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Remarks as Prepared

Good Afternoon. I would like to start off by thanking the Canada-Newfoundland and Labrador Offshore Petroleum Board for hosting this Conference, and for inviting me to participate. Opportunities like this are always valuable, and I always walk out from these events a lot more knowledgeable than when I came in. That is certainly the case today.

I am grateful to be here as well because the relationship that we in BSEE have with Canadian regulators is very important to us. We share common concerns, and are each committed to the quest to improve offshore safety. So every chance to match pointers is an opportunity not to be missed. It truly is an honor as well to follow such a distinguished list of speakers today, including my colleagues from the International Regulators Forum, Anne and Jane. This has been an extraordinary line up of presentations. These are truly fascinating times!

Wherever offshore activity is taking place, whether it's here in the northern Atlantic, in the Gulf of Mexico, in the North Sea, off Australia, or in the Arctic, I think we can all agree that the pace of technological innovation is astounding. We are seeing exploration and development today in regions and in formations that seemed impossible just a few years ago; and with all of the emerging technology that is making this possible, we are simultaneously confronted with the challenge to match our thinking and our methods to the new realities - both as members of the industry and as regulators.

By way of illustration, I will share a little story, and in this I beg your indulgence because I am going back to my maritime roots somewhat.

While in the UK a few years ago on business, I made a side trip to Portsmouth England, to do something I had long wanted to do, which was to go on board the *HMS Victory*. If you are a naval history buff, as I am, you will know that *Victory* was Lord Nelsons flagship at the battle of Trafalgar, which was where he defeated the combined fleets of the French and Spanish, and having a significant effect on the course of European history. It was a battle that cost him his life, so *Victory* is something of a shrine to Nelson, in addition to being the oldest commissioned warship in the world, first launched in 1765. It's a magnificent ship, maintained in pristine condition, representing the pinnacle of naval technology during the glorious age of sail.

Now, just across the dockyard from *HMS Victory* is another ship, also preserved as a museum, the *HMS Warrior*. *Warrior* was built in the mid 1800's, about 90 years later than *Victory*, and although she had masts and sails, **Warrior** was designed as a steam vessel. The advent of steam propulsion was revolutionary. No longer was a ships maneuverability strictly limited by wind.

And yet, what was striking in comparing the two ships, despite the revolution in technology, was how much of the old ways of thinking had carried over into the newer technological age. A prominent example of this was the arrangement of the guns. There were no turrets, as we would

expect to see in more modern ships, where guns could be swung in any direction. Instead, they were arrayed on WARRIOR in the same fashion as they were on *Victory*, which is to say, along the sides, where they would be brought to bear against a target in the same way that Nelson employed them at Trafalgar. You had to point the ship just so, in order to fire the guns. So they had a revolutionary form of propulsion, which could maneuver irrespective of the wind, but were still thinking in terms of sailing vessels.

I mention this story, because it is a useful metaphor for how human beings sometimes confront significant changes. There is an inherent tension about it. On the one hand, it shows how the way we work and think about our professions does not uniformly keep pace with technological advancements. We often apply old thinking to new situations because it has always worked before, even at the expense of foregoing new possibilities and potentially even driving up the overall level of risk. This is undoubtedly a frustration for the early adopters among us! On the other hand, this story shows a cautious willingness to incorporate new technology, but with a healthy dose of skepticism. The thinking is that perhaps it is better to take the time to experiment, understand limits, and above all, have a fallback position that we know will work.

Either way, whether you are jumping feet first into new technology, or taking your time to fully understand it, risk is inevitable.

Today, we are used to a far greater pace of technological change. Forget a 90 year time frame, We grew up with Moore's law where we expect a doubling in computing power every 18 months! We have come to anticipate a new smart phone upgrade every year. Just think about how earlier this year we saw the announcement of the Apple Watch, which is basically a computer that is designed to be worn on your wrist. If you had asked me twenty years ago if I could envision a world in which I could surf the internet on my watch, I probably would have asked you what the internet is. Now, however, we are comfortable with that rate of change, and have come to eagerly anticipate the next generation of anything with a chip in it..

We like technology. It opens new possibilities and when used properly, it keeps us better informed, improves communication, makes our lives easier and helps us manage risk. But it also represents greater complexity. Even though we can do things that were not possible a few years ago, do we always fully understand the margins of safety?

In some cases, as in deepwater drilling, we are planning for wells which will use technology which has not yet been fully developed, and for which no technical standards have yet been devised. This is truly cutting edge stuff. The technology under development is extra-ordinary. The benefits to be derived from it are immense!

But, here I come back to the point of how we accommodate change. That we must be mindful of what this complexity represents for us in terms of risk, and seek to manage that risk as effectively as we can. All the more so because as we have all seen, when complex systems fail, they tend to do so in spectacular ways.

We can all rattle off names of many events which have had a profound effect, not only on individual operators, but on entire industries and even on governments, and most assuredly on public perceptions and expectations:

- The *Piper Alpha* explosion was the deadliest incident we have ever seen, and out of it the safety case approach was born.
- The Montara oil field blowout, about which Jane Cutler spoke earlier,
- The *Ocean Ranger* sinking, with 84 souls on board, which occurred not far from where we now stand,
- And of course, in the US, four and a half years ago, the fatal explosion, sinking and resulting massive oil spill from the *Deepwater Horizon*, and the Macondo field. This had a profound effect in the US and as Anne described, the effects were truly international.

From a business perspective, these catastrophic failures are not only deeply damaging and potentially fatal to individual operators; their effects reverberate throughout the entire industry.

Public acceptance of offshore operations is fragile. The term in use internationally, which has not yet gained currency in the US but it is descriptive and therefore useful, is “social license to operate.” Public acceptance of offshore drilling is fragile - as we have seen in the Gulf of Mexico, and as we are seeing in the Arctic. Acceptance is conditional; it has to be clean and it has to be safe.

Moreover, a dramatic failure by one operator will tarnish the entire industry. Everyone is blamed, including the regulator – because we are the ones the public depends upon to look after their interests. So, when it comes to managing risk, we are all in this together. We have a shared interest in safe and environmentally sound development of energy resources.

This, of course, is not something you are hearing for the first time – at least I hope not. For the past several years, there has been a lot of useful dialog and serious hard work to establish the framework for a meaningful *safety culture*. Here I would like to credit our Canadian colleagues for the leadership they have shown and for the scholarship they have undertaken in advancing our shared understanding of what safety culture means.

At the risk of understating its complexities, I will characterize the basic philosophy as being one where the primary owners of the risk are the operators, and therefore the operator must bear primary responsibility for managing it. This is the current philosophy in most countries where offshore activity occurs, even though the specific methods used to encourage and gauge the presence of a meaningful safety culture does vary.

In the U.S., we approach safety culture through our Safety and Environmental Management System (SEMS). This was a post Macondo development, which seeks to adopt some of the same

characteristics found in the safety case approach used elsewhere. There are clear differences as well, but the effect we are seeking to achieve is similar. We require the operator to develop a SEMS plan suitable to their activities, implement it, and then undergo periodic audits by third parties. The SEMS process supplements our own government inspections of offshore facilities, which are undertaken to ensure a baseline compliance with minimum standards. Because it preserves the government inspection component in conjunction with the performance based SEMS requirement, we call it a "hybrid" approach. It is an approach which recognizes that compliance with prescriptive standards will only get you so far. It verifies the condition of vital safety systems, but doesn't get to the heart of safety culture. So SEMS adds that performance oriented component which places the burden on the operator to think their safety processes through.

One can debate all day about the relative merits of various ways to approach offshore safety, whether it be a full-on compliance based regulatory approach, which was our previous model; a pure safety case approach in use in the North Sea and else where, or our hybrid approach..

Regardless of the system in use, I am confident that we would most likely agree on the desired outcomes we each seek to achieve through our regulatory efforts; however, I do not believe we will see complete harmonization between our regulatory regimes. For one thing, we all operate in our unique social and political environments, where public expectations shape the way we operate. Our methods are subject to scrutiny and to approval. As regulators, our currency is public trust. We are held to account based upon those expectations. So methods are bound to be different.

Our situation is a bit like the transition from sail to steam; we are keeping the sails just in case.

However, I do believe there is very little difference in the safety effects we are seeking to achieve, and therein lies the common ground between regulators, and with the industry we regulate. The one thing that holds true -regardless of the regulatory system in place: is that there is no escaping the importance of the individual operators' commitment to safety. It has to be real, not just a plan on a shelf. It has to start with leadership and permeate down to the workers on deck. And workers must think and act in a safety conscience way, even when no one is looking over their shoulder, and they must know that they will be supported when they stop work for safety reasons.

The point of safety culture is that it embraces not just the impressive technology, but the human element as well. People are part of the work process; they interact with the technology, derive data from it, make decisions based upon it. Human beings are also balancing competing pressures: Do I follow every step in a prescribed procedure and risk not meeting cost and schedule demands, or can I skip a step and make up some time? One wonders how many people wish they could have a "do over" in their response to that question? For that matter, how do we protect against someone just having a bad day? After all, we all have them. And as system managers, or as regulators, we need to assume that they will occur.

In thinking about how to move the discussion of safety culture to the next level, where systems, standards, procedures and people are linked in a more integrated way, I have been drawn to the approach used by High Reliability Organizations, or HROs. Some of the most technologically sophisticated industries and organizations in the world are following this approach as a way to make their safety programs more robust, and they have shown dramatic improvements in their safety performance, which is the ultimate measure of worth for any safety system.

One of the core attributes of an HRO is the preoccupation with failure – the focus on what can go wrong, strengthened by the assumption that at some point, it will fail. And when it fails, there will be consequences. Proceeding from that assumption, the question then becomes: how do you build in enough redundancy and internal controls so that when it fails, it fails safe?

There are many examples of how HROs have approached this. One of the most often cited examples is the U.S. Navy's "Subsafe" program, and with good reason. The SUBSAFE program was instituted after the loss of the *USS Thresher*, a nuclear powered submarine, in 1963. *Thresher* was lost due to uncontrolled flooding during a test dive, which forced the boat to descend below its crush depth.

SUBSAFE was established to prevent uncontrolled flooding. It looks at all system designs, material quality, and operational standards related to maintaining the integrity of the hull and preventing flooding. There is a rigorous series of certifications that underpin the system. And it has been effective. In the 50 years prior to SUBSAFE, the Navy lost 15 submarines to non-combat causes; in the 50 years since SUBSAFE, they've lost only one.

One can look to other fields as well and see similar results: the Nuclear Energy industry, and the Aviation industry. Two weeks ago, I was in a conversation with the Acting Chairman of the NTSB, and he pointed out that the Aviation industry achieved an 85% reduction in mishaps over a ten year period, simply by focusing on system reliability, no-fault reporting, and data sharing.

That same focus on systems, including the human element, used as a way to manage process safety and control risk, is every bit as applicable offshore. And thankfully, many companies in the offshore industry get this and are very far along in integrating HRO principles into their safety management approach. But, it is not yet universal, so the risk to the industry overall is still not fully addressed. The public trust that responsible operators are working to build and maintain, could be lost due to the failure of an irresponsible competitor. The entire industry is blamed when things go catastrophically wrong.

As a regulator, I want to do whatever I can to give meaning and rigor to safety management.

- Part of this is identifying and addressing risk as best we can... including targeting our regulatory activities towards the greatest risks and riskiest operators.
- Part of this is through collaboration with the industry, with academia and with SDOs, in helping to identify and then uphold the appropriate safety margins for new technology,

- and part of it is seeking to find ways where we can all benefit from increased information sharing and data analysis, so that we never stop focusing on what can go wrong.

That is why, among other things, we are embarking on a near miss reporting system, in the expectation that we will learn more about system reliability, including the human component of complex systems. It is why we will continue to refine our SEMS program, and to share information and lessons learned with our international colleagues, and why we remain intensely interested in learning from them. After all, we are interacting with the same companies, using similar technologies. It makes sense that we share what we are seeing. And it is why we are intensely interested in meetings such as this. This gathering lends itself to the questions that will inform our understanding of, and approach to, risk, especially because of the opportunity to hear it straight from the industry.

To sum up, ultimately, we are all coping with transformational change. And unlike the shift from sail to steam, the pace for us is exceedingly rapid, and highly complex. For those of us concerned with safety, we must continually question how best to manage change, from both a technological and a human perspective. And whether we are members of industry or regulators, we have a shared interest in making safety systems as meaningful as possible. Our fates, in the court of public opinion, are intertwined.

I appreciate the time and attention you have given me, and with the time remaining I would be happy to take your questions.