## Preventing the next Black Swan - Conference summary

More than 170 regulatory, industry, research and workforce representatives from 19 countries attended the 5th International Regulators' Offshore Safety Conference in Perth. Some four to five years since the Montara and Macondo offshore incidents, the conference focused on preventing the next 'Black Swan' event. A Black Swan event[1] lies outside the realm of regular expectations, carries an extreme 'impact', and for which human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable.

The conference program acknowledged work that has occurred since those major offshore incidents towards both understanding the causes and also preparing to better respond to similar incidents in future. The conference examined what has been progressed and noted in particular the capping and containment capabilities now available. Delegates also noted, however that such capability has addressed the right hand side of the 'event bow tie'. It is now necessary to focus on the left side of the 'event bow tie', to consider the control measures by industry and regulators to prevent future major accident events (MAEs).

The conference provided an opportunity for delegates to consider if enough had been done by industry and regulators.  This paper summarises the conclusions from the conference presentations, round table discussions and the panel sessions. It aims to identify what further work is needed to prevent the next Black Swan and to inform priorities for the International Regulators' Forum (IRF).

Presentations and discussions covered the following broad topic areas and challenged delegates to consider related questions:

1.  **Industry's progress, regulatory responses and response planning since Macondo and Montara**
    Questions - Have we done enough? Are we prepared as a regulated industry to protect people, the environment and communities should something go wrong?

2.  **Process and asset integrity risks**
    Questions – What should be our priorities for improving process safety, integrity management and reducing hydrocarbon releases?

3.  **Industry capacity; capability and competence of organisations and personnel**
    Questions - What are we missing? Where are the threats? Priorities for further effort?

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[1] The Black Swan: The Impact of the Highly Improbable, by Nassim N Taleb 2007

**Attachment 1** provides the collated responses of delegates from the round table working sessions.

The conference concluded in a panel session which drew on the discussions and sought to address priorities for further effort.

At the Annual meeting following the conference, the IRF considered the following themes and challenges.

### Organisational structure and incentives

Delegates were asked to consider whether organisations have built the required organisational structure and corporate behaviours into their companies to prevent major incidents. It was noted that some companies are now ensuring that they facilitate the role of engineers in considering process risks in their operations and to encourage independent thinking and improve the opportunity for the reporting of any concerns. This was support in some organisations by placing a process safety engineer within executive ranks.

It was suggested that regulators might take a role in encouraging companies to review the appropriateness of their structures to ensure there is adequate technical capacity available in all operations and locations to understand process safety risks.

It was also noted that while some companies negatively linked bonus results to OHS or Safety incidents it was suggested that bonuses may be better applied to leading process safety indicators.

Noting that company buy-in may more readily achieved if it could be shown that commercial benefits can be achieved through of a sound process safety culture, the conference delegates were challenged to find ways to demonstrate that linkage so that process safety can be built into each company's economic model.

It was posed that the development of appropriate standards might assist companies to implement process safety culture within their organisations. It was pointed out that the ISO/TC 67 'Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries' was building in some similar elements and there has already been a useful contribution by ISO standards 9001 and 14000 to organisational design and behaviour.

### Enlisting the support of industry

The conference noted the successes of the 'step change for safety' initiative in the United Kingdom. This has shown that industry, with encouragement from regulators, can achieve performance improvements without the need for new laws.

Regulators were encouraged to develop a list of their top five 'too hard' issues and set the challenge for industry to work on solutions to those issues.

### Understanding and selling a process safety culture

The conference acknowledged the work of Dr Mark Fleming within the IRF's current Priority Area 3 – "Safety Culture and Leadership". The creation of useful tools for organisations to examine the incorporation of process safety is likely to prove useful in promoting the message.

The depiction of 'process safety shields' inserted into the familiar 'swiss cheese' risk management model was considered a good way to demonstrate how the development of a process safety culture can act to prevent a potential company destroying 'Black Swan' event.

### Barriers to sharing the data and the lessons

There was strong support for the view that the sharing of incident data

- by regulators with industry, and
- between industry organisations

offers good prospects to increase knowledge of emerging trends or specific risks and can therefore, provide an opportunity to take action to reduce the risk of MAEs. Reliable data can have a positive influence on behaviour among both company technical engineers and executive management.

Delegates raised the ongoing importance of ensuring that staff avoid complacency and maintain a level of unease around the potential for MAEs. Three years on from Macondo are we seeing early signs of complacency? Such an outcome would be supported by sharing the lessons learned from mistakes and near misses.

There had also, however, been discussion during the conference of the barriers to sharing specific or detailed information. Some of the barriers mentioned included:

- fear of prosecution;
- fear of jeopardising a prosecution;
- fear of data being misused by third parties, and
- competitive positioning between companies.

It was suggested that industry and the IRF could more closely examine these barriers to determine if they are genuine, and, if so, how should they be removed.


**Engaging the workforce**

A number of delegates emphasised the importance of engaging with the workforce at all levels. It was noted that some companies are using the dissection of major incidents and the learnings from mistakes to help educate their workforce in process safety and, thereby, both guarding against complacency and enlisting the assistance of the workforce to maintain vigilance.

Another take on the value of engagement was the issue of workers (possibly in remote locations) who have not observed best practice at other facilities and who are, therefore, less informed in order to meaningfully gauge risk. Companies should find ways to expose workforce members to good practises in other facilities or companies (together with the necessary empowerment to recommend change). This could assist in improving operations across companies or regions.

It was noted that while workforce engagement is mandatory in some jurisdictions, engagement is often portrayed as too difficult or of little value. The industry and IRF could review the practices in various jurisdictions or circumstances to understand why engagement is not happening and how the impediments can be overcome.

**ATTACHMENT 1.**

**Analysis of roundtable discussion 1**

**Introduction**

A key activity at the International Regulators Offshore Safety Conference was two roundtable discussion sessions, which provided an opportunity for delegates to review issues covered by the presentations. This paper analyses the results from roundtable 1, which asked delegates to discuss

*"Have we done enough? Are we prepared as an industry to protect people, the environment and communities should something go wrong?"*

The roundtables were structured to ensure that discussions covered perspective of all offshore industry segments, including industry bodies (associations), individual oil companies, their supply chain and oil spill response partners, and the regulators. Given the breadth and seniority of those attending the IRF Conference, the summaries of these discussions should assist industry and regulators alike to review their existing work post Montara and Macondo, and to help set future priorities.

**What has gone well? Where post-Macondo work has been successful**

Each roundtable started by reviewing the work that had been done across the industry since Montara and Macondo. There was strong agreement that the improvements in well capping and oil spill containment were a key success, with acknowledgement that the availability of regional subsea capping and containment capability had seen a transformation. This had been coupled with a more subtle change in awareness within the industry and regulators alike of their vulnerability to loss of well control events, hence driving improvement such as better incident command structures, increased financial capacity, and greater focus on such process safety risks by regulators. The modernisation of a number of offshore regulatory systems since 2010 was noted.

Many of the table discussions also identified that the two major incidents had instigated strengthening of cooperation and collaboration within the global offshore industry on well control related issues, and acknowledged the role of the industry bodies in facilitating this. The rapid development of standards since 2010 was highlighted. Industry also tended to support an increasing ability of the regulators to work more collaboratively, seeking dialogue with those they regulate.

Lastly, it was apparent that the need for more formal competence management and assurance within the well control arena was now accepted

**Areas for improving or reinvigorating**

Interestingly, those areas highlighted as being successes were often the very same areas that the roundtables felt needed improving or reinvigorating, thus emphasising the need for continuous improvement. This was particularly apparent when discussions covered competency issues – with the so-called 'generation gap' now appearing across the industry, the need to complete roll outs of competency management systems, and to have strong assurance that such mechanisms were in place, were areas for further attention. Considerable concerns were expressed about the sustainability of the industry because of the lack of competency (particularly in the drilling sector given the numbers of new-build rigs) and a plea for the industry to be as innovative as possible to make sure of the competence of new entrants.

The regulators were not immune from criticism about their competency. While the challenges of ensuring a competent body of regulators was understood, it was felt by some that regulators in more mature regimes could provide better support to those who work within less mature or resourced jurisdictions, particularly given the global nature of the offshore industry. Emergency team competence was another issue highlighted, with a suggestion that industry funding to help design and/or run drill exercises (particularly for unusual situations) and provide trending and lesson learned advice from these, would be beneficial.

Some perceived a specific regulator issue of 'jurisdictional patch protection' in a number of IRF member countries. Regulatory systems with a multi-regulator approach were considered to have the potential for overlaps and uncertainties, and industry representatives felt their effectiveness and efficiency could be improved by greater clarity and coordination between those different regulators involved. Risk-based approaches by regulators were also felt to be best practice and the most effective use of scarce resources.

One area of cooperation that did not appear to be working as effectively as it should was sharing of lessons and data. Although regulator workshops were identified as one vehicle to promote the exchange of information, and regulator involvement in setting up safety performance and incident databases was suggested by one group, there was a concern about the commitment and ability of industry organisations to proactively share lessons with industry counterparts. The removal of legal liability barriers for genuine and meaningful sharing of lessons was highlighted. There was a plea for industry associations to better harmonise and coordinate global industry initiatives.

Well integrity and control, rather than capping and containment, were issues where delegates felt there was still some way to go post Montara and Macondo. The need for improvement in blow out preventer (BoP) reliability, better quality assurance over well construction and materials, and better and clearer working between well operators and drilling contractors were all issues that delegates felt ought to receive more attention. It was agreed that the challenges of responding to a shallow water blowout (a subject of a specific conference presentation) was a particular issue which warranted further attention.

Technology challenges tended to focus on the industry having the courage to think 'outside the box', with discussions asking what alternatives were being developed to traditional BOPs. Similarly, delegates concluded that there had not been much innovation on oil spill response techniques over the last couple of decades and were looking to updated equipment.

It was clear that the use of dispersants still needed to be taken further, with further studies to help establish the safety levels of when (and when not) to use them. Linked to this, it was felt that there ought to be more opportunities to share oil spill response plans to aim for better commonality and also to ensure that mutual aid agreements are in place across all geographical offshore basins. There were some reservations about how well the global capping/containment systems would work in some of the more remote regions, and the ongoing concern about the adequacy of existing solutions in the Arctic areas. Wildlife rehabilitation following oil spills was perceived as a weakness due to lack of appropriate personnel.

Lastly, there were still general concerns about the ability of the industry to effectively communicate its oil spill preparedness and to embrace social media communication to help.

**Analysis of roundtable discussion 2**

This paper analyses the results from roundtable 2, which asked delegates to discuss:

*"Priorities for improving process safety, integrity management and reducing hydrocarbon releases?"*

Each roundtable started by identifying 'good practices' that could be drawn from conference presentations and delegates own experiences that, if adopted elsewhere, could drive continuous improvement in safety globally. Secondly, each table considered how safety culture can have a positive impact on process safety and integrity management.

In reviewing and analysing the inputs received from the various roundtable discussions, the identification of 'good practices' currently in use translated readily into recommendations for priorities for driving improvements globally.

There was much discussion about the successes of larger scale initiatives, such as hydrocarbon leak reduction initiatives in the Norwegian and United Kingdom North Sea sectors, and other asset integrity initiatives such as the UK Key Programme 3 (KP-3), which was a comprehensive appraisal of asset integrity management of offshore installations.  KP-3 revealed significant issues with the maintenance of safety critical systems used in major accident hazard control in the industry. Following on from this initiative was the Ageing and Life Extension Inspection Programme (KP-4) with the aim being to promote awareness and management of the risks associated with ageing plant in the offshore oil and gas industry.

The success of the UK Step Change initiative was also recognised and cited by a number of delegates.

Key aspects of the success in achieving the stated objectives of the initiatives discussed above were, and continue to be, the cooperation and collaboration between stakeholders (which includes representation from industry, regulators and the workforce), with the resultant sharing of information and data and the adoption of best practices and learnings across the industry. Furthermore, these initiatives have been very successful at connecting people at all levels to create ownership.

Conference delegates stressed the need for companies to have a specific focus on process safety <u>in addition to</u> personal safety. Process safety focuses on preventing <u>fires</u>, <u>explosions</u> and accidental releases of <u>hazardous materials</u>. The frequency of process safety incidents is much lower compared to personal injuries, but the impact of a process safety incident can often be great, or even catastrophic.

Priorities identified by delegates for further improving process safety, integrity management and reducing hydrocarbon releases are summarised below:

**Leadership and management**

- Success requires strong leadership focusing an organisation on process safety (separate from, and in addition to, personal safety), including a clear articulation of process safety improvements that are required (for example setting a specific target for reduction of hydrocarbon leaks). Furthermore, leaders should stress <u>both</u> personal safety and process safety when visiting workplaces.
- Management systems must clearly address process safety in addition to personal safety. Among other things, these systems should focus on the importance of barriers and engender a shared responsibility to ensure these are effective and well maintained.

- Management systems should be designed to simplify processes as much as possible. For example, permit to work systems are in some cases too complex to work effectively.
- Leaders must be equipped with the necessary knowledge, tools and performance indicators regarding process safety.
- Asset integrity requires a long term perspective from day one (addressing what to do to be safe both now and in five and ten years' time) with a clearly communicated integrity plan.
- Contractors and subcontractors need to be educated on, and integrated into, operators' process safety and integrity management systems and plans.
- Management must demonstrate a willingness to slow down or curtail production as and when appropriate, to divert attention to ensuring ongoing facility process safety and integrity, and must empower workers to do the same.
- Long term integrity plans should consider removal of equipment as and when it becomes obsolete to reduce risk.

**Learning and communication**

- Communication efforts should be enhanced to elevate process safety risks to front of mind within organisations. Given the infrequent nature of such incidents, and the potential catastrophic consequences, such risks need to be made real to employees at all levels. The Piper 25 video is a good example.
- Expanded efforts are required for analysing process safety incidents for root causes and corrective actions. Process safety incidents should be analysed with the same vigour as is routinely done when investigating personal safety incidents. Use of a data driven approach, looking at process safety incidents in general, will help identify areas to focus attention.
- Industry should seek increased opportunities for sharing of incidents (including lessons learned), experiences, and best practices. Information shared in respect of incidents needs significantly more detail. If it is overly sanitized due to legal or competitive concerns, it is then difficult to understand and for others to effectively apply learnings.
- Forums for addressing cross industry safety issues, with a balanced involvement of management, workers and union representatives, would be beneficial.

**Operations**

- All operational roles should have defined competencies that are specific to process safety, and ongoing competency assessment and training programs should be in place.
- Safe operating limits need to be clearly defined and communicated, and employees empowered to shut down activities when limits are exceeded.
- Operators must take personal ownership over barriers within their areas of responsibility. Knowing what barriers individuals are responsible for, and that these same individuals are able to identify signs when the barriers are failing, is critical.
- Indicators on the status of barriers must be clearly visible to employees and management, both for surface and sub-surface barriers.
- Dedicated engineering resources should routinely review operating performance and barrier effectiveness to ensure consistency and effectiveness.
- Appropriate key performance indicators need to be identified, and dashboards should be used as an aid to driving improved performance (delegates pointed to dashboards in use by certain companies in respect of hydrocarbon release reduction plans as a good example of how this has been done).
- Toolbox talks at the worksite should include dedicated discussions about <u>both</u> personal safety and process safety.

**Workforce engagement**

- Senior management need to be equipped with the tools and knowledge to effectively communicate with the workforce.
- Managers and supervisors need to be actively involved in the work performed on the job site so as to properly understand the risks and provide appropriate management oversight. Likewise, the workforce (including unions as appropriate) needs to be actively engaged in identifying hazards and barriers.
- Worker input should be actively sought for all new company initiatives to ferret out risks and impacts that may otherwise be overlooked.

**Safety culture**

- Organisations need to strive for a 'no-blame' culture.
- It is healthy to maintain a 'chronic unease' in the workplace with respect to process safety so that risks remain front of mind at all times.
- Actions that exhibit a positive safety culture should be identified, reinforced and, very importantly, recognized and rewarded when displayed.  Measuring the effectiveness of these actions can assist in fine tuning behavioural expectations.
- Personnel need to be empowered to resist pressures to start-up new facilities before readiness, and to shut down operations when safety concerns would dictate, and be rewarded through positive reinforcement when doing so.
- Improving safety culture requires focus on four positive dimensions (safety leadership, vigilance, empowerment and accountability, and resiliency) while clearly acknowledging and recognising the negative dimensions that act as threats to organisational safety defences (e.g. production pressure, complacency, normalisation of deviance, and tolerance of inadequate systems and resources)