneesh Kumar	IRCA	Agree	Strongly Agree	Disagree	Agree	Strongly Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Agree	Disagree	Neutral	Agree	Agree	Agree	Strongly Agree
Omar Al Hammadi	ADCO	Agree	Agree	Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree
Ramu Gandhi	ADCO	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Disagree	Neutral	Strongly Agree	Strongly Agree	Disagree	Disagree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Disagree	Strongly Agree	Strongly Agree	Strongly Agree
Mohammed Rizwan	ADCO	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Disagree	Neutral	Agree	Strongly Agree	Disagree	Disagree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Disagree	Agree	Strongly Agree	Agree
Leena Pathrabe	-	Agree	Agree	Agree	Agree	Neutral	Neutral	Neutral	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Neutral	Neutral	Agree	Agree	Neutral	Agree	Agree
Yilmaz	ADMA-OPCO	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree
Maryam	Alhosn Gas	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Neutral	Neutral	Strongly Agree	Neutral	Agree	Neutral	Agree	Neutral	Neutral	Agree	Agree	Neutral	Neutral	Agree	Neutral	Neutral	Neutral	Neutral
Ian Dutton	Retired	Agree	Agree	Agree	Neutral	Neutral	Strongly Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Agree	Disagree	Neutral	Agree	Agree	Strongly Agree	Disagree	Disagree
abdulla karmastaji	ADNOC	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Ravi Venkateswaran	Formerly with Hardy Oil and Gas	Strongly Agree	Agree	Strongly Agree	Agree	Neutral	Neutral	Strongly Agree	Neutral	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Neutral	Neutral	Disagree	Agree	Neutral	Agree
Panneer Selvam	Cairn India Ltd	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Strongly Agree
S Ulaganathan	Hardy E&P India Inc, Chennai	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Disagree	Agree	Strongly Agree	Agree	Neutral	Neutral	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Disagree	Agree	Strongly Agree	Agree	Agree	Agree
Babu Manohar	ADCO	Neutral	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree
Abdularhman	Adco	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Agree	Disagree	Disagree	Disagree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree
Tapan Shukla	WorleyParsons	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Neutral	Agree	Agree	Neutral	Agree	Neutral	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Rajagopal Kannan	Al Hosn Gas	Agree	Agree	Neutral	Agree	Disagree	Agree	Agree	Disagree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Disagree
Zubair Ansari	DNV GL	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Wasee Akhtar	-	Agree	Strongly Agree	Agree	Disagree	Disagree	Strongly Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Neutral	Disagree	Disagree	Strongly Agree	Neutral	Agree	Disagree	Disagree	Agree	Disagree	Disagree	Agree	Strongly Agree
Naser Husain Alawi Abu Bake	EAD	Agree	Agree	Agree	Neutral	Neutral	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Neutral	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Neutral	Neutral	Agree	Strongly Agree
Sumit Bhat	ERM	Agree	Agree	Agree	Disagree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Neutral	Agree	Agree	Neutral	Neutral	Agree	Agree	Agree	Agree
Eelaine Boo	Risktec Solutions DMCC	Agree	Agree	Neutral	Agree	Agree	Neutral	Disagree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree
Tahir Siddiqui	Risktec	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Neutral	Strongly Agree	Agree	Neutral	Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree
Raunak Kabra	Risktec Solutions	Strongly Agree	Agree	Neutral	Agree	Neutral	Agree	Neutral	Neutral	Neutral	Disagree	Strongly Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Neutral	Neutral	Agree	Strongly Agree	Agree	Disagree	Neutral	Neutral	Agree
Cleopatra Ong	Risktec Solution Limited	Agree	Neutral	Agree	Agree	Neutral	Agree	Agree	Disagree	Strongly Agree	Strongly Agree	Agree	Agree	Disagree	Agree	Agree	Agree	Neutral	Neutral	Agree	Agree	Neutral	Agree	Disagree	Agree	Neutral
Baptiste Ellias	Risktec Solutions	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Disagree	Agree	Strongly Agree	Agree	Agree	Strongly Agree
David McDade	Risktec Solutions	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Agree	Strongly Agree	Neutral	Agree	Strongly Agree	Agree	Strongly Agree	Agree
Divya	Risktec	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Neutral	Strongly Agree	Agree	Neutral	Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree
Antoine	Risktec	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree
Debashish Dash	ERM	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Strongly Agree
Chithra Chakra	The Petroleum Institute	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Agree	Strongly Agree
Muhammad Sajjad Rana	Bureau Veritas	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Aashish Choradia	Bureau Veritas	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Neutral	Disagree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Manish Khadakkar	DNV	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree
John Robert Taylor	Denmarks Technical University	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Shaili varma	Total Oil India Pvt. Limited	Agree	Neutral	Agree	Neutral	Neutral	Agree	Neutral	Neutral	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree
Priya	DNV	Agree	Strongly Agree	Agree	Agree	Disagree	Neutral	Agree	Disagree	Agree	Agree	Neutral	Agree	Neutral	Disagree	Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Neutral	Agree	Disagree	Agree	Disagree
Dr Parashu Uniyal	AHG	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Ramachandran Sivalingam	BUREAU VERITAS S.A. - ABU DHABI E	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree
Velmurugan Renganathan	Abu Dhabi Oil Company (Japan) Ltd.,	Agree	Strongly Agree	Agree	Agree	Disagree	Neutral	Agree	Disagree	Agree	Agree	Neutral	Agree	Neutral	Disagree	Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Neutral	Agree	Disagree	Agree	Disagree
Parag Diwan	Paradigm Consulting	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Agree	Strongly Agree
Jyoti Bisoi	Freelance HSE Engineer	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Agree
Anand George	Bureau Veritas	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Disagree	Agree	Strongly Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Disagree	Neutral	Agree	Agree	Neutral	Agree	Agree
Andrea	IQ Oil and GAs	Neutral	Agree	Strongly Agree	Disagree	Neutral	Agree	Agree	Agree	Disagree	Neutral	Neutral	Agree	Agree	Neutral	Disagree	Agree	Agree	Neutral	Neutral	Neutral	Neutral	Agree	Strongly Agree	Neutral	Strongly Agree
Ravi Chitkala	ADCO	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Neutral	Agree	Neutral	Agree
Manikandan	ADCO	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Disagree	Agree	Strongly Agree
Viswasri Pendyala	ADCO	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Disagree	Strongly Agree	Agree	Strongly Agree	Strongly Disagree	Strongly Disagree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree
Sundara Cholan	Bureau Veritas	Neutral	Agree	Agree	Agree	Neutral	Agree	Agree	Neutral	Agree	Strongly Agree	Disagree	Disagree	Agree	Agree	Neutral	Neutral	Agree	Disagree	Agree	Neutral	Agree	Neutral	Agree	Agree	Agree
abinash kumar	bureau veritas	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Syed Asim Nabi	Bureau Veritas	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
Stan Gustas	AAC	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Disagree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Disagree	Disagree	Strongly Agree	Strongly Agree	Disagree	Disagree	Agree	Disagree
Rowena Alvares	Vanguard Solutions	Agree	Agree	Neutral	Disagree	Strongly Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Neutral	Neutral	Agree	Neutral	Strongly Agree	Agree	Disagree	Agree	Agree
David Lawrence	Al Hosn Gas	Neutral	Agree	Strongly Agree	Disagree	Neutral	Agree	Agree	Agree	Disagree	Neutral	Neutral	Agree	Agree	Neutral	Disagree	Agree	Agree	Neutral	Neutral	Neutral	Neutral	Agree	Strongly Agree	Neutral	Strongly Agree
Archana Rawat	Al Hosn Gas	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Agree	Neutral	Agree	Agree
Linda A. Jose	Dash Inspectorate P L	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree

senthil palaniappan	apache corp	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Medhat Al Habsi	Al Hosn Gas	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Khaled Rion	MI Services	Neutral	Agree	Strongly Agree	Disagree	Neutral	Agree	Agree	Agree	Disagree	Neutral	Neutral	Agree	Agree	Neutral	Disagree	Agree	Agree	Neutral	Neutral	Neutral	Neutral	Agree	Strongly Agree	Neutral	Strongly Agree
Venkatnarayanan S	Shell	Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree
Srinivasan K	DNVGL	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Disagree	Neutral	Agree	Agree	Strongly Agree	Neutral
Koheila M	DNVGL	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Disagree	Agree	Strongly Agree	Agree	Neutral	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Disagree	Neutral	Agree	Agree	Neutral	Agree	Agree
Vikas Naik	DNVGL	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree
Manish K	DNVGL	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Neutral	Neutral	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Waseem Akhtar	DNVGL	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Debashish D	ERM	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Strongly Agree
Jyoti Bisoi	DNVGL	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree
Deepshikha	Vectra LLC	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Agree
Sahar Dorosthi	Technip	Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree
Mina K	Darya Pala Engineering Company	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree
Wael M	Qatar Gas	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree
Faraj A	Exxon Mobil	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Mahmoud	Lukoil	Neutral	Agree	Agree	Agree	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Neutral	Agree	Neutral	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
K.Oleg	Lukoil	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Yuri Beloson	Lukoil	Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Neutral	Agree	Neutral	Neutral	Agree	Neutral	Neutral	Agree	Neutral	Agree	Disagree
Konstantin K	JSC	Disagree	Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Disagree	Agree	Disagree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Disagree	Disagree	Agree	Disagree
Andrey S	Eurasia drilling	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree
Mohamed G	PDO	Agree	Strongly Disagree	Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Disagree	Strongly Agree	Disagree	Strongly Agree	Strongly Agree	Strongly Agree
Girolamo B	Al Hosn Gas	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Disagree	Disagree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree
Vishal Agarwal	Halliburton	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree
Jayasharadha C	SLB	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree
Shivam Mishra	KOC	Disagree	Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Disagree	Agree	Disagree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Disagree	Disagree	Agree	Disagree
Rashmi Gupta	Xodus Group	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Neutral	Neutral	Agree	Neutral	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Neutral	Agree	Neutral	Neutral	Neutral	Neutral	Neutral	Agree
Satish Thorwe	Shell	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Yash Gupta	Shell	Strongly Agree	Agree	Neutral	Disagree	Disagree	Agree	Agree	Neutral	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
Prabudh Dwivedi	Shell	Neutral	Agree	Strongly Agree	Agree	Agree	Neutral	Disagree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Sukesh Ganda	SLB	Strongly Agree	Strongly Agree	Strongly Agree	Disagree	Disagree	Agree	Strongly Agree	Neutral	Agree	Disagree	Strongly Agree	Neutral	Agree	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Neutral	Neutral	Disagree	Neutral	Agree
Kopal Agarwal	SLB	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Mohit Kumar	Hindustan Oil Exploration Company	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree
Rohan Iyer	RIL	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree
Ankit Joshi	RIL	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Neutral	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Disagree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Neutral	Agree	Neutral	Disagree	Neutral	Agree
Paritosh Sethi	Sun Drilling LLP	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Disagree
Vishal Kumar	RIL	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
Sidhant Virmani	RIL	Neutral	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Neutral	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Agree	Neutral	Strongly Agree
Varun Asthana	Greka Drilling Limited	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Neutral	Neutral	Neutral	Strongly Agree	Strongly Agree	Neutral	Strongly Agree
Mohamed Ashraf	DEA Deutsche Erodel AG	Neutral	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Neutral	Agree	Neutral	Agree	Neutral	Neutral	Neutral	Agree	Agree
Kinzie Beavers	WPXEnergy	Strongly Agree	Agree	Agree	Neutral	Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Keith Chapman	Premier Directional Drilling	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Agree
George Marshall	Megadrill Nigeria	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree
Ugasciny A.	Weatherford	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Strongly Agree
Kapil Agarwal	ONGC	Neutral	Agree	Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Disagree	Strongly Agree	Disagree	Disagree	Disagree	Agree	Agree	Agree	Neutral	Neutral	Agree	Disagree	Disagree
S.K. Choudhary	ONGC	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Neutral	Neutral	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
ElRasheed M	ADMA	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree
Dayanand Wasate	Oil Field Instrumentation	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Disagree	Disagree	Agree	Strongly Agree	Agree	Neutral	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Disagree	Neutral	Agree	Agree	Neutral	Agree	Agree
Pervez Ahmed	SGS	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Disagree	Neutral	Agree	Agree	Strongly Agree	Neutral
Ratnab Sinha	ONGC	Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree
Akshat Tarate	North Shore Atlantic	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
Kiran Padman	ONGC	Neutral	Agree	Strongly Agree	Disagree	Neutral	Agree	Agree	Agree	Agree	Disagree	Neutral	Neutral	Agree	Agree	Neutral	Disagree	Agree	Agree	Neutral	Neutral	Neutral	Neutral	Agree	Strongly Agree	Neutral	Strongly Agree
Hicham Hebaichi	DNVGL	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree
Ismail A. Zarooni	Al Hosn Gas	Neutral	Agree	Agree	Agree	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Neutral	Agree	Neutral	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree
Sama AlHallaq	AlHosngas	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Sara taha	Al Hosn Gas	Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree
Lora Douss	Al Hosn Gas	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree
Arwa	PI	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Meera Al Marzooqi	Al Hosn Gas	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree
VIDYA	Al Hosn Gas	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Salem AlKaabi	Al hosn Gas	Neutral	Agree	Agree	Agree	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Neutral	Agree	Neutral	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree
Sara Khamis	Alhosn gas	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Sridhar Gopalan	ZADCO	Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Neutral	Neutral	Agree	Neutral	Agree	Disagree
Prakash K	Al Hosn Gas	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Agree	Agree
Chandra Sekhar Mandal	ADCO	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree
Ravikanth Kallakuri	Dolphin	Agree	Strongly Disagree	Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Disagree	Strongly Agree	Disagree	Strongly Agree	Strongly Agree	Strongly Agree
MOHANRAJ	WORLEYPARSONS	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Disagree	Disagree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree
Karthikeyan Subbiah	Qatar Petroleum	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree
Vikram Saigal	HPCL Mittal Energy Ltf	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree
Neethu Mary Jacob	D'Appolonia	Disagree	Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Disagree	Disagree	Agree	Disagree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Agree	Strongly Agree	Agree	Disagree	Disagree	Agree	Disagree
Krishn Kumar	Wipro	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Neutral	Neutral	Neutral	Agree	Neutral	Neutral	Neutral	Neutral	Agree	Agree	Neutral	Neutral	Agree	Neutral	Neutral	Neutral	Neutral	Neutral	Agree
Amey Kulkarni	ADNOC	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Vishal Shah	Al Hosn Gas	Strongly Agree	Agree	Neutral	Disagree	Disagree	Agree	Agree	Neutral	Neutral	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
Arunkumar	ConocoPhillips	Neutral	Agree	Strongly Agree	Agree	Agree	Neutral	Disagree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Azhagiri Basavarajan Mangala	Qatar Petroleum	Strongly Agree	Strongly Agree	Strongly Agree	Disagree	Disagree	Agree	Strongly Agree	Neutral	Neutral	Agree	Disagree	Strongly Agree	Neutral	Agree	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Neutral	Neutral	Disagree	Neutral	Agree
Patricio V. Rivera	Al Hosn Gas	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Clarence Rodrigues	Petroleum Instirute	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree
Dr. Rodney J. Simmons	The Petroleum Institute	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree
Adarah	Written Success	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Neutral	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Disagree	Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Neutral	Agree	Neutral	Disagree	Neutral	Agree
BOLLINA CHITTIYYA	AL HOSN GAS	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Disagree
Guodong Sun	Al Hosn Gas	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
adam azzi	Al Hosn gas	Neutral	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Neutral	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Agree	Neutral	Strongly Agree
Sorin Vlad	Al Hosn Gas	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Neutral	Neutral	Neutral	Strongly Agree	Strongly Agree	Neutral	Strongly Agree
Adel Mansour	Al Hosn GAs	Neutral	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree	Neutral	Neutral	Agree	Neutral	Agree	Neutral	Neutral	Neutral	Agree	Agree
Brian Bielss	Al Hosn Gas	Strongly Agree	Agree	Agree	Neutral	Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Tipu Jibran Zafar	Al Hosn Gas	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Agree
Kenny Hammon	Al Hosn Gas	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree
Festus Hagan	Al Hosn Gas	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Strongly Agree
Michael Kingdom	Miprosafe Services Limited	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
raja	bureau veritas	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Neutral	Neutral	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Sudha	ADNOC	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree
NAMANE LECHEHEB	ADGAS	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Disagree	Disagree	Agree	Strongly Agree	Agree	Neutral	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Disagree	Neutral	Agree	Agree	Neutral	Agree	Agree
Mohamed Said Faidi	ADNOC	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree	Disagree	Agree	Agree	Agree	Agree	Disagree	Neutral	Agree	Agree	Strongly Agree	Neutral
Ben Boardman	Al Hosn Gas	Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree
Gordhan Bhatia	Al Hosn Gas	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
Andrew Bradley	Al Hosn Gas	Neutral	Agree	Strongly Agree	Disagree	Neutral	Agree	Agree	Agree	Agree	Disagree	Neutral	Neutral	Agree	Agree	Neutral	Disagree	Agree	Agree	Neutral	Neutral	Neutral	Neutral	Agree	Strongly Agree	Neutral	Strongly Agree

Appendix 04 – Survey Questionnaire

Reliability – The extent to which barrier performance measure yields the same results on repeated trials during operations is a critical factor in safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Response Time – The length of time taken for a barrier at system or equipment level to react to a given stimulus / event is a critical component in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Robustness - The ability of a safety barrier to perform effectively even when the underlying variables or assumptions are altered in the context of safety allowances defined between operating and design limits is a critical factor in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Triggering event - The event or condition that triggers the activation of a barrier is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Capacity – The number of times the intended task can be performed by the intended barrier within its limits is a critical component in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Barrier Fitness – The ability to execute the safety function intended by the barrier without being destroyed is a critical factor in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Integrity - The ability of a safety barrier to remain whole or functional until conclusion of the event is a critical consideration in evaluating safety barrier performance for onshore drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Adequacy – The extent to which a properly functioning barrier will interrupt a particular scenario is a critical factor in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Safety-Critical Tasks - The range and scale of safety critical tasks required for successful barrier performance is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Human Factors – The required level of dependence on human action for successful barrier performance is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Availability – The percentage of time a barrier is considered ready to use when tasked (aka "up-time") is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Validity – The ability for a barrier to function / fulfill requirements upon demand is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Completeness - Having all the required characteristics to fulfill the function of a safety barrier is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral

- Agree
- Strongly Agree

Maintainability – The measure of the ease and rapidity with which a safety barrier can be restored to operational status following a failure or usage is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Lagging Indicators - The measure of past performance of the safety barriers is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Effectiveness – The degree to which a barrier is successful in producing a desired result is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Barrier Level of Confidence During Operations – The percentage of all possible safety barriers that can be expected to include the true population parameter (of a safety barrier) is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree

- Strongly Agree

Error Promptness - The feature of the barriers to alert the barrier owner of a potential error in the near future is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Operational Complexity of the Barrier - The feature of an operation that is difficult to understand or lacking simplicity is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Barrier Reputation – The widespread belief that the safety barrier has a particular characteristic function or did not function on demand is a critical factor in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Barrier Test Simulation - The performance results of the barriers in a test environment to the exact conditions the barrier has a possibility to be subjected has a critical impact on the opinion of an operation in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Barrier Inter-Dependency - The mutual dependence between barriers of two or more groups is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Barrier Redundancy - The inclusion of additional barriers which are not strictly necessary to functioning (in case of failure of other barriers) is a critical consideration in evaluating the primary safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Impact of Safety Critical Tasks on Barriers – The critical activities required to be conducted on the barriers, which impact the barrier performance, is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Survivability – The protection required by a barrier or equipment item to ensure continued operation during a major incident is a critical consideration in evaluating safety barrier performance for onshore gas drilling operations.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Respondent details:	Reliability	Response Time	Robustness	Triggering event	Capacity	Barrier Fitness	Integrity	Adequacy
Sama AlHallaq	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree
Sara taha	Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Strongly Agree	Agree
Lora Douss	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree
Arwa	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree
Meera Al Marzooqi	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree
VIDYA	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Salem AlKaabi	Neutral	Agree	Agree	Agree	Neutral	Agree	Agree	Neutral
Sara Khamis	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Sridhar Gopalan	Agree	Agree	Agree	Strongly Agree	Agree	Neutral	Agree	Agree
Prakash K	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree
Chandra Sekhar Mandal	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree
Ravikanth Kallakuri	Agree	Strongly Disagree	Agree	Agree	Disagree	Agree	Agree	Agree
MOHANRAJ	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Karthikeyan Subbiah	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Vikram Saigal	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree
Neethu Mary Jacob	Disagree	Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Disagree
Krishn Kumar	Neutral	Agree	Agree	Neutral	Neutral	Neutral	Agree	Neutral
Amey Kulkarni	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Vishal Shah	Strongly Agree	Agree	Neutral	Disagree	Disagree	Agree	Agree	Neutral
Arunkumar	Neutral	Agree	Strongly Agree	Agree	Agree	Neutral	Disagree	Agree
Azhagiri Basavarajan Mangalam	Strongly Agree	Strongly Agree	Strongly Agree	Disagree	Disagree	Agree	Strongly Agree	Neutral
Patricio V. Rivera	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Clarence Rodrigues	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Agree	Agree
Dr. Rodney J. Simmons	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree
Adarah	Strongly Agree	Strongly Agree	Strongly Agree	Neutral	Neutral	Strongly Disagree	Strongly Agree	Strongly Agree
BOLLINA CHITTIYYA	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree
Guodong Sun	Strongly Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
adam azzi	Neutral	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree
Sorin Vlad	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Adel Mansour	Neutral	Agree	Agree	Neutral	Agree	Agree	Agree	Agree
Brian Bielss	Strongly Agree	Agree	Agree	Neutral	Agree	Neutral	Strongly Agree	Strongly Agree
Tipu Jibran Zafar	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree
Kenny Hammon	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Festus Hagan	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Michael Kingdom	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
raja	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree
Sudha	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree
NAMANE LECHEHEB	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Disagree
Mohamed Said Faidi	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree
Ben Boardman	Agree	Agree	Agree	Neutral	Agree	Strongly Agree	Agree	Agree
Gordhan Bhatia	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Andrew Bradley	Neutral	Agree	Strongly Agree	Disagree	Neutral	Agree	Agree	Agree

Respondent details:	Safety-Critical Tasks applicability	Human Factors	Availability	Validity	Completeness	Maintainability	Lagging Indicators	Effectiveness
Sama AlHallaq	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Strongly Agree	Strongly Agree
Sara taha	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree	Strongly Agree	Agree
Lora Douss	Strongly Agree	Neutral	Agree	Agree	Agree	Strongly Agree	Agree	Agree
Arwa	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Meera Al Marzooqi	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree
VIDYA	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Salem AlKaabi	Neutral	Agree	Agree	Neutral	Neutral	Agree	Neutral	Agree
Sara Khamis	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Sridhar Gopalan	Agree	Agree	Neutral	Neutral	Agree	Neutral	Agree	Agree
Prakash K	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree
Chandra Sekhar Mandal	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree
Ravikanth Kallakuri	Agree	Agree	Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
MOHANRAJ	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Karthikeyan Subbiah	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
Vikram Saigal	Agree	Agree	Agree	Neutral	Agree	Agree	Agree	Agree
Neethu Mary Jacob	Agree	Disagree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree
Krishn Kumar	Neutral	Agree	Neutral	Neutral	Neutral	Neutral	Agree	Agree
Amey Kulkarni	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Vishal Shah	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Neutral
Arunkumar	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree	Agree	Strongly Agree
Azhagiri Basavarajan Mangalam	Agree	Disagree	Strongly Agree	Neutral	Agree	Neutral	Agree	Agree
Patricio V. Rivera	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Clarence Rodrigues	Agree	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree
Dr. Rodney J. Simmons	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Agree	Agree
Adarah	Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Disagree	Agree	Strongly Agree
BOLLINA CHITTIYYA	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Guodong Sun	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
adam azzi	Strongly Agree	Strongly Agree	Neutral	Neutral	Agree	Strongly Agree	Agree	Agree
Sorin Vlad	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Adel Mansour	Agree	Agree	Agree	Agree	Agree	Neutral	Neutral	Agree
Brian Bielss	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Neutral	Agree
Tipu Jibran Zafar	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Disagree	Agree
Kenny Hammon	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree
Festus Hagan	Agree	Neutral	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Michael Kingdom	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
raja	Strongly Agree	Neutral	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Sudha	Agree	Neutral	Strongly Agree	Strongly Agree	Agree	Agree	Agree	Agree
NAMANE LECHEHEB	Agree	Strongly Agree	Agree	Neutral	Agree	Neutral	Agree	Strongly Agree
Mohamed Said Faidi	Agree	Neutral	Agree	Agree	Agree	Agree	Disagree	Agree
Ben Boardman	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Neutral	Agree	Strongly Agree
Gordhan Bhatia	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Andrew Bradley	Disagree	Neutral	Neutral	Agree	Agree	Neutral	Disagree	Agree

Respondent details:	Barrier Level of Confidence During Operations	Error Promptness	Operational Complexity of the Barrier	Barrier Reputation	Barrier Test Simulation	Barrier Inter-Dependency	Barrier Redundancy	Impact of Safety Critical Tasks on Barriers	Survivability
Sama AlHallaq	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Sara taha	Agree	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree
Lora Douss	Strongly Agree	Agree	Agree	Agree	Agree	Strongly Agree	Neutral	Agree	Agree
Arwa	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Meera Al Marzooqi	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Agree	Agree
VIDYA	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Salem AlKaabi	Neutral	Agree	Agree	Agree	Agree	Agree	Neutral	Agree	Agree
Sara Khamis	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Sridhar Gopalan	Neutral	Neutral	Agree	Neutral	Neutral	Agree	Neutral	Agree	Disagree
Prakash K	Agree	Agree	Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Agree	Agree
Chandra Sekhar Mandal	Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree
Ravikanth Kallakuri	Agree	Agree	Agree	Disagree	Strongly Agree	Disagree	Strongly Agree	Strongly Agree	Strongly Agree
MOHANRAJ	Neutral	Disagree	Disagree	Agree	Strongly Agree	Agree	Agree	Agree	Strongly Agree
Karthikeyan Subbiah	Agree	Strongly Agree	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree
Vikram Saigal	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Agree	Strongly Agree
Neethu Mary Jacob	Neutral	Strongly Agree	Agree	Strongly Agree	Agree	Disagree	Disagree	Agree	Disagree
Krishn Kumar	Neutral	Neutral	Agree	Neutral	Neutral	Neutral	Neutral	Neutral	Agree
Amey Kulkarni	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Vishal Shah	Neutral	Agree	Neutral	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
Arunkumar	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Azhagiri Basavarajan Mangalam	Neutral	Neutral	Neutral	Agree	Neutral	Neutral	Disagree	Neutral	Agree
Patricio V. Rivera	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
Clarence Rodrigues	Neutral	Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Agree
Dr. Rodney J. Simmons	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree
Adarah	Neutral	Strongly Agree	Agree	Neutral	Agree	Neutral	Disagree	Neutral	Agree
BOLLINA CHITTIYYA	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Disagree	Strongly Disagree
Guodong Sun	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
adam azzi	Agree	Agree	Agree	Neutral	Strongly Agree	Agree	Agree	Neutral	Strongly Agree
Sorin Vlad	Agree	Strongly Agree	Neutral	Neutral	Neutral	Strongly Agree	Strongly Agree	Neutral	Strongly Agree
Adel Mansour	Neutral	Agree	Neutral	Agree	Neutral	Neutral	Neutral	Agree	Agree
Brian Bielss	Agree	Agree	Strongly Agree	Neutral	Agree	Agree	Strongly Agree	Strongly Agree	Strongly Agree
Tipu Jibran Zafar	Agree	Agree	Agree	Strongly Agree	Strongly Agree	Neutral	Agree	Agree	Agree
Kenny Hammon	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree	Agree	Agree
Festus Hagan	Strongly Agree	Agree	Neutral	Strongly Agree	Strongly Agree	Neutral	Strongly Agree	Agree	Strongly Agree
Michael Kingdom	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree	Agree
raja	Neutral	Neutral	Neutral	Strongly Disagree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree	Strongly Agree
Sudha	Strongly Agree	Neutral	Agree	Agree	Agree	Agree	Agree	Strongly Agree	Agree
NAMANE LECHEHEB	Agree	Agree	Disagree	Neutral	Agree	Agree	Neutral	Agree	Agree
Mohamed Said Faidi	Agree	Agree	Agree	Disagree	Neutral	Agree	Agree	Strongly Agree	Neutral
Ben Boardman	Agree	Agree	Agree	Agree	Strongly Agree	Agree	Agree	Strongly Agree	Agree
Gordhan Bhatia	Strongly Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree	Agree	Strongly Agree	Strongly Agree
Andrew Bradley	Agree	Neutral	Neutral	Neutral	Neutral	Agree	Strongly Agree	Neutral	Strongly Agree

Appendix 6 - KMO and Bartlett's Test Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.83386502
Bartlett's Test of Sphericity	Approx. Chi-Square	1762.25153
	df	300
	Sig.	4.387E-205

Appendix 7 - Correlation Matrix

Correlation Matrix

		Reliability	Response Time	Robustness	Triggering event	Capacity	Barrier Fitness	Integrity	Adequacy	Safety-Critical Tasks	Human Factors	Availability	Validity	Completeness	Maintainability	Lagging Indicators	Effectiveness	Barrier Level of Confidence During Operations	Error Promptness	Operational Complexity of the Barrier	Barrier Reputation	Barrier Test Simulation	Barrier Inter-Dependency	Barrier Redundancy	Impact of Safety Critical Tasks on Barriers	Survivability
Correlation	Reliability	1	0.346228989	0.253299507	0.154745081	0.308847496	0.185028522	0.376247443	0.303169859	0.38607996	0.172777412	0.46776189	0.355681011	0.364385124	0.167233455	0.23422529	0.271403976	0.24822051	0.238026201	0.210413499	0.12658407	0.203942323	0.277252168	0.156494096	0.254472794	0.200815799
	Response Time	0.346228989	1	0.274214566	0.228589844	0.295098545	0.292115692	0.411264806	0.214748966	0.300787111	0.113610754	0.268211376	0.300558796	0.288604701	0.160042608	0.090401429	0.249595059	0.245431214	0.254695363	0.123818477	0.134343389	0.176312311	0.245249325	0.084146724	0.040478439	0.110826715
	Robustness	0.253299507	0.274214566	1	0.122035434	0.172146734	0.232792615	0.287043625	0.276114927	0.178260739	0.07601783	0.239846099	0.214666177	0.255145286	0.238013921	0.205922427	0.359639927	0.235237232	0.192700901	0.041283247	0.093174562	0.137362358	0.126827208	0.28240206	0.055874618	0.176683437
	Triggering event	0.154745081	0.228589844	0.122035434	1	0.376584921	0.207160837	0.22861185	0.17483327	0.428347971	0.139146392	0.134125058	0.181325011	0.284912492	0.393704269	0.345744478	0.301669033	0.265608963	0.249942986	0.114703521	0.075810902	0.305279238	0.185477441	0.155751068	0.206329289	0.015934272
	Capacity	0.308847496	0.295098545	0.172146734	0.376584921	1	0.331475254	0.269905727	0.379734551	0.300002035	0.239939027	0.283210831	0.24826869	0.466812552	0.306363655	0.195980228	0.20859904	0.37121579	0.363902637	0.242172303	0.26399631	0.319188399	0.313219366	0.240482052	0.144365064	0.208687916
	Barrier Fitness	0.185028522	0.292115692	0.232792615	0.207160837	0.331475254	1	0.40165943	0.187837801	0.380874522	-0.003127169	0.259516289	0.443929971	0.523854289	0.374732266	0.22368814	0.395880847	0.192951196	0.313082816	0.153195647	0.160224224	0.383087269	0.165690326	0.256833153	0.223238237	0.160751486
	Integrity	0.376247443	0.411264806	0.287043625	0.22861185	0.269905727	0.40165943	1	0.345202927	0.358887274	0.260258927	0.368584924	0.389684729	0.414155232	0.250080549	0.399784307	0.395950191	0.136730171	0.342053534	0.119909223	0.053366373	0.257691368	0.209557311	0.179084555	0.168322583	0.238192839
	Adequacy	0.303169859	0.214748966	0.276114927	0.17483327	0.379734551	0.187837801	0.345202927	1	0.270756526	0.142007021	0.314025134	0.341431219	0.338375138	0.336364404	0.168323228	0.245592392	0.164113132	0.172326381	0.252183302	0.213943511	0.227867509	0.250251513	0.414622152	0.395392461	0.536495297
	Safety-Critical Tasks	0.38607996	0.300787111	0.178260739	0.428347971	0.300002035	0.380874522	0.358887274	0.270756526	1	0.216527994	0.391420842	0.406694771	0.360627737	0.361051288	0.445108527	0.40557888	0.287761934	0.378423446	0.292214932	0.103570594	0.310657387	0.312059136	0.175919771	0.330952273	0.134574871
	Human Factors	0.172777412	0.113610754	0.07601783	0.139146392	0.239939027	-0.003127169	0.260258927	0.142007021	0.216527994	1	0.266582099	0.040616397	0.070940027	0.196689067	0.291326265	0.177831602	0.228616854	0.383083128	0.205139473	0.132243088	0.234751183	0.321213306	0.277264605	0.12732824	0.185077392
	Availability	0.46776189	0.268211376	0.239846099	0.134125058	0.283210831	0.259516289	0.368584924	0.314025134	0.391420842	0.266582099	1	0.473861444	0.315724416	0.383569924	0.462934751	0.320372115	0.228076874	0.44051202	0.213075316	0.166236713	0.375869798	0.280754526	0.209115805	0.271969494	0.311470115
	Validity	0.355681011	0.300558796	0.214666177	0.181325011	0.24826869	0.443929971	0.389684729	0.341431219	0.406694771	0.040616397	0.473861444	1	0.535472554	0.438796938	0.312518879	0.346062529	0.316394081	0.44050412	0.251346839	0.153633063	0.352540398	0.16692298	0.290098591	0.354894054	0.239041978
	Completeness	0.364385124	0.288604701	0.255145286	0.284912492	0.466812552	0.523854289	0.414155232	0.338375138	0.360627737	0.070940027	0.315724416	0.535472554	1	0.346509918	0.282209392	0.39194196	0.37857191	0.443418003	0.201746617	0.203071275	0.362640356	0.146624385	0.271089557	0.300353695	0.247420397
	Maintainability	0.167233455	0.160042608	0.238013921	0.393704269	0.306363655	0.374732266	0.250080549	0.336364404	0.361051288	0.196689067	0.383569924	0.438796938	0.346509918	1	0.473701627	0.228143496	0.362631689	0.280280358	0.209721989	0.130576247	0.328661105	0.232988556	0.366901234	0.194904523	0.219942952
	Lagging Indicators	0.23422529	0.090401429	0.205922427	0.345744478	0.195980228	0.22368814	0.399784307	0.168323228	0.445108527	0.291326265	0.462934751	0.312518879	0.282209392	0.473701627	1	0.34683205	0.302055194	0.325084136	0.148941996	0.187358131	0.335635746	0.261427466	0.147338345	0.188836688	0.162769212
	Effectiveness	0.271403976	0.249595059	0.359639927	0.301669033	0.20859904	0.395880847	0.395950191	0.245592392	0.40557888	0.177831602	0.320372115	0.346062529	0.39194196	0.228143496	0.34683205	1	0.308776607	0.340106976	0.143662659	0.009571861	0.380995231	0.114675394	0.206972146	0.301523492	0.255806745
	Barrier Level of Confidence During Operations	0.24822051	0.245431214	0.235237232	0.265608963	0.37121579	0.192951196	0.136730171	0.164113132	0.287761934	0.228616854	0.228076874	0.316394081	0.37857191	0.362631689	0.302055194	0.308776607	1	0.348009363	0.342357779	0.262542724	0.36824993	0.245749703	0.364086461	0.257247656	0.221086909
	Error Promptness	0.238026201	0.254695363	0.192700901	0.249942986	0.363902637	0.313082816	0.342053534	0.172326381	0.378423446	0.383083128	0.44051202	0.44050412	0.443418003	0.280280358	0.325084136	0.340106976	0.348009363	1	0.437405864	0.218039857	0.335245807	0.223725671	0.166456318	0.23102603	0.144563127
	Operational Complexity of the Barrier	0.210413499	0.123818477	0.041283247	0.114703521	0.242172303	0.153195647	0.119909223	0.252183302	0.292214932	0.205139473	0.213075316	0.251346839	0.201746617	0.209721989	0.148941996	0.143662659	0.342357779	0.437405864	1	0.204309087	0.213442449	0.284228507	0.133070004	0.278227799	0.102909339
	Barrier Reputation	0.12658407	0.134343389	0.093174562	0.075810902	0.26399631	0.160224224	0.053366373	0.213943511	0.103570594	0.132243088	0.166236713	0.153633063	0.203071275	0.130576247	0.187358131	0.009571861	0.262542724	0.218039857	0.204309087	1	0.166410356	-0.030057359	0.112482998	0.241199731	0.130135278
	Barrier Test Simulation	0.203942323	0.176312311	0.137362358	0.305279238	0.319188399	0.383087269	0.257691368	0.227867509	0.310657387	0.234751183	0.375869798	0.352540398	0.362640356	0.328661105	0.335635746	0.380995231	0.36824993	0.335245807	0.213442449	0.166410356	1	0.253764119	0.224857874	0.296925187	0.356780319
	Barrier Inter-Dependency	0.277252168	0.245249325	0.126827208	0.185477441	0.313219366	0.165690326	0.209557311	0.250251513	0.312059136	0.321213306	0.280754526	0.16692298	0.146624385	0.232988556	0.261427466	0.114675394	0.245749703	0.223725671	0.284228507	-0.030057359	0.253764119	1	0.377318603	0.189375642	0.286913176
	Barrier Redundancy	0.156494096	0.084146724	0.28240206	0.155751068	0.240482052	0.256833153	0.179084555	0.414622152	0.175919771	0.277264605	0.209115805	0.290098591	0.271089557	0.366901234	0.147338345	0.206972146	0.364086461	0.166456318	0.133070004	0.112482998	0.224857874	0.377318603	1	0.22347796	0.346464738
	Impact of Safety Critical Tasks on Barriers	0.254472794	0.040478439	0.055874618	0.206329289	0.144365064	0.223238237	0.168322583	0.395392461	0.330952273	0.12732824	0.271969494	0.354894054	0.300353695	0.194904523	0.188836688	0.301523492	0.257247656	0.23102603	0.278227799	0.241199731	0.296925187	0.189375642	0.22347796	1	0.378423739
	Survivability	0.200815799	0.110826715	0.176683437	0.015934272	0.208687916	0.160751486	0.238192839	0.536495297	0.134574871	0.185077392	0.311470115	0.239041978	0.247420397	0.219942952	0.162769212	0.255806745	0.221086909	0.144563127	0.102909339	0.130135278	0.356780319	0.286913176	0.346464738	0.378423739	1

Barrier Performance parameters	Operative Definitions
Functionality /Reliability	Extent to which barrier performance measure yields the same results on repeated trials
Response time	Length of time taken for a barrier to react to a given stimulus or event
Robustness	The ability of a safety barrier to perform effectively even when the underlying variables or assumptions are altered
Triggering Event	A tangible or intangible barrier or occurrence that once breached or met, causes another event to occur
Capacity	Maximum limit to which the barrier can perform
Efficiency	Ratio of the useful work performed by a barrier to the total energy input.
Ability to withstand loads	Ability to execute the safety function intended by the barrier without being destroyed
Integrity	Defined as a state of the barrier being whole or undivided
Implementation delay	Delay in execution of an idea, it may refer to the process of setting up a new hardware / software after purchase is made
Adequacy	Adequacy defines the extent to which a properly functioning Barrier will interrupt a particular scenario.
Safety critical tasks applicability	Defines the applicability of safety critical tasks for successful barrier performance
Human dependence	Dependence on human action for barrier performance
Availability	Percentage of time a barrier is considered ready to use when tasked.

Validity	Refers to whether or not it measures what it is supposed to measure (execute the objective function of the safety barrier)
Completeness	Having all the required characteristics to fulfil the function of safety barrier
Maintainability	Measure of the ease and rapidity with which a safety barrier can be restored to operational status following a failure.
Lagging indicators	Measure of past performance of the safety barriers
Effectiveness	Degree to which a barrier is successful in producing a desired result
Level of confidence during operation	Percentage of all possible safety barriers that can be expected to include the true population parameter (of a safety barrier)
Error Promptness	It is the feature of the barriers to alert the barrier of a potential error in the near future
Operational complexity of the barrier	It is used to characterize operating something with many parts where those parts interact with each other in multiple ways
Barrier reputation	A widespread belief that the barrier has a particular characteristic
Barrier Test simulation	Checking the performance of the barriers in a test environment to the exact conditions the barrier has a possibility to be subjected
Barrier inter-dependency	It is the mutual dependence between barriers of two or more groups
Barrier redundancy	Inclusion of additional barriers which are not strictly necessary to functioning, in case of failure of other barriers
Impact of safety critical tasks on barriers	Critical activities to be conducted on the barriers which impact the barrier performance
Survivability	Protection required by a barrier or equipment item to ensure continued operation during a major incident

		MAH number	1			2		3	4				5		6
Threat Barriers No.	Barrier Type / Category	Threat (T)	T1 - Loss of well control during drilling	T2- Loss of well control during work over	T3- Loss of well control during testing	T4- Formation fluid influx into well bore (kick) leading to formation fluid to surface while drilling through Habshan reservoir	T5- Formation fluid influx into well bore (kick) leading to formation fluid to surface while running 9 5/8 * 10 3/4 casing	T38- Formation fluid influx into well bore (kick) leading to formation fluid to surface while drilling 8 1/2" Pilot Hole through Arab reservoir	T6- Formation fluid influx into well bore (kick) while coring	T7- Induced Well control event while retrieving core to the surface	T8 -Unstable well condition from pumping hydrocarbons into the well bore while logging onto the drill pipe	T9 - Formation fluid influx due to plug failure whilst plugging Pilot hole	T10 - Formation fluid influx into well bore (kick) leading to formation fluid to surface while drilling 8 1/2" Hole through Arab reservoir (same as T38)	T11- Well flow while running 7" casing	T13 - Formation fluid influx into well bore (kick) while drilling 6" hole through Arab reservoir to Total Depth (TD)
1	Training and Competency	IWCF well control training for AHG and NDC personnel													
2	Hardware	Well control equipment - BOP													
3	Hardware	Well control equipment - Drilling Mud													
4	Maintenance Management	Operational maintenance													
5	Hardware	H2S certified BOP													
6	Hardware	Well control equipment - X mas tree													
7	Hardware	H2S certified equipment													
8	Hardware	Pit Volume Totaliser (PVT) monitoring equipment													
9	Hardware	Instrumentation													
10	Operating Procedures	Drilling and Tripping procedures													
11	Operating Procedures	confirm location of plug													
12	Operating Procedures	Testing on cement slurry													
13	Operating Procedures	Maintain hydrostatic overbalance with mud													
14	Operating Procedures	Cement plug procedure													
15	Operating Procedures	Killing procedure													
16	Design	Known formation (other wells)													
17	Operating Procedures	Adequate mud overbalance													
18	Hardware	H2S Scavenger													
19	Operating Procedures	Mud logging													
20	Hardware	Flowline and header box detection devices													
21	Hardware	Vented slotted barrel													
22	Hardware	Slow tripping speeds													
23	Operating Procedures	Planned circulation programme for tripping out of hole													
24	Hardware	Gas detection													
25	Hardware	H2S rated logging tools													
26	Operating Procedures	Maintain ability to ciculate well bore above logging tools													
27	Hardware	Safety valve													
28	Hardware	Ram configuration suitable for job													

		MAH number	1			2			3			4			5			6		
Recovery Measures / Mitigants No.	Recovery Measures Type / Category	Consequence (C)	C1 - Affecting ADCO field personnel, multiple fatalities & Asset Damage	C2 - Affecting SGD personnel, multiple fatalities & Asset Damage	C3 - Affecting general public, multiple fatalities & Asset Damage	C19 - Major toxic release	C40 - Fire	C41 - Explosions	C20 - Major Toxic release (same as C19)	C42 - Fire (same as C40)	C43 - Explosions (same as C41)	C4- Major Toxic release	C44 - Fire	C45 - Explosions	C8- Major Toxic release	C9 - Fire	C46 - Explosions	C10- Major Toxic release	C47-Fire	C48 - Explosions
1	Hardware	Emergency Shutdown System																		
2	Hardware	SO2 and H2S point detectors around 1.5 kms zone will provide radio signal to rig control room																		
3	Emergency Response Planning	Well control contingency plan (WCCP) - Exclusion zones includes approved SIMOPS procedure, trainings and drills																		
4	Emergency Response Planning	Well control contingency plan (WCCP) - Intervention procedures includes approved well control plan, trainings and drills																		
5	Emergency Response Planning	Well control contingency plan (WCCP) - Relief well includes approved well control plan, trainings and drills																		
6	Communications	Emergency Response Plan Notifications including regular communication equipment checks, authorised procedures																		
7	Operating Procedures	SIMOPS exclusion zone around the well																		
8	Design	Electrical Area Classification - Ignition Risk																		
9	Design	Minimisation of Plant congestion - explosion risk																		
10	Hardware	Fire fighting measures																		
11	Hardware	Escape respirators carried by personnel																		
12	Emergency Response Planning	Site specific safety plan																		
13	Operating Procedures	No sleeping accommodation within 5 kms radius																		
14	Operating Procedures	Designated muster areas																		
15	Hardware	Fire and gas detection system																		
16	Hardware	Alarms																		
17	Training and Competency	IWCF Well control training for key NDC and ADGDC personnel																		
18	Hardware	Breathing air systems spread includes Recharge facilities, BA stations, additional rescue BA sets, additional escape BA sets																		

Appendix 8 - MAH Threat Barriers mapping - Matrix

Threat Barrier category	Barriers	Performance Factor (includes availability, validity, lagging indicators, effectiveness, barrier test simulation, safety critical tasks)	Defence Factor (includes adequacy, redundancy, impact of safety critical tasks, survivability)	Trust Factor (includes reliability, response time and integrity)	Limit Factor (includes triggering event, capacity and maintainability)	Perception Factor (includes level of confidence during operations, error promptness, operational complexity and barrier reputation)	Dependency factor (includes human dependance and barrier inter-dependance)	Robustness factor (includes only robustness)	Overall score	Normalised score
		Safety barrier evaluation factors - Shah Drilling operations								
Training and Competency	IWCF well control training for AHG and NDC personnel	3.75	3.75	3.75	2.25	4.5	4.25	1.75	**3.8**	**0.76**
Hardware	Well control equipment - BOP	4.75	4.25	4.5	4.25	4.5	3	4	**4.3**	**0.87**
Hardware	Well control equipment - Drilling Muc	4	4.25	2.25	3.5	3	3.75	2.75	**3.5**	**0.70**
Maintenance Management	Operational maintenance	3.75	3.5	3	2.75	3	3.25	2.5	**3.2**	**0.63**
Hardware	H2S certified BOP	4	4	4.25	3.75	4.5	3.75	4.5	**4.1**	**0.82**
Hardware	Well control equipment - X mas tree	4.25	4.25	4.25	3.25	4.25	2.25	4.5	**3.9**	**0.77**
Hardware	H2S certified equipment	4	4	3.75	3	4.25	3	3	**3.7**	**0.74**
Hardware	Pit Volume Totaliser (PVT) monioring equipment	3.5	3.25	3	3	3.25	3.25	3	**3.2**	**0.64**
Hardware	Instrumentation	4	3.5	3.5	3.75	3.75	3.5	3.75	**3.7**	**0.74**
Operating Procedures	Drilling and Tripping procedures	2.75	2.75	2.75	2.75	3.75	4	3.75	**3.8**	**0.76**
Operating Procedures	Confirm location of plug	3.75	4	3.75	3	3.75	3.25	3.75	**3.6**	**0.72**
Operating Procedures	Testing on cement slurry	3.25	2.75	2.75	2.75	3.75	4	3.75	**3.9**	**0.77**
Operating Procedures	Maintain hydrostatic overbalance with mud	4	4	4	3.5	4	4	3.75	**3.9**	**0.78**
Operating Procedures	Cement plug procedure	3.75	2.75	2.5	2.5	3	3.5	2.75	**3.8**	**0.75**
Operating Procedures	Killing procedure	4	2.75	2.5	2.75	2.75	3.75	2.5	**3.8**	**0.76**
Design	Known formation (other wells)	3.75	3	2.75	2.5	3.5	2.5	2.75	**3.3**	**0.67**
Operating Procedures	Adequate mud overbalance	3.75	3.75	4.25	3.25	4.25	4	3.75	**3.9**	**0.77**
Hardware	H2S Scavenger	3.5	3	3.25	3.5	4	3.5	3.25	**3.4**	**0.69**
Operating Procedures	Mud logging	3.25	3	3	2.75	3.5	3.75	3	**3.3**	**0.65**
Hardware	Flowline and header box detection devices	3.5	3.25	3.5	3.25	3.75	2	2.75	**3.1**	**0.63**
Hardware	Vented slotted barrel	2.5	2.5	2.25	2	2.25	1.75	2.25	**3.0**	**0.59**
Hardware	Slow tripping speeds	3.5	3.75	3.5	3.5	3.5	3.5	3	**3.5**	**0.69**
Operating Procedures	Planned circulation programme for tripping out of hole	3.75	4	3.5	3	4	3.25	3.25	**3.5**	**0.71**
Hardware	Gas detection	3.75	3.75	3.75	3.75	4	3.5	3.75	**3.8**	**0.75**
Hardware	H2S rated logging tools	2.5	2.5	2.5	2.25	2.5	2.25	2.25	**3.2**	**0.64**
Operating Procedures	Maintain ability to ciculate well bore above logging tools	3.75	2.75	3.5	3	3.5	2.5	2.75	**3.2**	**0.63**
Hardware	Safety valve	4.5	4.25	4.25	4	4	2.25	4	**4.0**	**0.81**
Hardware	Ram configuration suitable for job	4.5	4.25	4.5	4.25	4.5	3.25	3.75	**4.3**	**0.86**

Rating scale

0 - Not applicable
1- Very Low (Higly ineffective)
2- Low (Ineffective)
3- Medium (Moderately effective)
4-High (Highly effective)
5 -Vey High (Extreme High effective)

Name:

Designation:

Initials:

		Safety barrier evaluation factors - Shah Drilling operations								
		Performance Factor	Defence Factor	Trust Factor	Limit Factor	Perception Factor	Dependency factor	Robustness factor		
		(includes availability, validity, lagging indicators, effectiveness, barrier test simulation, safety critical tasks)	(includes adequacy, redundancy, impact of safety critical tasks, survivability)	(includes reliability, response time and integrity)	(includes triggering event, capacity and maintainability)	(includes level of confidence during operations, error promptness, operational complexity and barrier reputation)	(includes human dependance and barrier inter-dependance)	(includes only robustness)	**Overall score**	**Normalised score**
Recovery measures category	**Recovery measures**									
Hardware	Emergency Shutdown System	4.5	4.25	4.5	4.25	4.5	4	4.25	**4.3**	**0.9**
Hardware	SO2 and H2S point detectorsaround 1.5 kms zone will provide radio signal to rig control room	3.5	3.75	3.25	3.25	3.75	3	3.25	**3.4**	**0.7**
Emergency Response Planning	Well control contingency plan (WCCP) -Exclusion zones includes approved SIMOPS procedure, trainings and drills	3.5	3.5	3.25	3.25	4	3.25	3.25	**3.4**	**0.7**
Emergency Response Planning	Well control contingency plan (WCCP) - Intervention procedures includes approved well control plan, trainings and drills	3.25	3.5	3.25	3	3.75	3	3.25	**3.3**	**0.7**
Emergency Response Planning	Well control contingency plan (WCCP) - Relief well includes approved well control plan, trainings and drills	2	1.75	3	3	2.5	3.5	2.75	**3.3**	**0.7**
Communications	Emergency Response Plan Notifications including regular communication equipment checks, authorised procedures	2.5	2.75	2.25	2.5	3.25	3.75	2.5	**3.4**	**0.7**
Operating Procedures	SIMOPS exclusion zone around the well	3	1.75	1.75	2.75	3.25	3.25	2	**3.4**	**0.7**
Design	Electrical Area Classification - Ignition Risk	2.75	1.75	1.75	2.5	3	3.5	2	**3.3**	**0.7**
Design	Minimisation of Plant congestion - explosion risk	2.75	1.75	1.75	2.5	2.5	2.5	2.25	**3.4**	**0.7**
Hardware	Fire fighting measures	3	2.75	2.75	2.75	2.5	2.75	2.75	**3.7**	**0.7**
Hardware	Escape respirators carried by personnel	3	3.25	3.75	4	3.75	3.5	4	**3.8**	**0.8**
Emergency Response Planning	Site specific safety plan	2.75	2.75	2.75	2.75	2.75	3.25	2.5	**3.4**	**0.7**
Operating Procedures	No sleeping accommodation within 5 kms radius	3	2	2	2	2	2.25	2	**3.9**	**0.8**
Operating Procedures	Designated muster areas	2.75	3	2.75	1.75	2	3.5	1.75	**3.6**	**0.7**
Hardware	Fire and gas detection system	2.75	3	2.75	2.75	2.75	3.25	2.5	**3.5**	**0.7**
Hardware	Alarms	3	3.5	3.75	3.5	3.75	3.5	3.75	**3.7**	**0.7**
Training and Competency	IWCF Well control training for key NDC and ADGDC personnel	4	4	3.75	2.75	4.25	4	2	**3.9**	**0.8**
Hardware	Breathing air systems spread includes Recharge facilities, BA stations, additional rescue BA sets, additional escape BA sets	3.75	4.25	3.75	4.25	4	3.5	3.5	**3.9**	**0.8**

Rating scale

0 - Not applicable
1- Very Low (Higly ineffective)
2- Low (Ineffective)
3- Medium (Moderately effective)
4-High (Highly effective)
5 -Vey High (Extreme High effective)

Name:

Designation:

Initials:

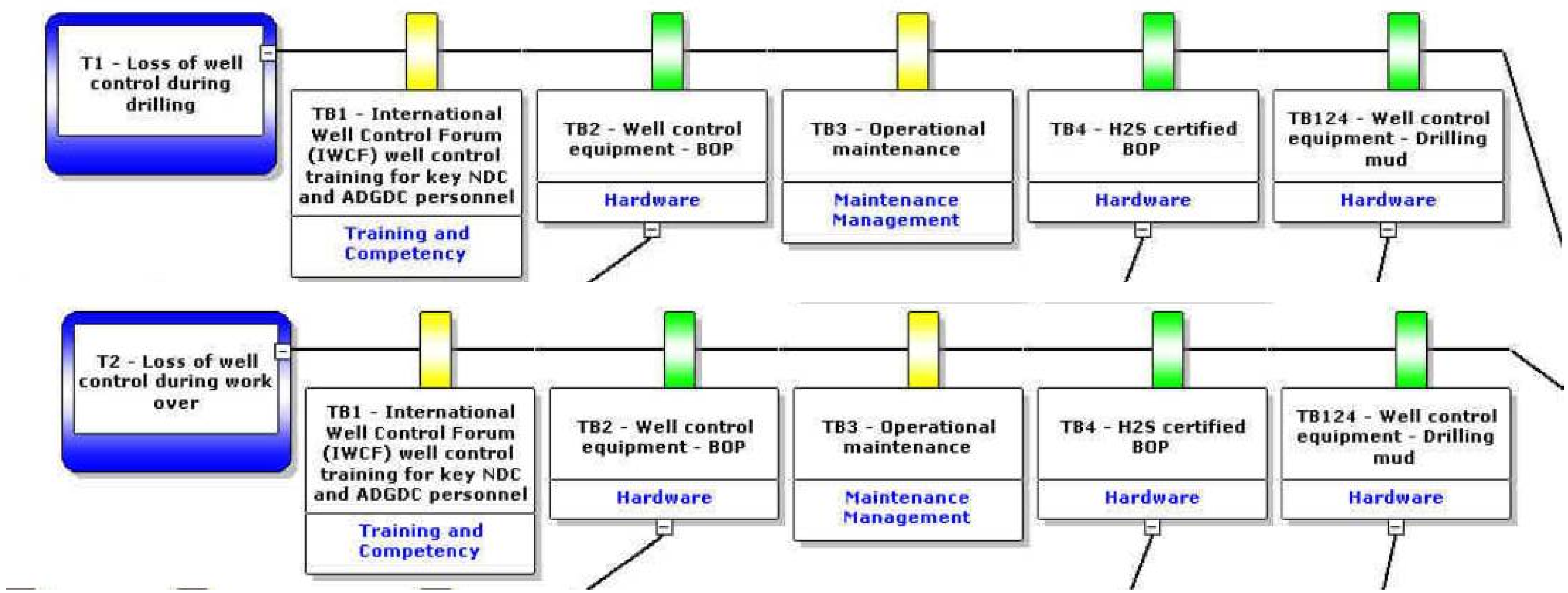
Appendix 12 – Bow-Tie to Bayesian Conversion

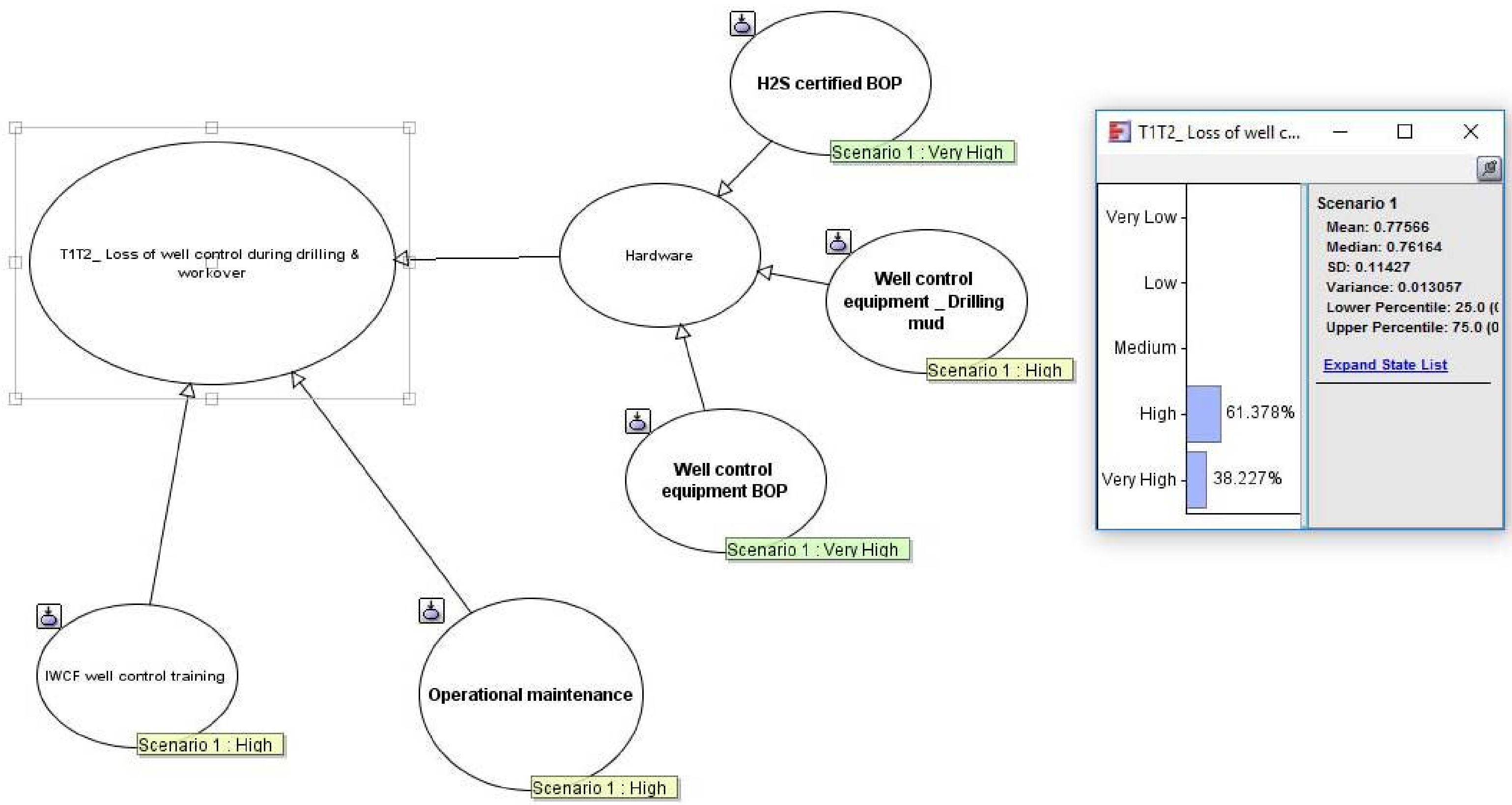
MAH 1: Loss of containment during well operations during drilling activities resulting in multiple fatalities onsite and offsite and asset damage

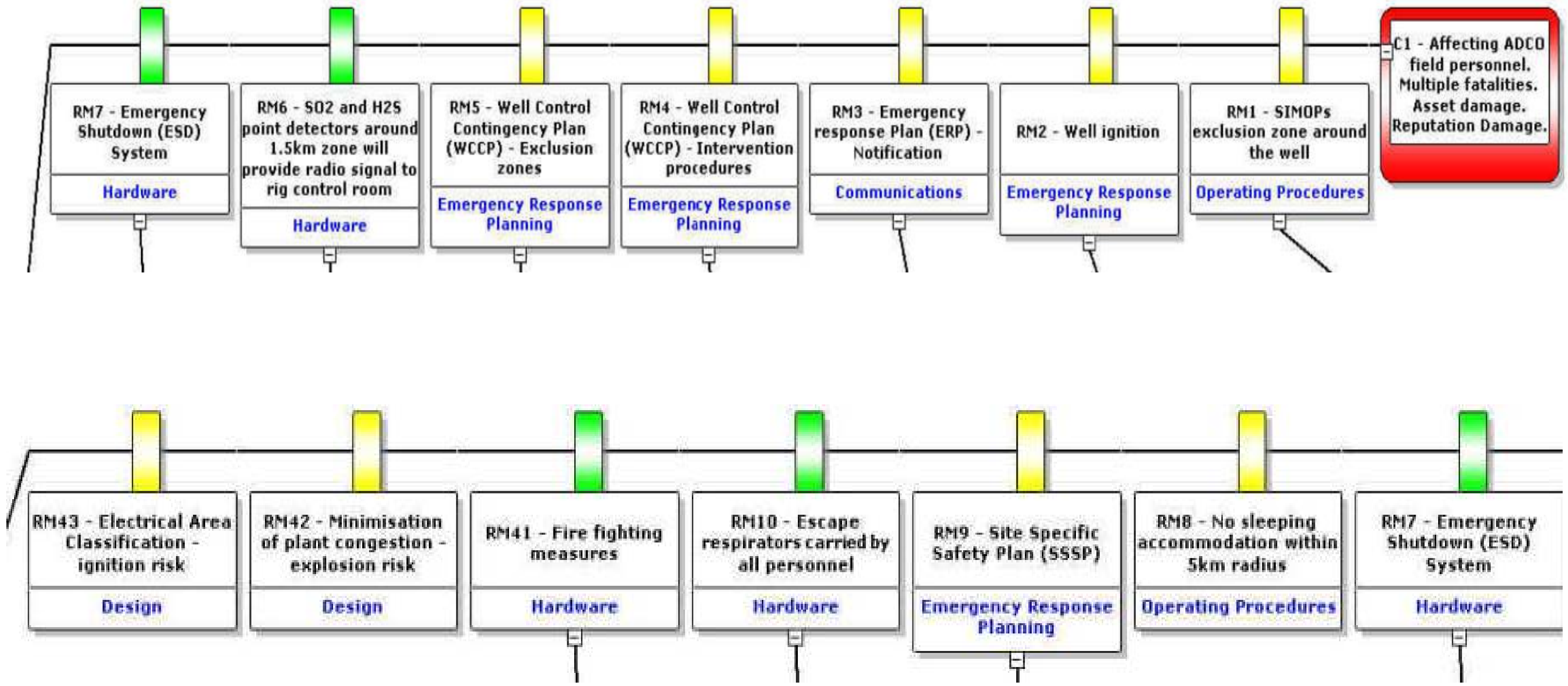
- affecting ADCO personnel (offsite)

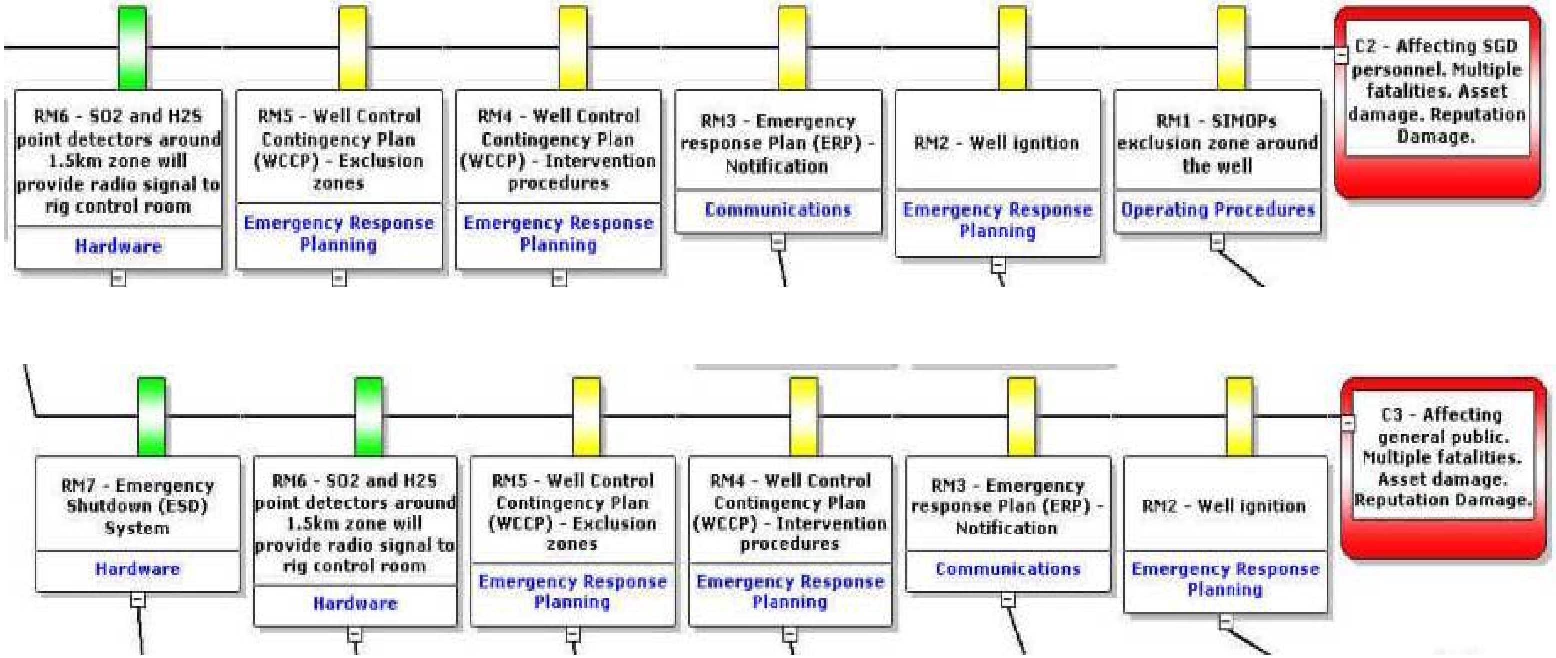
- affecting AHG personnel (onsite)

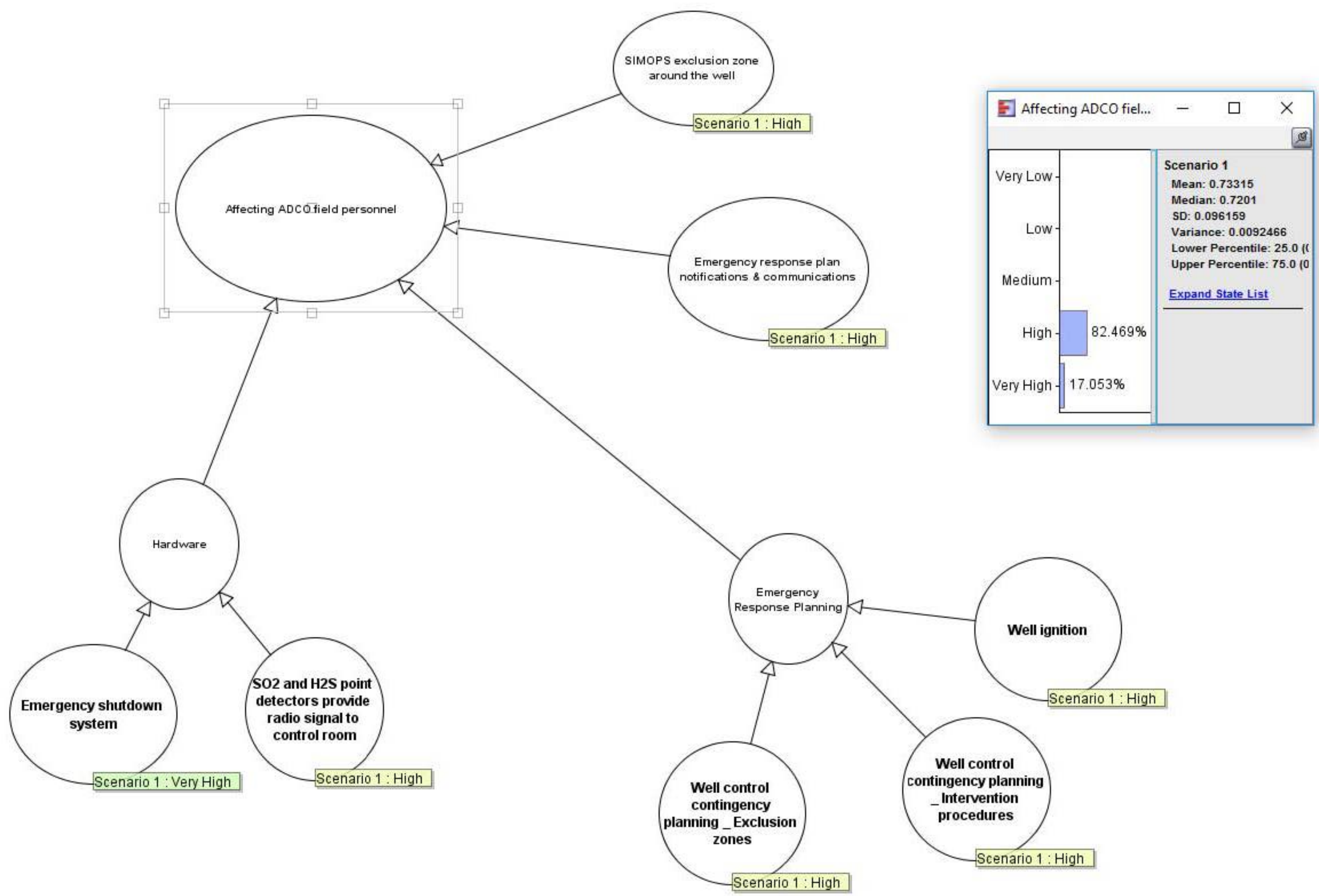
- affecting public

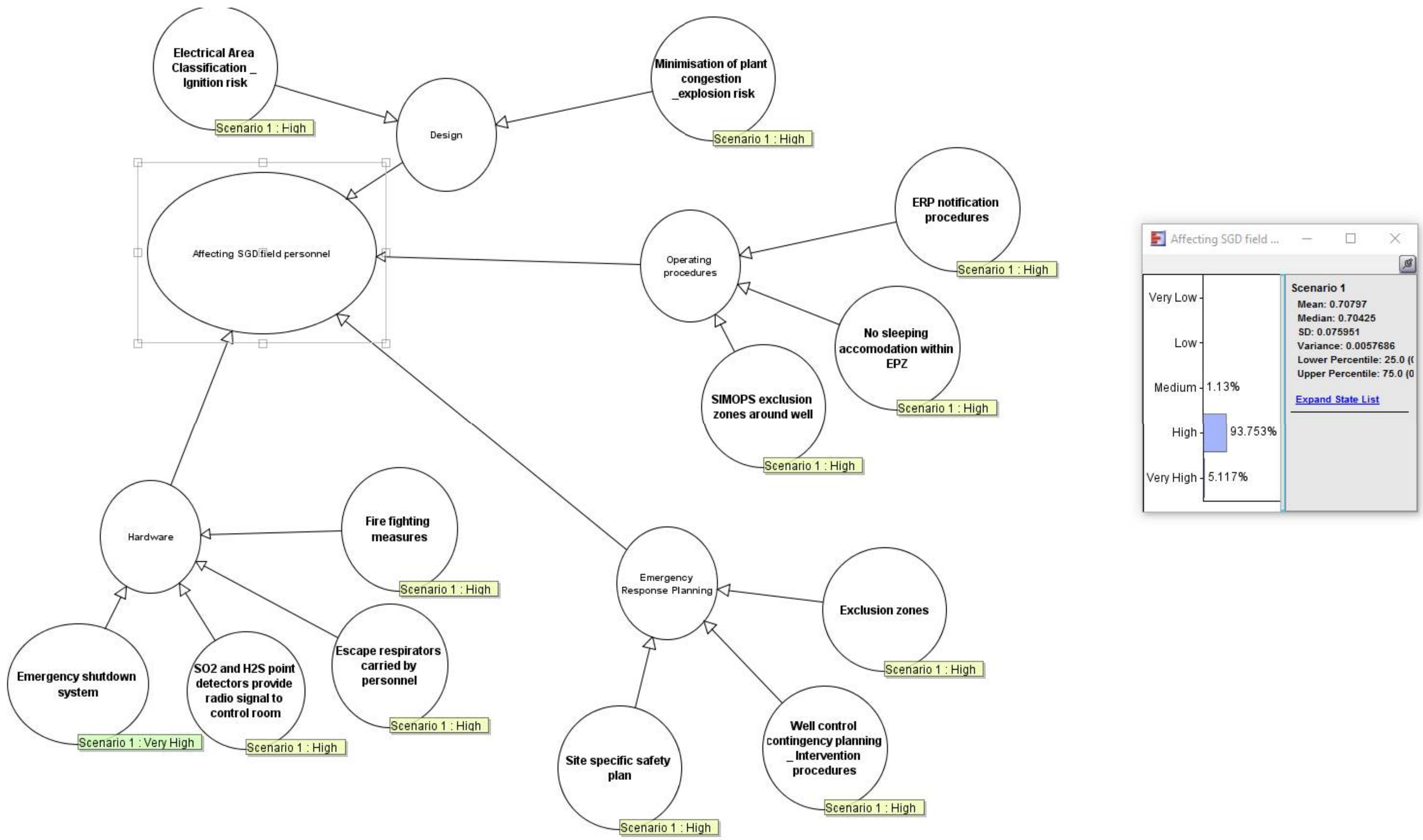



H2S certified BOP
Scenario 1 : Very High
Well control equipment _Drilling mud
Scenario 1 : High
Hardware
Well control equipment BOP
Scenario 1 : Very High
T1T2_ Loss of well control during drilling & workover
IWCF well control training
Scenario 1 : High
Operational maintenance
Scenario 1 : High
T1T2_ Loss of well c...
Very Low
Low
Medium
High
Very High
61.378%
38.227%
Scenario 1
Mean: 0.77566
Median: 0.76164
SD: 0.11427
Variance: 0.013057
Lower Percentile: 25.0
Upper Percentile: 75.0
Expand State List

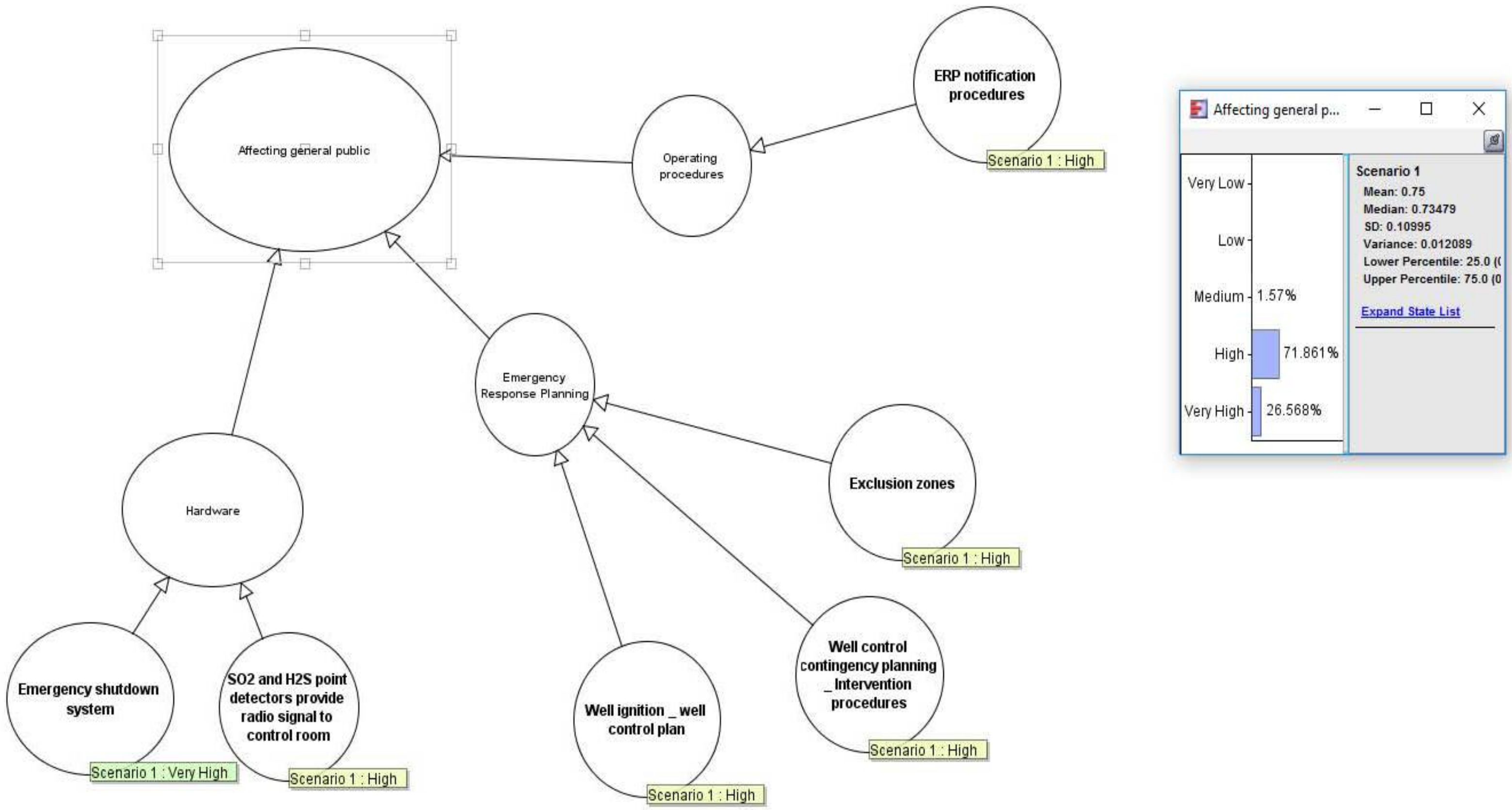

C1 - Affecting ADCO field personnel. Multiple fatalities. Asset damage. Reputation Damage.
RM1 - SIMOPs exclusion zone around the well
Operating Procedures
RM2 - Well ignition
Emergency Response Planning
RM3 - Emergency response Plan (ERP) - Notification
Communications
RM4 - Well Control Contingency Plan (WCCP) - Intervention procedures
Emergency Response Planning
RM5 - Well Control Contingency Plan (WCCP) - Exclusion zones
Emergency Response Planning
RM6 - SO2 and H2S point detectors around 1.5km zone will provide radio signal to rig control room
Hardware
RM7 - Emergency Shutdown (ESD) System
Hardware
RM7 - Emergency Shutdown (ESD) System
Hardware
RM8 - No sleeping accommodation within 5km radius
Operating Procedures
RM9 - Site Specific Safety Plan (SSSP)
Emergency Response Planning
RM10 - Escape respirators carried by all personnel
Hardware
RM41 - Fire fighting measures
Hardware
RM42 - Minimisation of plant congestion - explosion risk
Design
RM43 - Electrical Area Classification - ignition risk
Design


RM6 - SO2 and H2S point detectors around 1.5km zone will provide radio signal to rig control room
Hardware
RM5 - Well Control Contingency Plan (WCCP) - Exclusion zones
Emergency Response Planning
RM4 - Well Control Contingency Plan (WCCP) - Intervention procedures
Emergency Response Planning
RM3 - Emergency response Plan (ERP) - Notification
Communications
RM2 - Well ignition
Emergency Response Planning
RM1 - SIMOPs exclusion zone around the well
Operating Procedures
C2 - Affecting SGD personnel. Multiple fatalities. Asset damage. Reputation Damage.
RM7 - Emergency Shutdown (ESD) System
Hardware
RM6 - SO2 and H2S point detectors around 1.5km zone will provide radio signal to rig control room
Hardware
RM5 - Well Control Contingency Plan (WCCP) - Exclusion zones
Emergency Response Planning
RM4 - Well Control Contingency Plan (WCCP) - Intervention procedures
Emergency Response Planning
RM3 - Emergency response Plan (ERP) - Notification
Communications
RM2 - Well ignition
Emergency Response Planning
C3 - Affecting general public. Multiple fatalities. Asset damage. Reputation Damage.


SIMOPS exclusion zone around the well
Scenario 1 : High
Affecting ADCO field personnel
Emergency response plan notifications & communications
Scenario 1 : High
Affecting ADCO fiel...
Very Low
Low
Medium
High
Very High
82.469%
17.053%
Scenario 1
Mean: 0.73315
Median: 0.7201
SD: 0.096159
Variance: 0.0092466
Lower Percentile: 25.0 (
Upper Percentile: 75.0 (0
Expand State List
Hardware
Emergency Response Planning
Well ignition
Scenario 1 : High
Emergency shutdown system
Scenario 1 : Very High
SO2 and H2S point detectors provide radio signal to control room
Scenario 1 : High
Well control contingency planning _ Exclusion zones
Scenario 1 : High
Well control contingency planning _ Intervention procedures
Scenario 1 : High



Electrical Area Classification _ Ignition risk
Scenario 1 : High
Design
Minimisation of plant congestion _explosion risk
Scenario 1 : High
Affecting SGD field personnel
Operating procedures
ERP notification procedures
Scenario 1 : High
No sleeping accomodation within EPZ
Scenario 1 : High
SIMOPS exclusion zones around well
Scenario 1 : High
Hardware
Fire fighting measures
Scenario 1 : High
Escape respirators carried by personnel
Scenario 1 : High
SO2 and H2S point detectors provide radio signal to control room
Scenario 1 : High
Emergency shutdown system
Scenario 1 : Very High
Emergency Response Planning
Exclusion zones
Scenario 1 : High
Well control contingency planning _Intervention procedures
Scenario 1 : High
Site specific safety plan
Scenario 1 : High
Affecting SGD field ...
Very Low
Low
Medium 1.13%
High 93.753%
Very High 5.117%
Scenario 1
Mean: 0.70797
Median: 0.70425
SD: 0.075951
Variance: 0.0057686
Lower Percentile: 25.0 (0
Upper Percentile: 75.0 (0
Expand State List



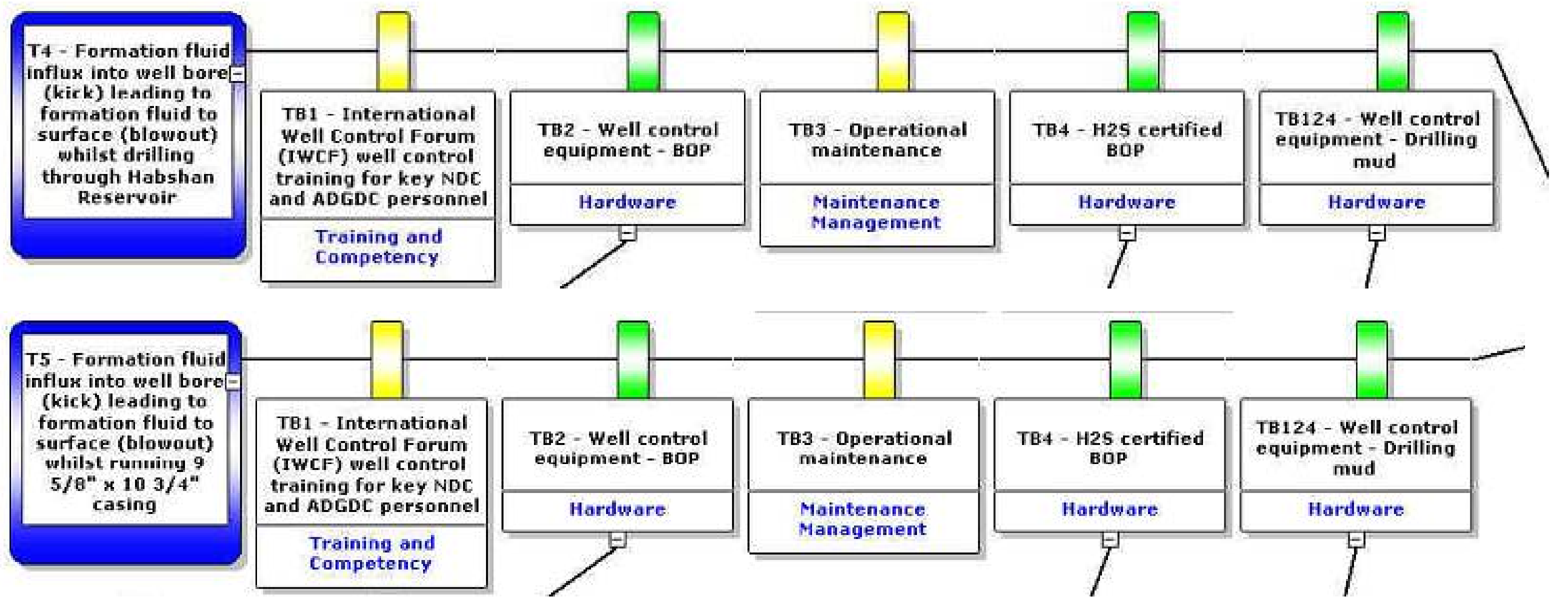
Affecting general public
Operating procedures
ERP notification procedures
Scenario 1 : High
Emergency Response Planning
Exclusion zones
Scenario 1 : High
Well control contingency planning _ Intervention procedures
Scenario 1 : High
Well ignition _ well control plan
Scenario 1 : High
Hardware
Emergency shutdown system
Scenario 1 : Very High
SO2 and H2S point detectors provide radio signal to control room
Scenario 1 : High
Affecting general p...
Very Low
Low
Medium
High
Very High
1.57%
71.861%
26.568%
Scenario 1
Mean: 0.75
Median: 0.73479
SD: 0.10995
Variance: 0.012089
Lower Percentile: 25.0 (
Upper Percentile: 75.0 (0
Expand State List

MAH 2: Loss of containment (Blowout scenario) - Formation fluid influx into well bore

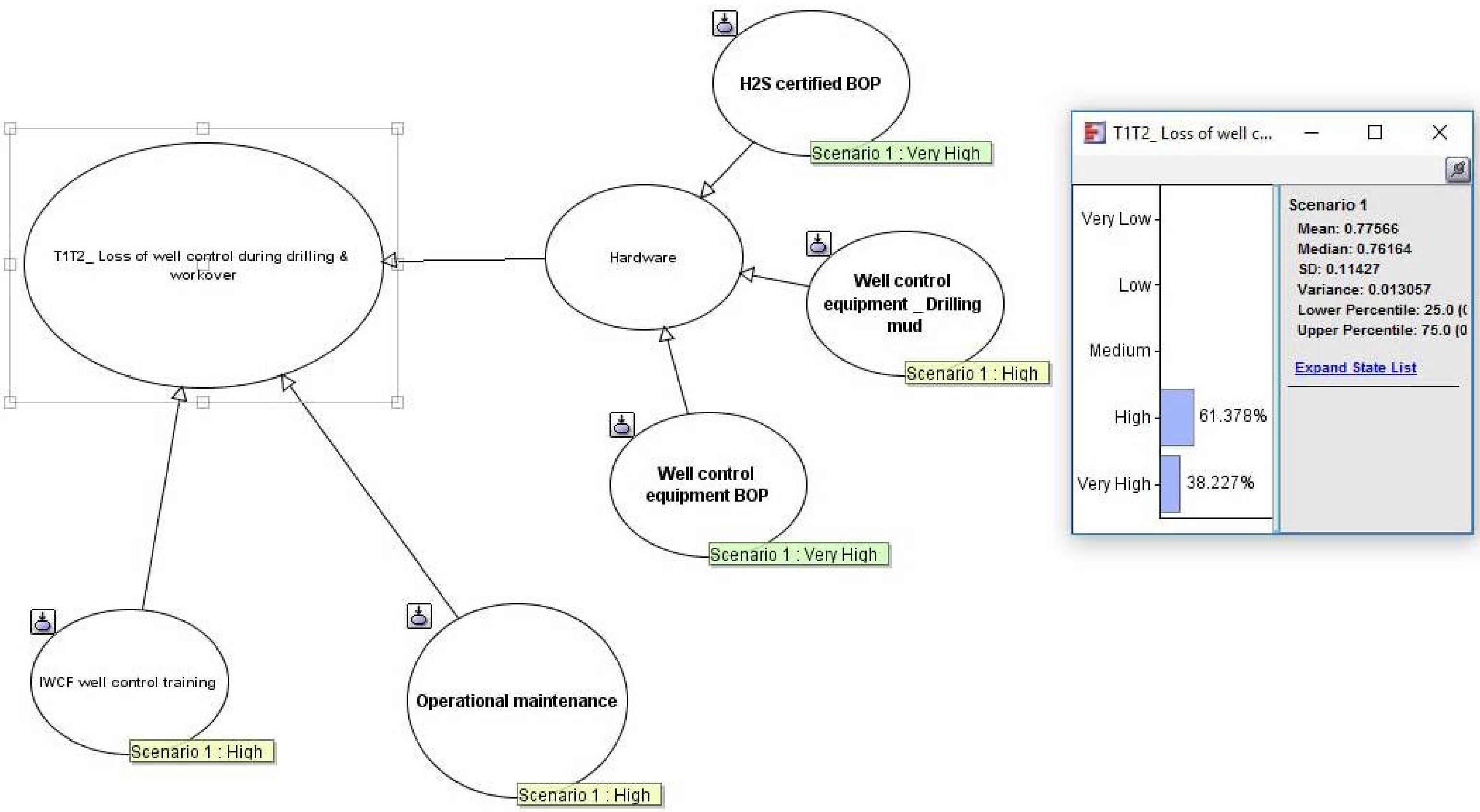
- during drilling through Habshan Reservoir

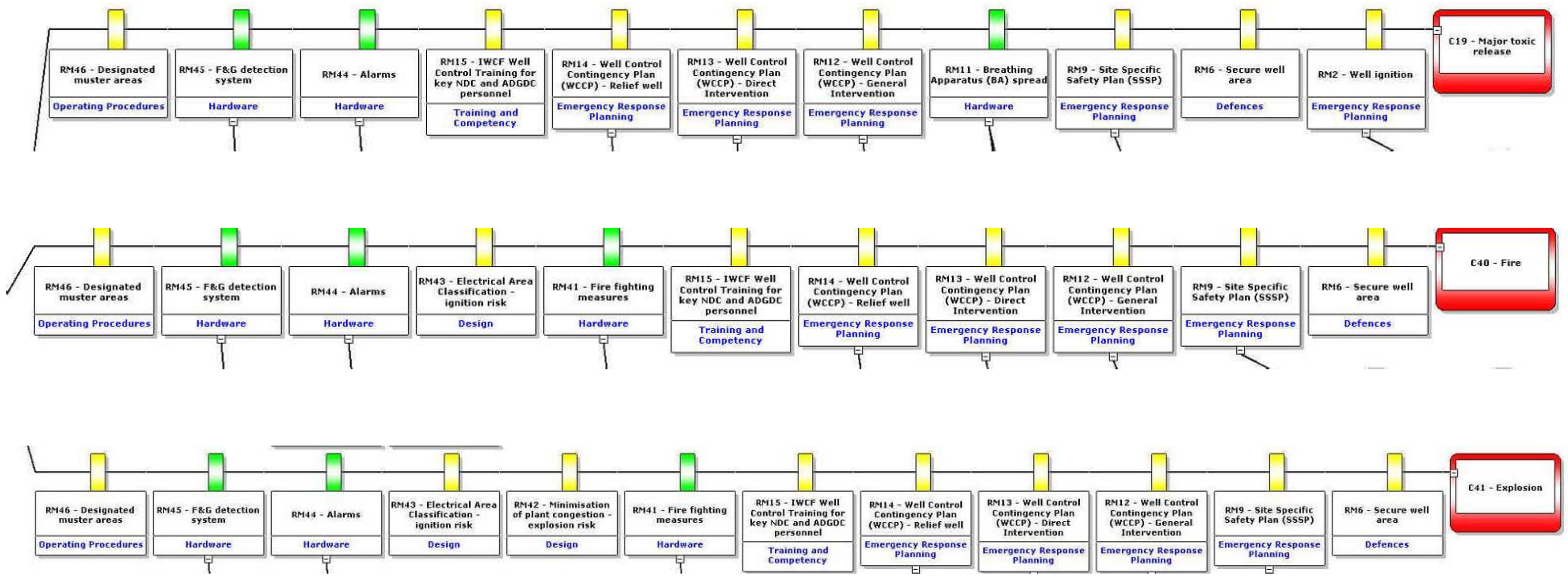
- while running 9 5/8" x 10 3/4" casing

Resulting in major toxic release, fire and explosion

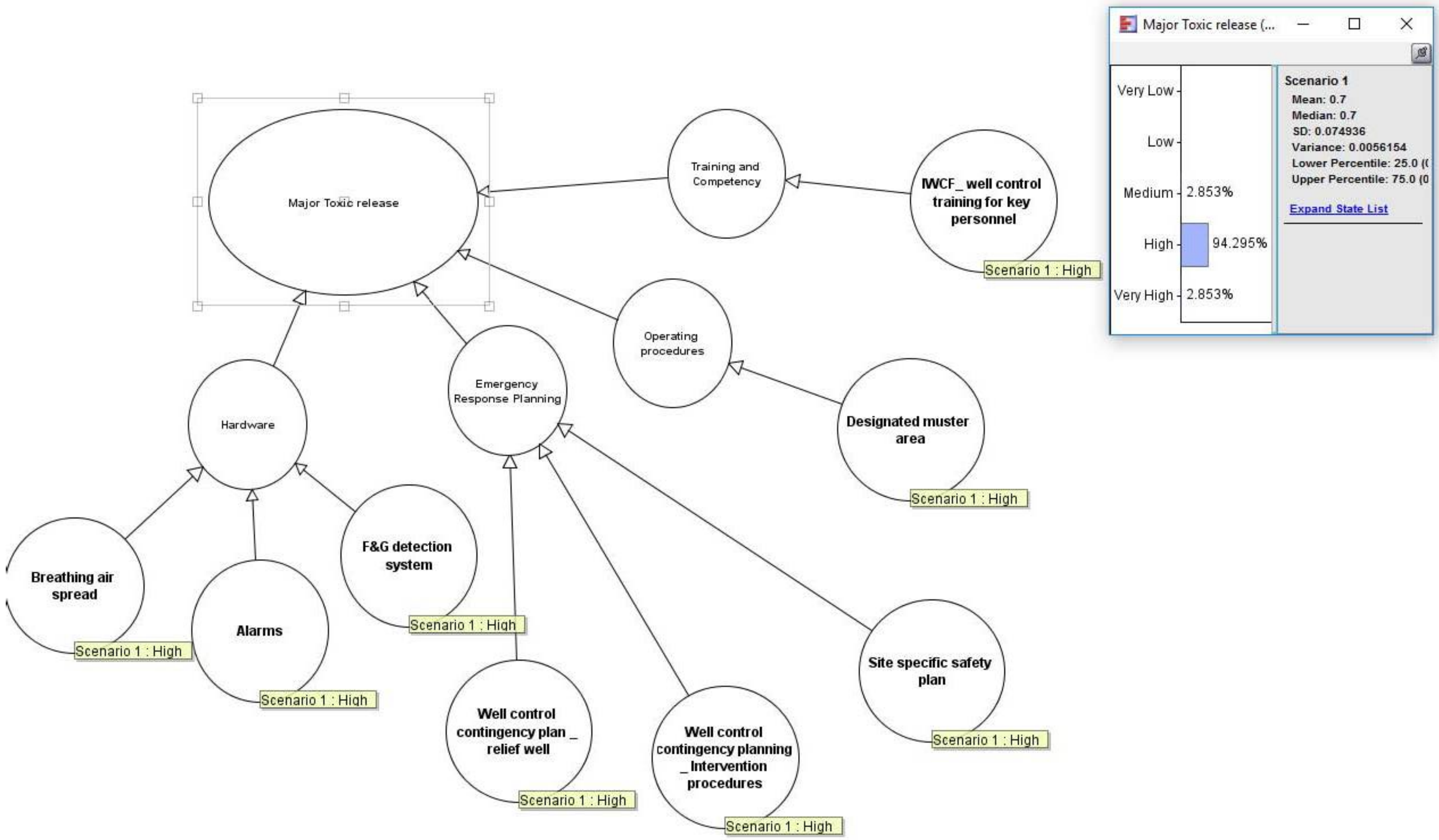


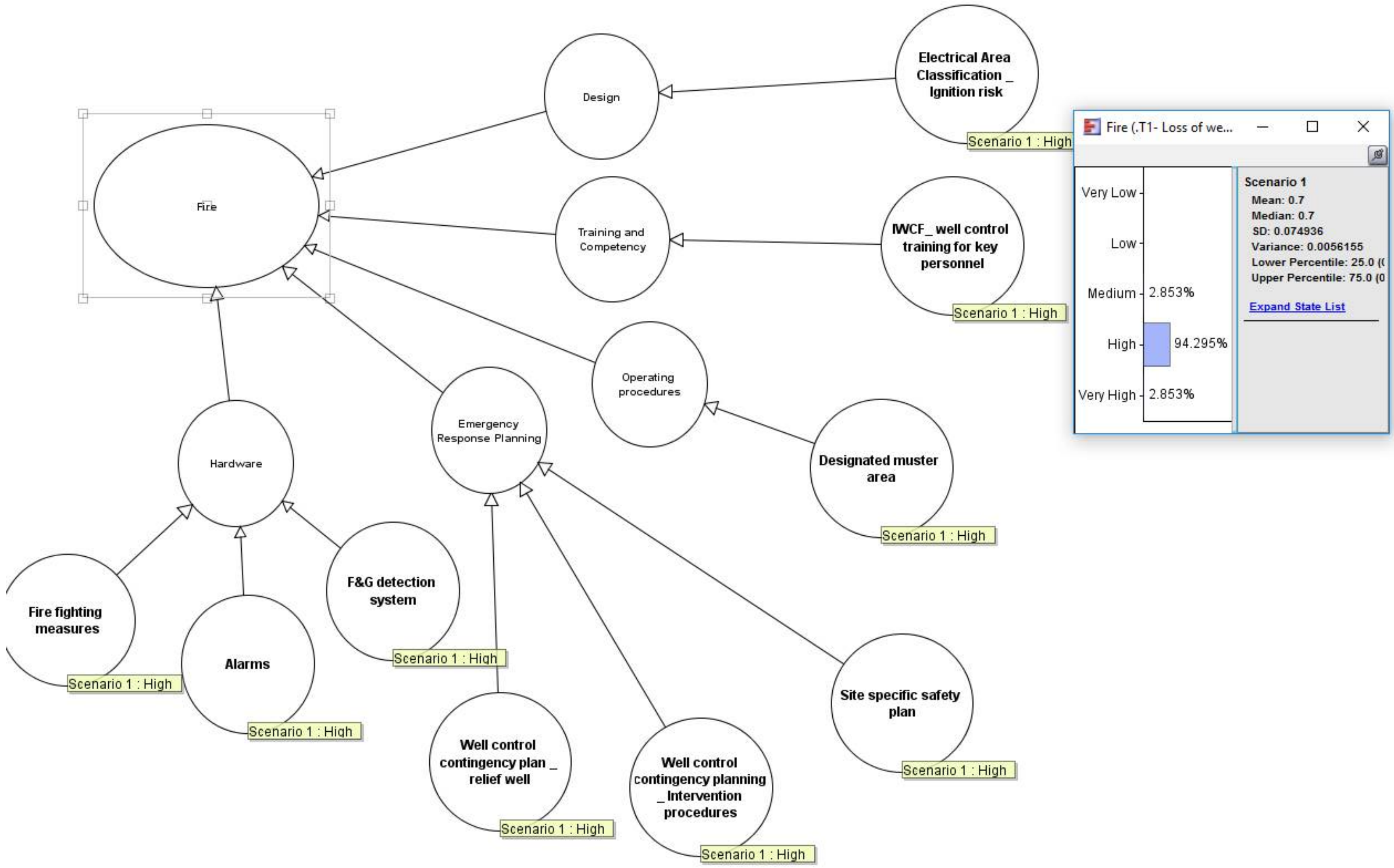
(Similar barriers as in T1 and T2)

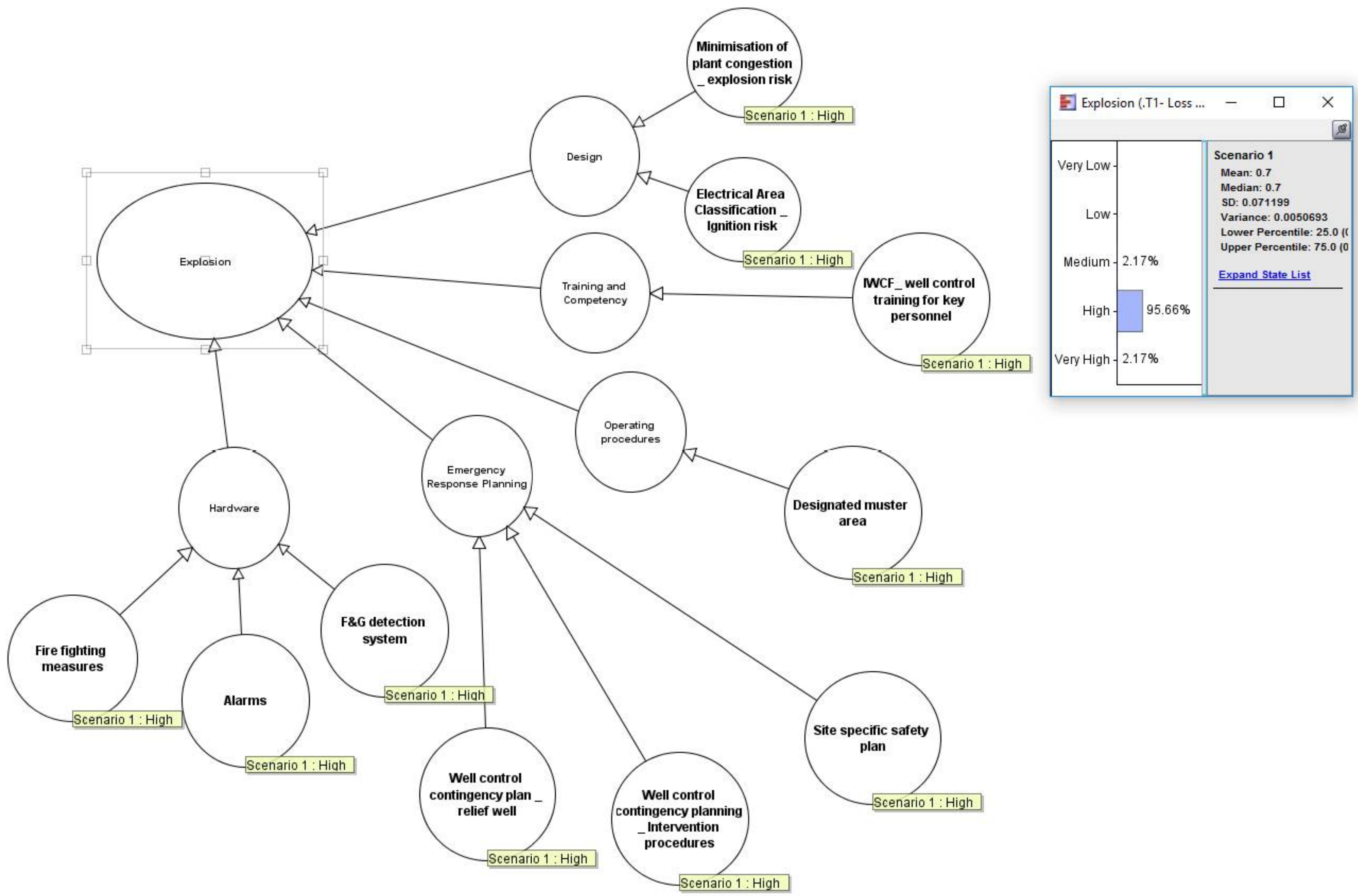

T1T2_ Loss of well control during drilling & workover
Hardware
H2S certified BOP
Scenario 1 : Very High
Well control equipment _ Drilling mud
Scenario 1 : High
Well control equipment BOP
Scenario 1 : Very High
IWCF well control training
Scenario 1 : High
Operational maintenance
Scenario 1 : High
T1T2_ Loss of well c...
Very Low
Low
Medium
High
Very High
61.378%
38.227%
Scenario 1
Mean: 0.77566
Median: 0.76164
SD: 0.11427
Variance: 0.013057
Expand State List



RM46 - Designated muster areas
Operating Procedures
RM45 - F&G detection system
Hardware
RM44 - Alarms
Hardware
RM15 - IWCF Well Control Training for key NDC and ADGDC personnel
Training and Competency
RM14 - Well Control Contingency Plan (WCCP) - Relief well
Emergency Response Planning
RM13 - Well Control Contingency Plan (WCCP) - Direct Intervention
Emergency Response Planning
RM12 - Well Control Contingency Plan (WCCP) - General Intervention
Emergency Response Planning
RM11 - Breathing Apparatus (BA) spread
Hardware
RM9 - Site Specific Safety Plan (SSSP)
Emergency Response Planning
RM6 - Secure well area
Defences
RM2 - Well ignition
Emergency Response Planning
C19 - Major toxic release
RM46 - Designated muster areas
Operating Procedures
RM45 - F&G detection system
Hardware
RM44 - Alarms
Hardware
RM43 - Electrical Area Classification - ignition risk
Design
RM41 - Fire fighting measures
Hardware
RM15 - IWCF Well Control Training for key NDC and ADGDC personnel
Training and Competency
RM14 - Well Control Contingency Plan (WCCP) - Relief well
Emergency Response Planning
RM13 - Well Control Contingency Plan (WCCP) - Direct Intervention
Emergency Response Planning
RM12 - Well Control Contingency Plan (WCCP) - General Intervention
Emergency Response Planning
RM9 - Site Specific Safety Plan (SSSP)
Emergency Response Planning
RM6 - Secure well area
Defences
C40 - Fire
RM46 - Designated muster areas
Operating Procedures
RM45 - F&G detection system
Hardware
RM44 - Alarms
Hardware
RM43 - Electrical Area Classification - ignition risk
Design
RM42 - Minimisation of plant congestion - explosion risk
Design
RM41 - Fire fighting measures
Hardware
RM15 - IWCF Well Control Training for key NDC and ADGDC personnel
Training and Competency
RM14 - Well Control Contingency Plan (WCCP) - Relief well
Emergency Response Planning
RM13 - Well Control Contingency Plan (WCCP) - Direct Intervention
Emergency Response Planning
RM12 - Well Control Contingency Plan (WCCP) - General Intervention
Emergency Response Planning
RM9 - Site Specific Safety Plan (SSSP)
Emergency Response Planning
RM6 - Secure well area
Defences
C41 - Explosion


Major Toxic release
Training and Competency
IWCF_ well control training for key personnel
Scenario 1 : High
Operating procedures
Designated muster area
Scenario 1 : High
Hardware
Emergency Response Planning
Breathing air spread
Scenario 1 : High
Alarms
Scenario 1 : High
F&G detection system
Scenario 1 : High
Well control contingency plan _ relief well
Scenario 1 : High
Well control contingency planning _ Intervention procedures
Scenario 1 : High
Site specific safety plan
Scenario 1 : High
Major Toxic release (...
Very Low
Low
Medium 2.853%
High 94.295%
Very High 2.853%
Scenario 1
Mean: 0.7
Median: 0.7
SD: 0.074936
Variance: 0.0056154
Lower Percentile: 25.0 (
Upper Percentile: 75.0 (
Expand State List

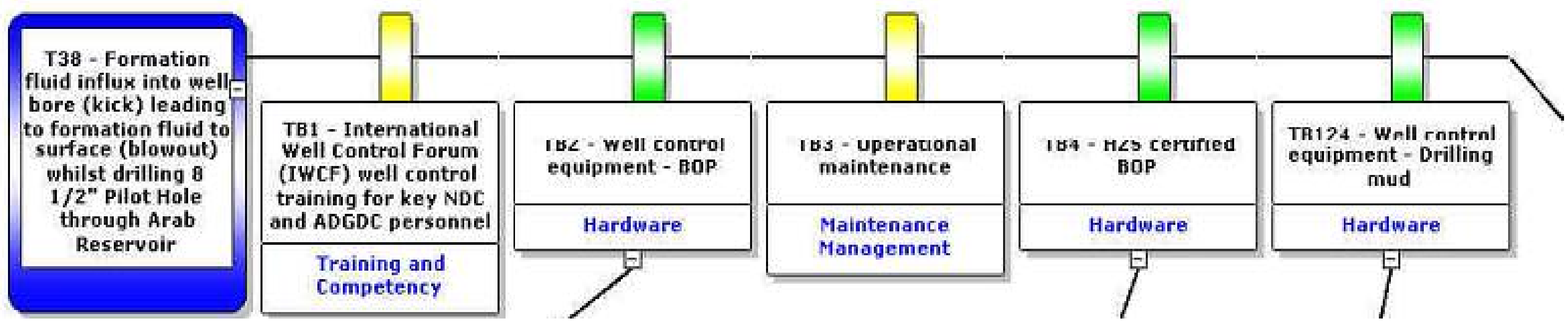

Fire
Design
Training and Competency
Operating procedures
Emergency Response Planning
Hardware
Electrical Area Classification _ Ignition risk
Scenario 1 : High
IWCF_ well control training for key personnel
Scenario 1 : High
Designated muster area
Scenario 1 : High
Site specific safety plan
Scenario 1 : High
Well control contingency planning _ Intervention procedures
Scenario 1 : High
Well control contingency plan _ relief well
Scenario 1 : High
F&G detection system
Scenario 1 : High
Alarms
Scenario 1 : High
Fire fighting measures
Scenario 1 : High
Fire (.T1- Loss of we...
Very Low
Low
Medium 2.853%
High 94.295%
Very High 2.853%
Scenario 1
Mean: 0.7
Median: 0.7
SD: 0.074936
Variance: 0.0056155
Lower Percentile: 25.0 (
Upper Percentile: 75.0 (0
Expand State List

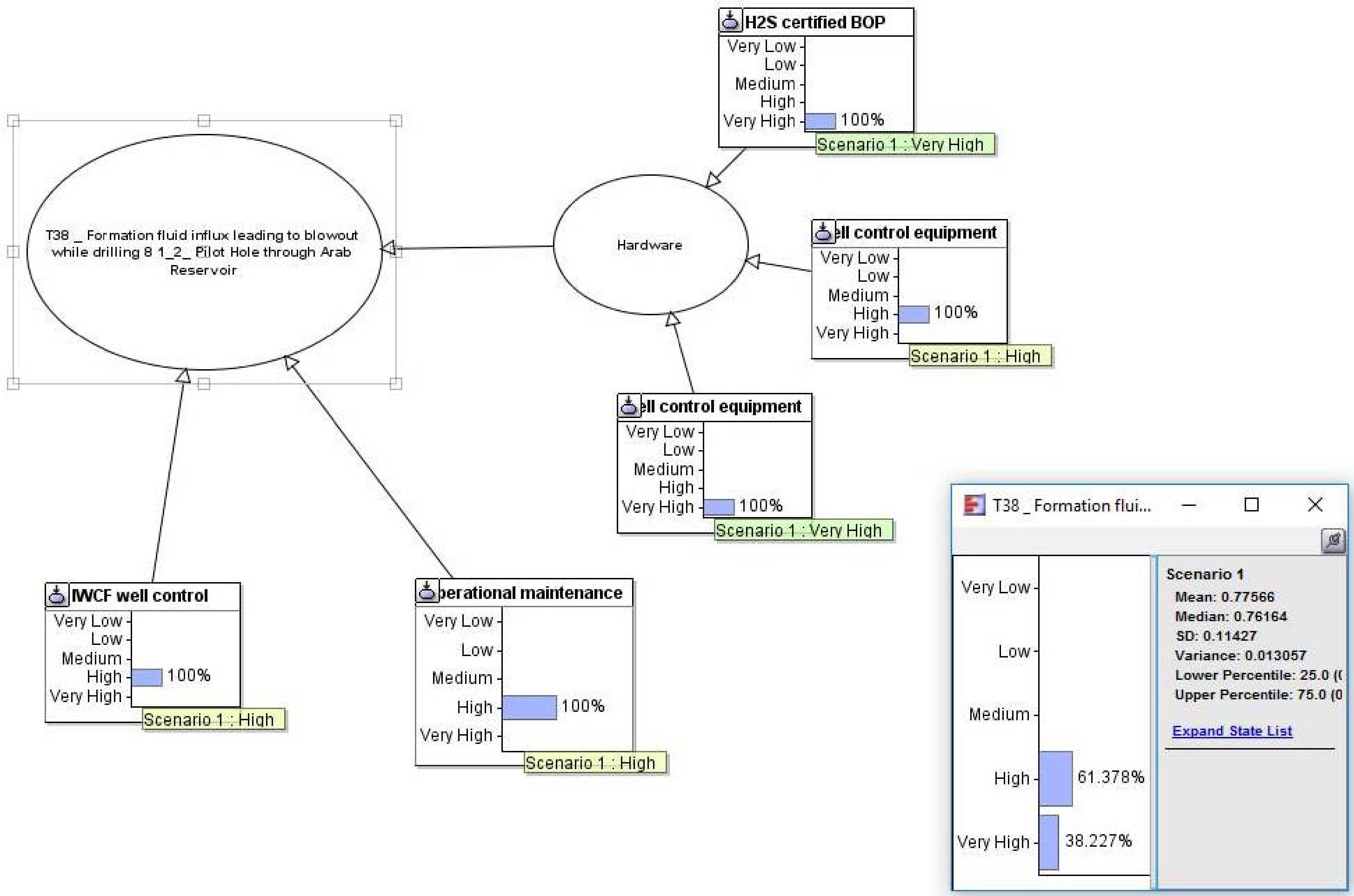

Explosion (.T1- Loss ...
Very Low
Low
Medium
High
Very High
2.17%
95.66%
2.17%
Scenario 1
Mean: 0.7
Median: 0.7
SD: 0.071199
Variance: 0.0050693
Lower Percentile: 25.0 (
Upper Percentile: 75.0 (0
Expand State List
Explosion
Design
Minimisation of plant congestion _ explosion risk
Scenario 1 : High
Electrical Area Classification _ Ignition risk
Scenario 1 : High
Training and Competency
IWCF_ well control training for key personnel
Scenario 1 : High
Operating procedures
Designated muster area
Scenario 1 : High
Emergency Response Planning
Site specific safety plan
Scenario 1 : High
Well control contingency planning _ Intervention procedures
Scenario 1 : High
Well control contingency plan _ relief well
Scenario 1 : High
Hardware
F&G detection system
Scenario 1 : High
Alarms
Scenario 1 : High
Fire fighting measures
Scenario 1 : High

MAH 3: Loss of containment (Blowout scenario)

- during drilling 8 1/2" Pilot Hole through Arab Reservoir

Resulting in major toxic release, fire and explosion





MAH 3 – Consequences (Toxic release, Fire and Explosion) – Same as MAH 2

MAH 4 - Loss of containment

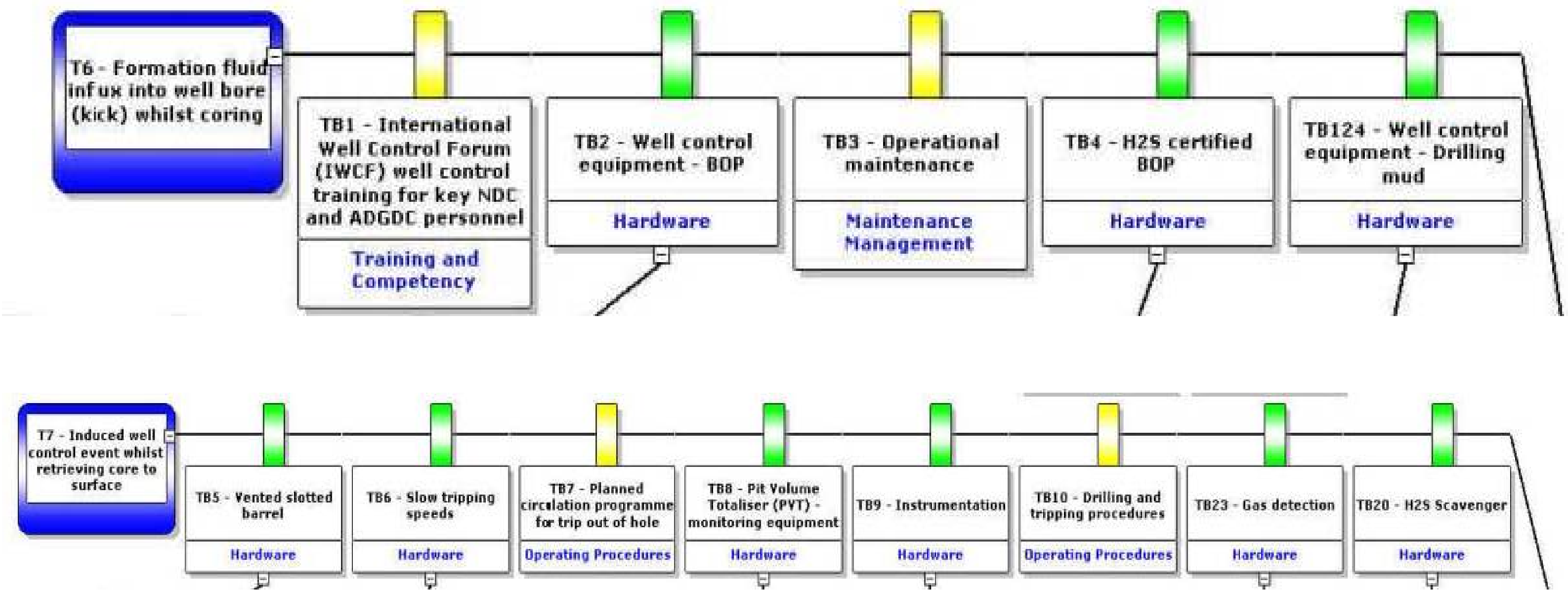
- Formation fluid influx (kick) during coring

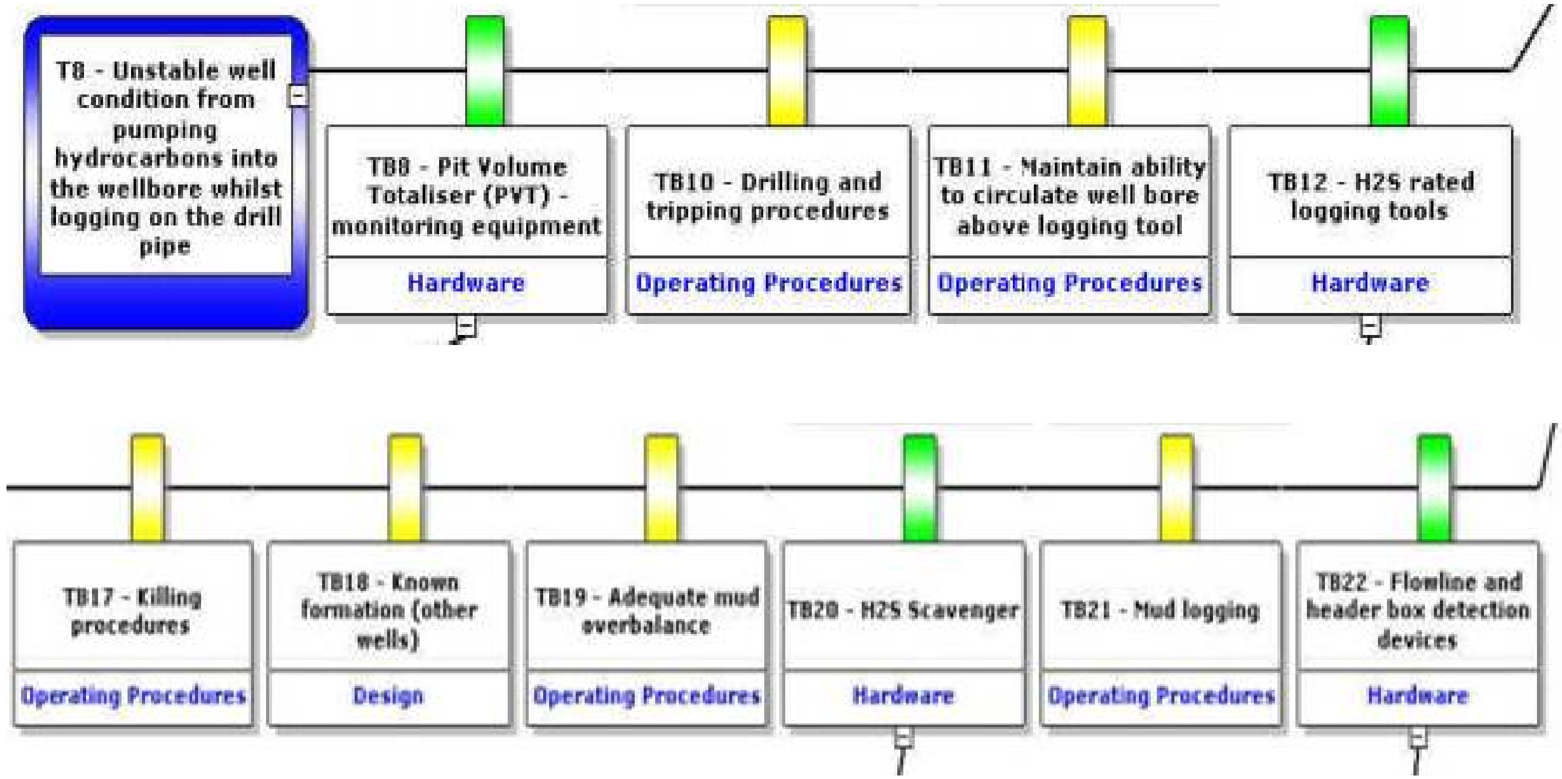
- Induced well control while retrieving core to the surface

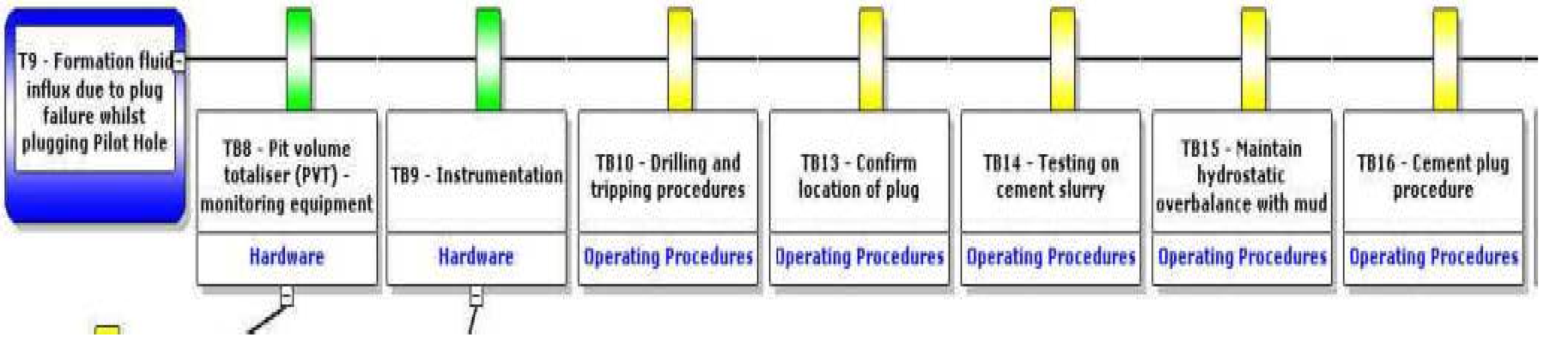
- Unstable well conditions from pumping HC's into the well bore while logging on the drill pipe

- Plug failure while plugging pilot hole

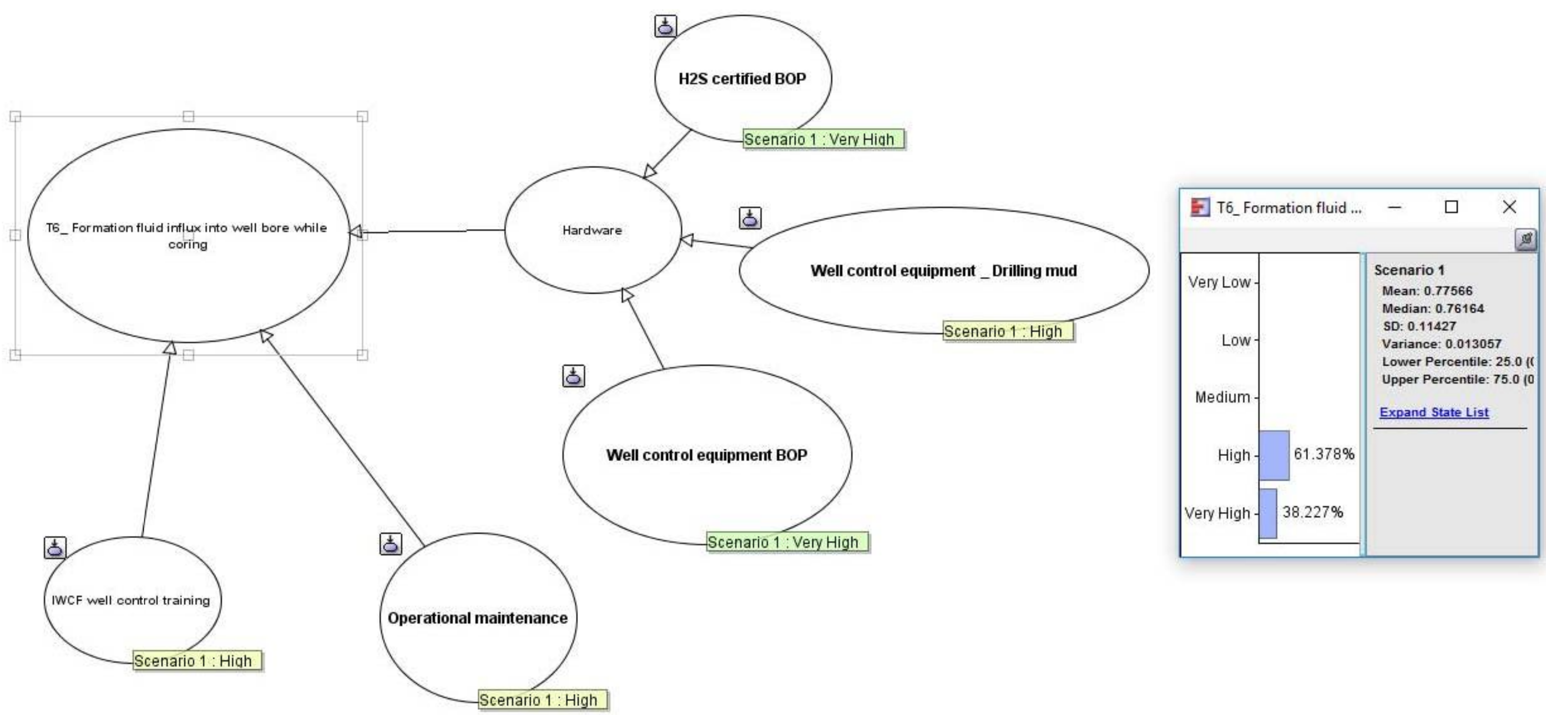
Resulting in major toxic release, fire and explosion

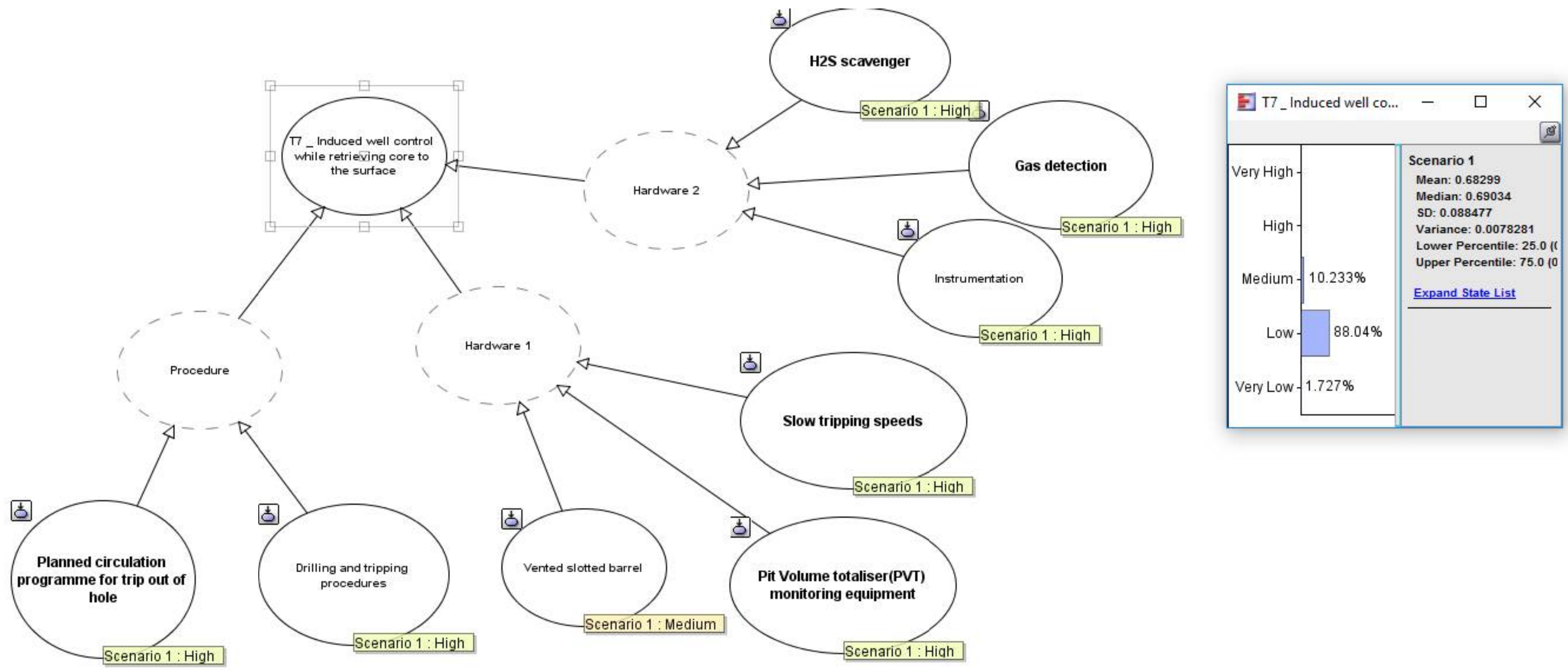


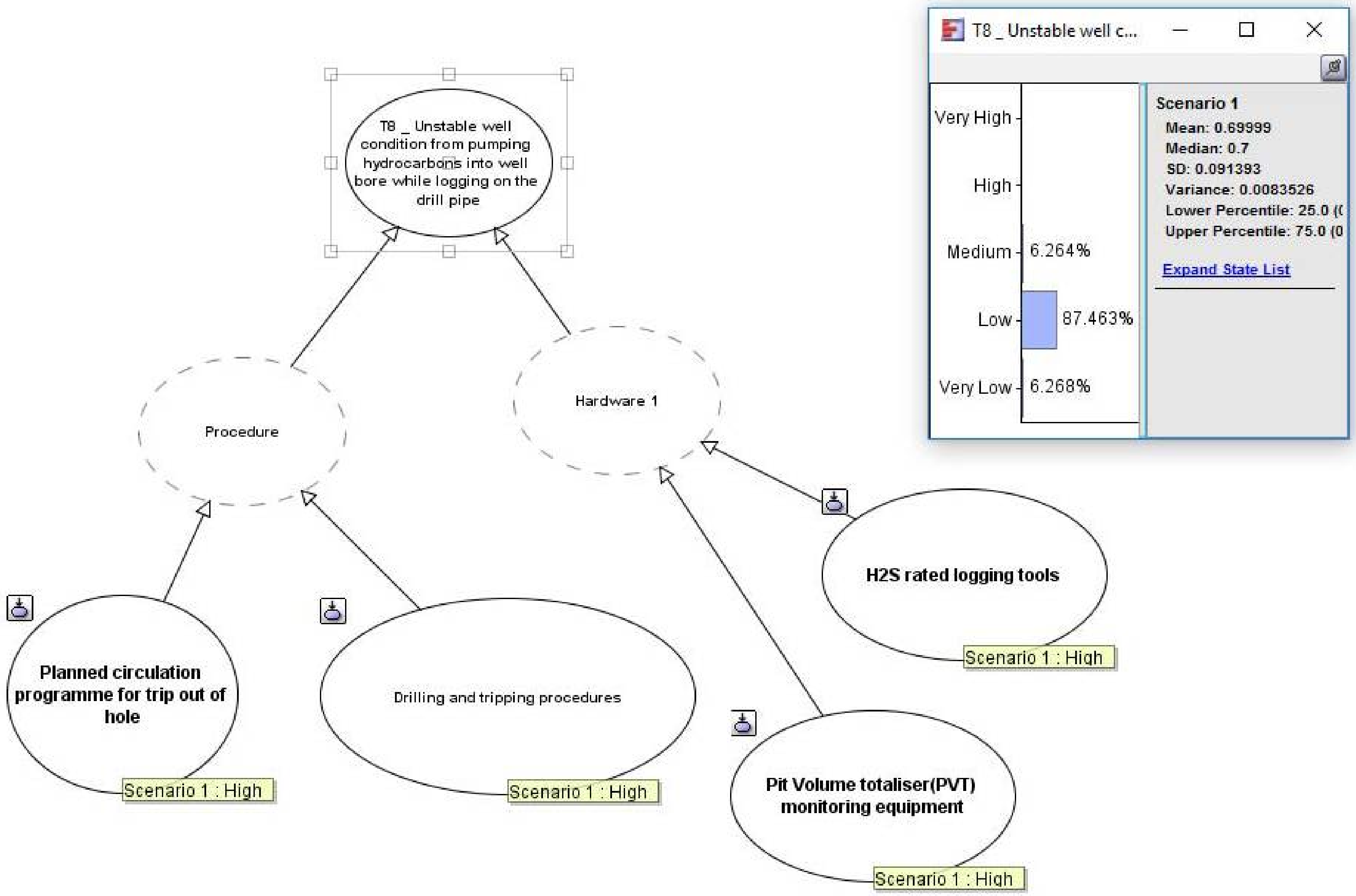

T8 - Unstable well condition from pumping hydrocarbons into the wellbore whilst logging on the drill pipe
TB8 - Pit Volume Totaliser (PVT) - monitoring equipment
Hardware
TB10 - Drilling and tripping procedures
Operating Procedures
TB11 - Maintain ability to circulate well bore above logging tool
Operating Procedures
TB12 - H2S rated logging tools
Hardware
TB17 - Killing procedures
Operating Procedures
TB18 - Known formation (other wells)
Design
TB19 - Adequate mud overbalance
Operating Procedures
TB20 - H2S Scavenger
Hardware
TB21 - Mud logging
Operating Procedures
TB22 - Flowline and header box detection devices
Hardware

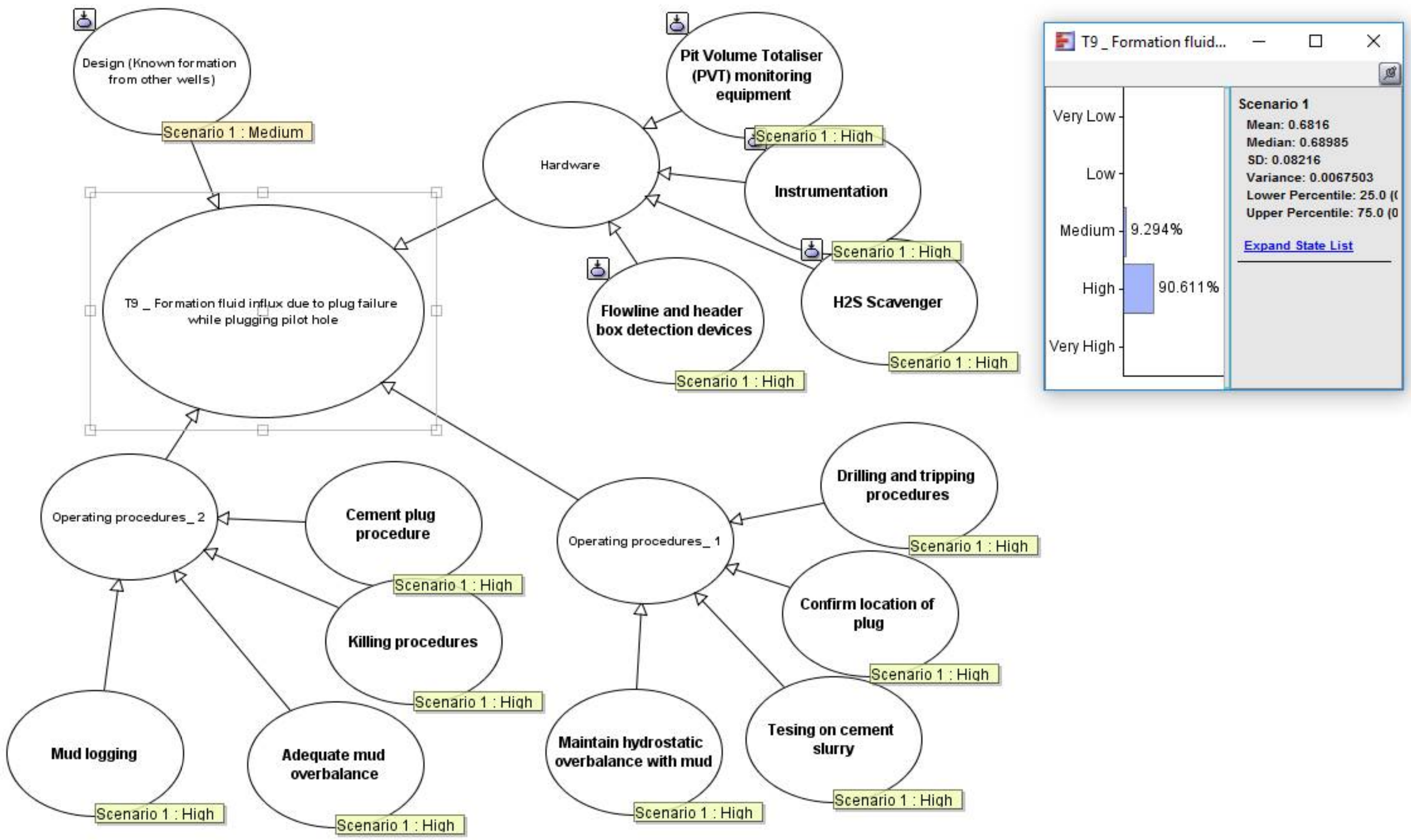


T9 - Formation fluid influx due to plug failure whilst plugging Pilot Hole
TB8 - Pit volume totaliser (PVT) - monitoring equipment
Hardware
TB9 - Instrumentation
Hardware
TB10 - Drilling and tripping procedures
Operating Procedures
TB13 - Confirm location of plug
Operating Procedures
TB14 - Testing on cement slurry
Operating Procedures
TB15 - Maintain hydrostatic overbalance with mud
Operating Procedures
TB16 - Cement plug procedure
Operating Procedures


T6_ Formation fluid influx into well bore while coring
Hardware
H2S certified BOP
Scenario 1 : Very High
Well control equipment _ Drilling mud
Scenario 1 : High
Well control equipment BOP
Scenario 1 : Very High
IWCF well control training
Scenario 1 : High
Operational maintenance
Scenario 1 : High
T6_ Formation fluid ...
Very Low
Low
Medium
High
Very High
61.378%
38.227%
Scenario 1
Mean: 0.77566
Median: 0.76164
SD: 0.11427
Variance: 0.013057
Lower Percentile: 25.0 ((
Upper Percentile: 75.0 (0
Expand State List


T7 _ Induced well control while retrieving core to the surface
Hardware 2
H2S scavenger
Scenario 1 : High
Gas detection
Scenario 1 : High
Instrumentation
Scenario 1 : High
Hardware 1
Slow tripping speeds
Scenario 1 : High
Procedure
Planned circulation programme for trip out of hole
Scenario 1 : High
Drilling and tripping procedures
Scenario 1 : High
Vented slotted barrel
Scenario 1 : Medium
Pit Volume totaliser(PVT) monitoring equipment
Scenario 1 : High
T7 _ Induced well co...
Very High
High
Medium
10.233%
Low
88.04%
Very Low
1.727%
Scenario 1
Mean: 0.68299
Median: 0.69034
SD: 0.088477
Variance: 0.0078281
Lower Percentile: 25.0 (
Upper Percentile: 75.0 (
Expand State List


T8 _ Unstable well c...
Very High
High
Medium
6.264%
Low
87.463%
Very Low
6.268%
Scenario 1
Mean: 0.69999
Median: 0.7
SD: 0.091393
Variance: 0.0083526
Lower Percentile: 25.0 (0
Upper Percentile: 75.0 (0
Expand State List
T8 _ Unstable well condition from pumping hydrocarbons into well bore while logging on the drill pipe
Procedure
Hardware 1
Planned circulation programme for trip out of hole
Scenario 1 : High
Drilling and tripping procedures
Scenario 1 : High
H2S rated logging tools
Scenario 1 : High
Pit Volume totaliser(PVT) monitoring equipment
Scenario 1 : High



MAH 4 – Consequences (Toxic release, Fire and Explosion) – Same as MAH 2

MAH 5: Loss of containment (kick and well flow) during

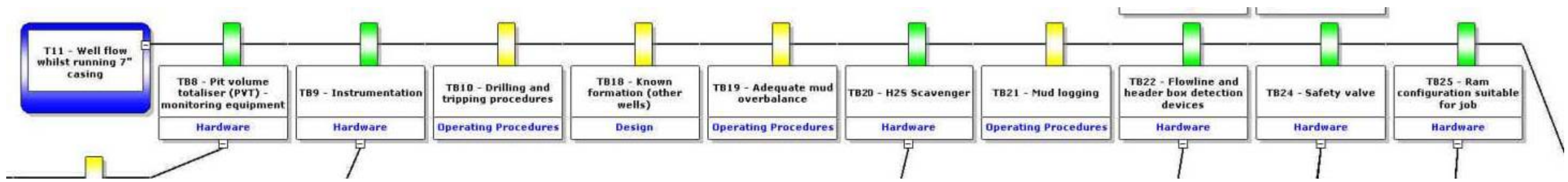
- Drilling 8 1/2" hole through Arab reservoir (T10)

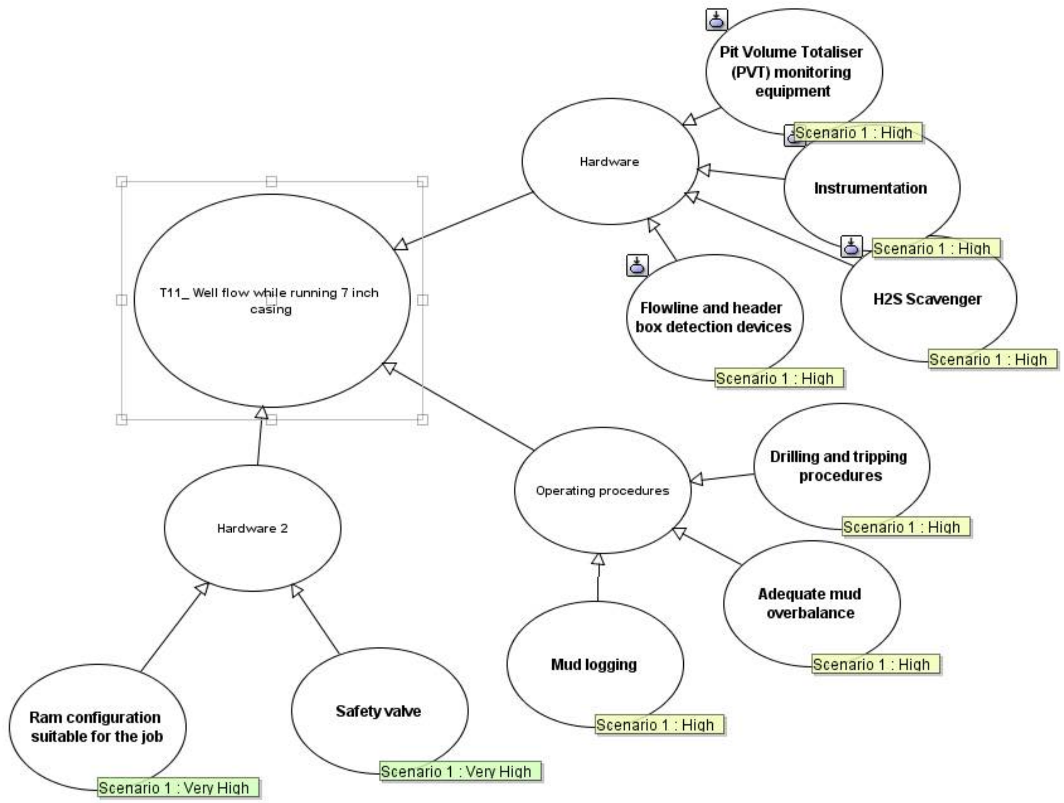
- Well flow while running 7" casing (T11)

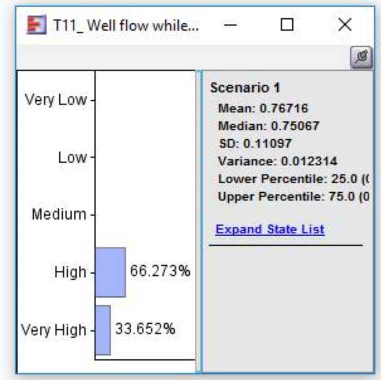
- Running 7" CRA liner (T12)

Resulting in major toxic release, fire and explosion

(T10, T12- Same set of barriers as T1)





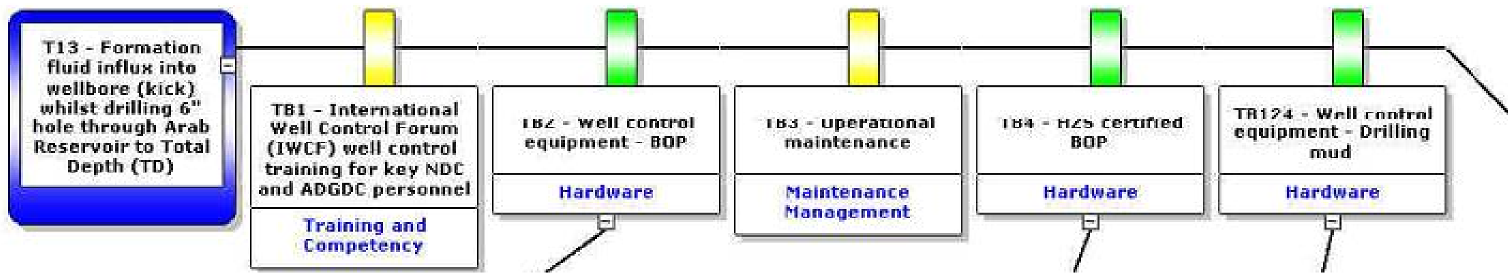


MAH 5 – Consequences (Toxic release, Fire and Explosion) – Same as MAH 2

MAH 6: Loss of containment (kick) during

- Drilling 6" hole through Arab reservoir

Resulting in major toxic release, fire and explosion



(T13- Same set of barriers as T1)

MAH 6 – Consequences (Toxic release, Fire and Explosion) – Same as MAH 2

Appendix 13 – Model feedback and validation workshop sheets

Barrier based Risk Assessment model for Major Accident Hazard applicable to Onshore gas drilling operations

Date : 06- Dec-2016

Model validation and feedback

Scale	1	2	3	4	5
	(very low)	(low)	(Neutral)	(high)	(very high)
Overall Conceptual framework - Barrier Performance factors					✓
Relevance of data				✓	
Models and Techniques					✓
Interpretation of results					✓
Overall applied value of the Risk model					✓

General feedback (if any)

Name	Designation	Organisation	Signature
VISHAL SHAH	TEAM LEADER TECHNICAL SAFETY	AL HOSN GAS	[signature]

Barrier based Risk Assessment model for Major Accident Hazard applicable to Onshore gas drilling operations

Date : 06- Dec-2016

Model validation and feedback

Scale	1	2	3	4	5
	(very low)	(low)	(Neutral)	(high)	(very high)
Overall Conceptual framework - Barrier Performance factors					X
Relevance of data				X	
Models and Techniques					X
Interpretation of results				X	
Overall applied value of the Risk model				X	

General feedback (if any)

Name	Designation	Organisation	Signature
Brian Bielss	Drilling HSE Mgr	Development AHG	[signature]

Barrier based Risk Assessment model for Major Accident Hazard applicable to Onshore gas drilling operations

Date : 06- Dec-2016

Model validation and feedback

Scale	1	2	3	4	5
	(very low)	(low)	(Neutral)	(high)	(very high)
Overall Conceptual framework - Barrier Performance factors					✓
Relevance of data					✓
Models and Techniques					✓
Interpretation of results					✓
Overall applied value of the Risk model					✓

General feedback (if any)

Excellent Presentation. Clearly a deep understanding of the topic. The presentation was well received and all the questions were answered in a clear and professional manner

Name	Designation	Organisation	Signature
Ben Boardman	HSE Systems Manager	AC Raw Gas	[signature]

Barrier based Risk Assessment model for Major Accident Hazard applicable to Onshore gas drilling operations

Date : 06- Dec-2016

Model validation and feedback

Scale	1	2	3	4	5
	(very low)	(low)	(Neutral)	(high)	(very high)
Overall Conceptual framework - Barrier Performance factors					✓
Relevance of data					✓
Models and Techniques					✓
Interpretation of results					✓
Overall applied value of the Risk model					✓

General feedback (if any)

(1) The Chart in the first slides are not clear → Numbers. → Colors.
(2) Bow tie Results (~~Front~~) must be bigger.

Name	Designation	Organisation	Signature
Ismail ALZarooni	Process Safety Engineer	CHSE	[signature]

Barrier based Risk Assessment model for Major Accident Hazard applicable to Onshore gas drilling operations

Date : 06- Dec-2016

Model validation and feedback

Scale	1	2	3	4	5
	(very low)	(low)	(Neutral)	(high)	(very high)
Overall Conceptual framework - Barrier Performance factors					✓
Relevance of data					✓
Models and Techniques					✓
Interpretation of results					✓
Overall applied value of the Risk model					✓

General feedback (if any)

⇒ Consistent font format in the ppt is preferable. / On slide 33, the Drilling locations taken are from UAE? or International? its UAE just mention it is offshore field here. / in slide 37, the figures are not Clear ⇒ same to slide 40.

Name	Designation	Organisation	Signature
Sara	Process Safety Eng	AHG	[signature]

Barrier based Risk Assessment model for Major Accident Hazard applicable to Onshore gas drilling operations

Date : 06- Dec-2016

Model validation and feedback

Scale	1	2	3	4	5
	(very low)	(low)	(Neutral)	(high)	(very high)
Overall Conceptual framework - Barrier Performance factors					✓
Relevance of data				✓	
Models and Techniques					✓
Interpretation of results			✓		
Overall applied value of the Risk model				✓	

General feedback (if any)

Use of Baseyian Network & combination of Bowtie is a very excellent idea & its self learning ability will maintain a dynamic overview of Barrier Risk Management.

Name	Designation	Organisation	Signature
AMEY KULKARNI	A/Mgr. SAFETY	ADNOC	[signature]

Barrier based Risk Assessment model for Major Accident Hazard applicable to Onshore gas drilling operations

Date : 06- Dec-2016

Model validation and feedback

Scale	1	2	3	4	5
	(very low)	(low)	(Neutral)	(high)	(very high)
Overall Conceptual framework - Barrier Performance factors					✓
Relevance of data				✓	
Models and Techniques				✓	
Interpretation of results					✓
Overall applied value of the Risk model				✓	

General feedback (if any)

Name	Designation	Organisation	Signature
G. DAWSON	SDE	AHG	[signature]

Barrier based Risk Assessment model for Major Accident Hazard applicable to Onshore gas drilling operations

Date : 06- Dec-2016

Model validation and feedback

Scale	1	2	3	4	5
	(very low)	(low)	(Neutral)	(high)	(very high)
Overall Conceptual framework - Barrier Performance factors				✓	
Relevance of data				✓	
Models and Techniques					✓
Interpretation of results				✓	
Overall applied value of the Risk model					✓

General feedback (if any)

Name	Designation	Organisation	Signature
TINU JIBRAN ZAFAR	SR. ENV. ENGINEER	AL HOSN GAS	[signature]

Barrier based Risk Assessment model for Major Accident Hazard applicable to Onshore gas drilling operations

Date : 06- Dec-2016

Model validation and feedback

Scale	1	2	3	4	5
	(very low)	(low)	(Neutral)	(high)	(very high)
Overall Conceptual framework - Barrier Performance factors					✓
Relevance of data				✓	
Models and Techniques					✓
Interpretation of results					✓
Overall applied value of the Risk model					✓

General feedback (if any)

Verey Good Project & good research

Name	**Designation**	**Organisation**	**Signature**
Andrey Yugay	Senior Well integrity Eng.	ADCO	[signature]

Barrier based Risk Assessment model for Major Accident Hazard applicable to Onshore gas drilling operations

Date : Jan 17th, 2017

Model validation and feedback

Scale	1	2	3	4	5
	(very low)	(low)	(Neutral)	(high)	(very high)
Overall Conceptual framework - Barrier Performance factors				✓	
Relevance of data				✓	
Models and Techniques					✓
Interpretation of results				✓	
Overall applied value of the Risk model				✓	

General feedback (if any)

I SUGGEST YOU EXPAND THE MODEL TO A "NON-LINEAR" SYSTEM I.E. A PLANT WHERE MULTIPLE PROCESSES ARE CONDUCTED IN PARALLEL

Name	Designation	Organisation	Signature
PATRICIO V. RIVERA	HSE - VP	AL HOSN GAS	Patricio Rivera

Meetings Record

Location:	CI Tower, 18th Floor	Date:	06.12.2016

Purpose of the Meeting:	Barrier based Risk Assessment model- Presentation & feedback

NAME	POSITION	CONTACT NUMBER	SIGNATURE
Sara Khamis	Process Safety Eng	050/2636868	[signature]
Ben Boardman	HSE SYSTEMS MANAGER	050 8115 829	[signature]
GRAEME DAWSON	SENIOR DE	050 6198529	[signature]
AMEY KULKARNI	ADNOC SAFETY DEP MGR	0503112753	[signature]
Andrey Lugay	Senior Well Integrity ADCO	0526521356	[signature]
TIPU JIBRA ZAFAR	SR. ENV. ENG	0508128938	[signature]
Brian Bielss	Drilling HSE Mgr	0566851399	[signature]
Ismail AlZaroon	Process Safety Eng	0507877661	[signature]