1.	Good morning. My name is Dave Rouse. I am an Incident Manager at Oil Spill Response Limited. During an oil spill I am accountable for ensuring OSRL's mobilisation and response is efficient and effective. I've been studying and working in the field of crisis management for 16 years. For the last ten years I have specialised in oil spill preparedness and response. I'd like to thank the leadership of the Petroleum Association of Japan for their hospitality and the invitation to speak at this workshop focussed on future challenges for oil spill response management and operations. The petroleum industry has made great progress in reducing the frequency of oil spill incidents. We are living in a time where, fortunately, major oil spills are a rare occurrence. Against this backdrop, we must remain focussed on ensuring that we are prepared and ready to respond to incidents. This workshop is a great chance to gain deeper insights from each other into what the future may hold and to develop our thinking about how to manage our resources to prepare for oil spill incidents in the most efficient and effective way possible.
2.	Over the next thirty minutes I'm going to be sharing OSRL's global perspectives with you. As you may know OSRL is owned by the oil and gas industry. Today we have 43 Participant Shareholder Members and more than more than 100 Associate Members. Together they represent more than 70% of global oil and gas production. We work with Members to prepare and respond to oil spills anywhere in the world and we have attended more than 400 spills in the last 30 years. Whilst OSRL grew out of responding to spills for the shipping industry, in recent years more than 90% of OSRL's preparedness and response experience has come from working with the exploration and production side. I've taken care here to select the insights and ideas that are most relevant to all parts of our industry.
3.	To forecast the issues which will be most relevant for the future of oil spill preparedness and response management, we need to understand current trends and their underlying root causes. There is a proverb that three heads are better than one. Applying that logic, I thought that 25 heads must be better still. So I consulted with 24 of my most senior and respected colleagues and we identified more than 80 different high-value insights, perspectives and ideas.

4.	The science says that adults are best able to absorb information when it is presented in a way they can contextualise. So for that reason, rather than talk in a theoretical sense, I've selected a number of recent real examples to illustrate the key trends and considerations for future spill response management, and have grouped these under five broad themes: • Evolution • Collaboration • Technology • Data and Information Management • Public Expectations Before I start I want to recognise and thank PAJ's very professional translation team. My promise to them, and you, is to speak slowly. This could be a challenge because I've only got half an hour and there's a lot I want to share with you… but let's give it a go!
5.	My first theme is Evolution We all know the many ways the oil and gas industry is evolving. The phrase "lower for longer" is often heard in reference to the price of a barrel of oil. Over the past few years we have seen the drive for cost efficiency across the whole industry. This, together with a shift in regulation towards cleaner fuels for vessels, and the trend towards exploring for gas, is changing the landscape for spill response. For example, we have seen major international oil companies divesting uneconomical assets which are being acquired and operated by smaller companies. Some of these smaller companies are new entrants to the oil and gas industry, backed by venture capitalists. The trend in these smaller companies in particular is of a much leaner and more streamlined business model. OSRL has observed that oil spill response expertise is lower and less widespread in industry than in the past. The underlying causes for this are that oil spill experts within oil and shipping companies are becoming a rare breed as a consequence of downsizing, job changes and retirements The good job industry is doing in preventing oil spills means that skill fade is becoming a real issue, and many in industry now have never responded in real life. The consequence of this is a high reliance placed on outsourced oil spill expertise. It is increasingly common for these outsourced experts to be managed by staff with limited knowledge of oil spills. A consequence of jobs holding wider portfolios than in the past. This can present risks in ensuring the right experts are selected, and that they are as good as their marketing suggests – particularly when it comes to responding.

6.	Another trend linked to this theme is the adoption of good practice guidance which is becoming more widespread. This is driven in part by the availability of clear and current information from the excellent publications produced by IOGP and IPIECA, and in part by increased expectations from regulators. Conventional thinking is that increasing expectations equates to increasing complexity and cost. This doesn't need to be the case as I hope to illustrate with the next example of how industry's preparedness for oil spills is evolving to meet the challenges of a lower oil price, leaner business models, reduced expertise within oil companies, and increasing expectations.
7.	We recently completed a project with a small operator that is setting out to drill one Exploration Well in Gambia. OSRL's role in the project was to develop and deliver the environmental and oil spill documentation required in order for the Operator to be granted their licence to drill. Gambia has no existing oil and gas industry, has limited infrastructure and the Regulator has limited knowledge and understanding of spill response. As well as that, the operator wanted the oil spill planning to adhere to all the latest good practices. The operator is very lean and relies heavily on outsourcing of key technical expertise and efficient supply chain management. This can be seen by looking at the make up of the project team which consists of just 17 people (one of which is the Managing Director of the company, another is a driver). The majority are contractors. The team is small but through selecting individuals with deep expertise and realising the need to work in partnership with the Regulator, they have been able to work at pace. To illustrate the type of pace I'm talking about, the environmental impact statement and oil spill contingency plan documents were submitted to the regulator yesterday, less than three months after work started on them. Those of you with experience of the upstream oil industry will know that this is exceptionally fast. One of the reasons this was achieved so quickly is the effort invested into developing good relationships with the Regulator, building trust and communicating openly with them. This example highlights what can be achieved in a very short timeframe through early partnering, open communication between industry and government and employing high quality expertise - without incurring high costs.

8.	This leads me neatly into my second theme of Collaboration. Collaboration is the key to high quality and efficient preparedness… and response. We know that an effective response relies on a high degree of cooperation between numerous stakeholders. We are seeing more examples of effective collaboration between operators and governments in the planning phase. The three main reasons for this are: • Cost efficiency – just a few years ago it was commonplace for organisations to independently commission virtually identical work. With pressure on costs, we see operators scoping projects such as sensitivity mapping jointly and dividing the cost. • Clarifying expectations – we have seen high turnover of staff in much of the industry and the consolidation of roles. For many of our clients, oil spill response is part of a very broad portfolio of responsibilities. The detailed understanding of who does what in an oil spill is not always retained in an organisation's corporate memory. Much of the collaborative work we see now is about ensuring individuals and organisations are clear about roles and accountabilities in the event of an incident. • Relationship building – It is well known that establishing relationships during preparedness improves outcomes during a pressured response. The turnover of staff within Operators, Regulators and other stakeholders means that new relationships constantly have to be developed.

9.	An example of what can be achieved through effective collaboration is the Global Initiative for West, Central and Southern Africa Project known as GI WACAF. The project was launched in 2006 as a cooperation between the International Maritime Organisation (IMO) and IPIECA. The project was originally commissioned to last just two years, but was so successful it was extended well beyond. The project covers 22 West, Central and Southern African countries, and is jointly funded by the IMO and currently seven oil companies. The scope of the project today is to organise workshops, training and exercises in collaboration with national authorities in charge of oil spill response, in partnership with oil company business units. The aim is to bring these parties closer together. GI WACAF is the longest standing of IPIECA's Global Initiative regional groups. Amongst its achievements, since 2006 the project has: Facilitated each of the member states in designating competent authorities responsible for oil spill related issues. Supported a number of the member states in developing and publishing National Oil Spill Contingency Plans. This support has been through capacity building which includes training, sharing of good practice and exercising. More than two thirds of the states within the GI WACAF project have now published National Oil Spill Contingency Plans. Facilitated the closer cooperation of Government and private stakeholders, which has led to joint activities including exercises. From its most recent Regional Conference, the participants agreed a number of priorities for the next two years including: • Developing comprehensive national dispersant use policies for each member state, which includes approved products, usage scenarios and approval authority. The further ambition for this is to harmonise the policies across all member states. • Developing shoreline response policies for each member state which includes defining the interface between authorities responsible for at-sea and shoreline response, and planning for waste and oiled wildlife management. • Formalising transboundary agreements to enable efficient cooperation during response, primarily by organising sub-regional activities and transboundary exercises. The GI WACAF model of enhancing regional cooperation has been very successful and aspects of it have been adapted by other similarly minded initiatives including GI South East Asia.

10.	My next example is also of regional cooperation. It is an example of a trend we expect to continue – of multiple industry and Governmental stakeholders working together to address a complex problem, rather than addressing it in silos. This example is a project which has just started with the aim of improving the planning for a shoreline response in the UK. OSRL is working with Oil and Gas UK, the leading trade association for the United Kingdom offshore oil and gas industry. In the event of an oil spill which impacts the UK shoreline, the national oil spill contingency plan outlines the specific roles Governmental organisations will play, and how they will interact with each other and with the responsible party. A common lesson from exercises held in recent years has been that not all parties properly understand the full detail of how they will work together. Furthermore, the project has recognised that a lot of work has been done to establish the baseline conditions of the UK's coastline. The problem is, this work has been done independently by many different parties, sometimes duplicating what has been done before. The project was set up to address these points. A Workshop was held last week which brought together representatives from 27 oil and gas operators, 12 local Government agencies and all five regulatory stakeholder groups. The Workshop used a hypothetical oil spill scenario to increase awareness, strengthen arrangements and align expectations associated with responding to spills which impact the coastline.
11.	The workshop achieved a number of benefits: • Participants strengthened their knowledge of their own agency's arrangements • Educated all participants on the latest good practice guidance for shoreline response • Expectations were aligned between all parties that would respond • Duplication and gaps in an individual agency's plans were identified • Identified opportunities for response efficiencies • Participants developed their networks and relationships The project also developed a Geodatabase. This took data from existing shoreline response plans developed by Operators and local authorities and visualised it in an electronic format which will be accessible to any responding party through a geographical information system. It is not uncommon for Operators to invite Government agencies to participate in major exercises, but the example given here is one of the first instances of this type of collaborative approach being used in the complex domain of shoreline response with such a large number of diverse stakeholders, at the same time. It is significant for future oil spill response management to work with all stakeholders throughout the preparedness phase. Forming relationships and clarifying and aligning expectations during peacetime will be rewarded several times over in the event of an incident.

12.	My third theme is Technology. This is a very broad theme which covers many aspects. I'm going to pick just a few to illustrate. The options we have to respond to oil spills remain largely unchanged in their general principles, but as with all aspects of our lives, the underlying technology continues to develop and evolve.
13.	Let's take offshore containment and recovery. This uses specialist booms towed by vessels through floating oil to 'contain' it, and uses skimmers to 'recover' it from the sea surface into some form of temporary storage. Containment and recovery is one of many options available to clean up oil spills and has the advantage of removing oil from the environment. However, as you may know, even in optimal conditions with trained and experienced responders, the efficiency of this technique is generally low.
14.	To give you a personal example: I responded to the Montara Well blow out during 2009 and spent a month offshore in the East Timor Sea conducting containment and recovery operations. All the variables were as favourable as I've ever seen them: • Every morning aerial surveillance directed our vessels to oil in large continuous patches • Sea state was consistently calm, wind was minimal, visibility good • The vessels we were using were well suited to the operations – large deck space, good low speed manoeuvrability and ample towing capability • The two vessels had good communication and synchronised their movements as I directed them • Crews were competent and motivated • The booms and skimmers we used were well suited to the oil and the environmental conditions. On our best day, over a 10 hour working period we recovered 28m3 of liquid from the sea surface, of which we estimated 70-80% was oil, the remainder being seawater. This may sound like a lot, but bear in mind that our skimmer was capable of pumping that amount in just a few minutes. The main challenge that limited our effectiveness was our encounter rate. That is the speed at which we could corral the oil in the boom. The design limitation of the boom meant we could only move through the oil at very low speeds. Even with competent crews and well suited vessels, maintaining such a low speed when accounting for currents was tricky, resulting in oil occasionally escaping the boom Even with a lot of oil available to collect, and good surveillance to direct us, it was hugely time consuming to encounter sufficient oil to fill the apex of the boom. To give you an idea, we spent an average of 8 hours 'encountering' oil for every 1 hour of skimmer run-time. (As you may know, to minimise the amount of seawater recovered by the skimmer, the oil needs to reach a certain thickness).

15.	Oil spill equipment manufacturers seek to improve encounter rates and mitigate these challenges through evolving the technology. The concept is called “enhanced containment”. For example: • Offshore boom which can be towed through the oil at a faster rate without the oil escaping. These improve the rate of encounter through increasing the speed vessels can search out and capture the oil. • Systems which can be deployed and operated by a single vessel. These improve the rate of encounter by being more manoeuvrable. Assuming that sufficient vessels and boom are available, more systems can be deployed simultaneously. • Systems with in-built oil and water separators. These improve the rate of encounter by reducing the amount of water which is recovered. Whilst these improvements have been on the market for a number of years and have been proven to be effective, we need to remember that the infrequent nature of spills means that equipment sitting in stockpiles has a very long shelf life and is replaced infrequently. When clients seek our advice on the matter, in most circumstances we recommend they purchase or hire offshore containment equipment that takes advantage of the latest technology for enhancing the encounter rate. Whilst it is a higher cost than conventional boom, the response advantages clearly outweigh this drawback.

16.	The next area of technology advancement I want to talk about is unmanned, autonomous technology. We can see the rapid progress that is being made in this field in many areas of our lives. The most high profile is the advancement of self driving cars and of Unmanned Aerial Vehicles – or drones as they are more commonly known. The pace of change in this area is so fast that OSRL's own philosophy is not to buy technology which would become quickly out of date, but instead to build relationships with the manufacturers of unmanned, autonomous equipment, educate them about response needs and work together to optimise their solutions. In a response we would work together to employ the technology to best advantage. Within this field, we are primarily talking about unmanned aerial vehicles (UAVs), unmanned surface vehicles (USVs), and unmanned underwater vehicles (UAVs). To give you some context, let me briefly outline how just one aspect of this type of technology will bring improvements to response. Unmanned Aerial Vehicles – UAVs. This is the aspect which is currently furthest advanced. You might already be familiar with this kind of technology in the form of drones. UAVs will improve oil spill response surveillance. For example, surveying a shoreline by air as part of shoreline clean-up will be conducted by UAV instead of by helicopter. The high resolution video feed will be live streamed instantly to responders who can start prioritising the areas that need a more detailed survey on foot. Not only will this be significantly quicker than waiting for a helicopter to land and report its observations, but it comes without the high costs, safety issues and logistical challenges of putting people in aircraft. Currently, the main challenges are around battery technology to enable sufficient flying time, and that many parts of the world have yet to understand how to regulate the use of UAVs to ensure they are used safely and legally, and do not infringe on privacy. We anticipate both these limitations will be addressed in the near future. As you can tell, we have barely scratched the surface of what unmanned technology can do. Understanding its potential and limitations, and gaining the maximum benefit from it is a major consideration for future response.

17.	Information and Data Management is my next theme. Oil spill response operations have always generated a significant amount of data. Managing this data so that it supports rapid and effective decision making is not a new challenge to us. There are two aspects to this theme I want to talk about. The first is about recording and managing data so that response decisions can later be justified. Technical Reasonableness is the measure by which insurers evaluate response decisions. In the event of a spill where claims are made by communities for damages, the justification for response actions (or inactions) will be examined by Courts. We all know that decisions need to be made quickly during a response. It is rare that all the information to make decisions is available to us so we use the best available data and document our assumptions. We monitor the effectiveness of our decisions and make adjustments. It is critical that we record decisions and the reasons for them, including what data we had and did not have at the time. Every response needs to keep this in mind, even if the volume of data generated is relatively low.
18.	For example, last year I was involved in managing a response in Nigeria. The scenario was a leaking offshore pipeline. The impact of oil spills on the communities of Nigeria is well reported in the international media, as is the fact that many spills take place which are completely unrelated to the oil companies operating there. In this particular response, one of the key considerations was to ensure we maintained detailed information about the oil which spilled from the pipeline, in contrast to oil already in the environment or from sources unrelated to our client. From the very start we worked with the client to establish a robust regime of collecting and assuring data from satellite imagery, aerial surveillance and containment and recovery operations. Samples of recovered oil were analysed to test whether it had spilled from the pipeline or was from another source. Surveillance continued after the pipeline repairs had finished to build a complete picture. The data collected was far in excess of what was required to make good response decisions, but will be used to justify response actions and to enable future compensation claims from the community to be assessed correctly. Hundreds of gigabytes of data were generated – for a relatively straightforward response to a fairly small release of oil.

19.	I want you to try and imagine the volume of data that would be generated if a major tanker spill happened tomorrow. Data starts being collected immediately. Just a few examples: Satellite imagery. Oil spill models. Photographic and video surveillance from aircraft. Hi resolution video feeds from unmanned aerial vehicles. Shoreline surveys which start even before oil reaches shore and continue throughout. Records of oil collected. Water column monitoring. Air monitoring. Contracts. Records of responders who have worked on the response, including the roles they performed and when they worked. Health monitoring of responders. Financial expenditure. I could go on. The amount of data that a response generates is massive. In future we need to be prepared to collect, manage and retain even larger volumes of data as electronic file sizes get bigger and the number of sources of data increase. The challenges and considerations we face today in response will continue to be relevant in future. Just three: • How to process the huge volume of data that is collected – ensuring quality control systems are in place and that information can be prioritised. • How to present responders with the right information, when they need it so they can make informed response decisions. • How to meet the expectations of the public and other stakeholders, who demand transparency and access to real time data through the internet. Industry has published good practice guidance on developing a Common Operating Picture, which is the term used to describe the computing platform, based on geographical information system (GIS) technology that provides a single source of data and information for situational awareness, coordination, communication and data archival to support emergency management and response personnel and other stakeholders involved in or affected by an incident. A number of GIS companies offer software solutions which are continually improving. I predict the science of big data management and artificial intelligence will become increasingly relevant to oil spill response in the coming years, but for now two of the most important considerations remain: • Ensuring we know how data will be managed before a spill happens. • Ensuring a capability is in place to establish a common operating picture early in a response.

20.	My fifth and final theme follows on from this. I want to talk briefly about Public Expectations. This is really about managing communication to the public so that it is timely, appropriate and accurate. Which makes it sound a lot easier than it is. Here is an example of how important this is, and how easy it is to get wrong. OSRL was not involved in this but it was recounted to us by one of our clients. The regulator in a West African country organised and held a large oil spill exercise last year. As part of the exercise, oil spill equipment was deployed close to the shore from vessels, and workers on the shoreline deployed booms on the beaches. The first day of the exercise was successful and everyone was congratulated on a job well done. The next morning, the front page of the local newspaper had just one story. It showed photographs of the vessels deploying boom and the workers on the shoreline, and speculated that an oil spill had happened… Of course there was no oil spill, and the matter was quickly clarified by the organisers of the exercise who realised they had not notified the media or announced to the public that an exercise was taking place. This case illustrates the relentless demand for information from the media and the public. I want to build on this in my next example.
21.	Think back to the Deepwater Horizon oil spill. Do you remember the live video stream of the oil leaking from the seabed that BP published on their website? Much about that spill set new precedents, but one area in particular was the transparency of information BP made available to the public. Deepwater Horizon happened before smartphones were ubiquitous. We accessed the internet mostly through laptop or desktop computers; we took photographs with cameras. Today, the smartphone in your pocket gives you access to realtime information about anything. Sport scores, the stockmarket, breaking news. Information is immediate. They record high definition video and can upload it within seconds. Anyone can become a journalist and break news stories.

22.	The last example I am going to use today is a hypothetical scenario which I have used during crisis management training. Picture an offshore oil rig. There is a process malfunction leading to a fire. There is a risk of explosion and possibility of the rig sinking. Personnel are evacuated by helicopter. Once airborne, rig workers take photographs and videos on their smartphones of the rig ablaze. These photos are circulated via WhatsApp to their friends and family. Whilst the evacuation is still underway, the media has become aware of a potential problem offshore because helicopter movements have increased. Even before the first helicopter with evacuated rig workers reaches the shore, one of the videos has been published to Facebook. The media pick this up and publish a breaking news story. This leads to worry for families of rig workers and widespread public speculation about the environmental impact of an oil spill. You can see how quickly this could escalate and it does not require a lot of imagination to understand some of the things we need to consider when managing incidents in a future where everyone can be a journalist and social media is used as the platform for publishing unverified information at a pace that can overtake formal communication with the media and public.

23.	I'd like to conclude with a few final thoughts. We've covered a lot of information over the past thirty minutes or so. I hope the examples I've used have been relevant, interesting and have given you some context for five areas where it is important we focus our thinking as we consider future spill response management and operations. To briefly recap the five themes: • Evolution – the industry continues to evolve. Incidents are becoming rarer and response experience scarcer. Remaining focussed on preparedness is critical. • Collaboration is the key to effective response. It is also the key to efficient preparedness. Three heads are better than one. • Technology advancement will make spill response safer, more efficient and more effective, but we must ensure we understand how to access and optimise it so we can maximise the benefits it offers. • Data and information management – ensuring response decisions are based on good data has always been critical. In future we can expect much more information to be collected. Whilst managing this will be challenging, the potential is there for faster, better decision making as a consequence of making the right data available to responders. • Public expectations. Oil spills will always be newsworthy. The media landscape is changing and everyone now has the capability in their pocket to be a reporter. We need to prepare for a future where communication with stakeholders will be very different than it is today. In closing … This Workshop today is a great opportunity to get to know each other, to develop our thinking and deepen our insights. Preparedness for oil spills remains as important today as it always has been. It is a case of when, not if the next big spill will happen and it is our responsibility to make sure we are ready when it does. Thank you very much.