

# FROZEN FUTURE

Shell's ongoing gamble  
in the US Arctic





# Executive summary

Royal Dutch Shell stands at a strategic crossroads. Its response to the reserves scandal in 2004 has been a global reserves replacement hunt through a programme of relentless capital expenditure. This search included an investment in US Arctic Ocean leases in the mid-2000s that dwarfed other companies' spending (see section 1.2). Shell's US offshore Arctic plans have been a failure despite capital expenditure, to date, in excess of \$5bn. Following a 2012 drilling season beset by multiple operational failings and a subsequent 'pause' in the company's Arctic programme, Shell announced, on 30 January 2014, a forced reversal of its intention to return to the Chukchi Sea in the summer of 2014.<sup>1</sup> The main factor cited by Shell for its decision to pause its offshore Arctic drilling programme yet again was a decision by the US Court of Appeals for the Ninth Circuit. On 22 January 2014, the court found in favour of Alaska Native and conservation organisations in their challenge to the environmental analysis underlying the US government's decision to sell leases, including those owned by Shell, in the Chukchi Sea. The plaintiffs have sought to have the leases invalidated. Even if that does not occur, it is likely that the government will be forced to carry out a new environmental analysis, which could delay Shell's exploration in the Chukchi Sea by several years (see chapter 3).

Investors in IOCs are increasingly questioning allocation of shareholder capital to high cost, high risk projects such as offshore Arctic drilling against an industry backdrop of flat share prices and declining returns on equity even through a period of sustained \$100/barrel oil prices.<sup>2</sup> Shell's January 2014 profit warning – the company's first in 10 years – was attributed in part to "high exploration costs".<sup>3</sup> Despite increasingly vocal shareholder calls for greater capital discipline, Shell remains committed, at least publicly, to the high cost, high risk US Arctic Ocean.

Significant concerns remain regarding Shell's preparedness and capabilities for responding to a major incident. In reviewing the company's 2014 exploration plan and operating plan, one of the relevant regulatory agencies, the Bureau of Ocean Energy Management (BOEM), raised a number of significant questions. Several of these queries relate to contractor oversight (see section 5.2) – the source of many of the problems that arose in 2012 and an unwelcome echo of the root causes of the *Deepwater Horizon* disaster. Shell's response to these questions and its public statements do not evidence serious recognition of the problems in 2012 or a concerted effort to improve.

As Ben Van Beurden, the new CEO of Shell, prepares to deliver his vision for the future of the company and to set its strategic priorities, he and investors must carefully balance any focus on reserves replacement ratio with the potential financial impact of the short and long-term risks inherent in any project. The US Arctic Ocean presents almost a perfect storm of risks – a requirement for a long-term capital-intensive investment for uncertain return, a remote and uniquely challenging operating environment, ongoing court challenges, a lack of extraction and spill response infrastructure, and the spotlight of the world's environmental organisations, the US political community and international media. In this context, investors must scrutinise Shell's assessment of such risks and the company's ability to mitigate and manage them in order to determine whether the potential return provides sufficient justification to continue. Questions for investors to ask Shell on these issues are suggested at the end of each chapter and brought together in the conclusion.

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## ARCTIC OIL AND GAS PROJECTS – THE RISKS FOR SHELL AND ITS SHAREHOLDERS UNCERTAIN LONG-TERM PROFITABILITY

Shell's capital investment in 2013 is at a record high, while at the same time, the company has warned investors that its 2013 profits are at a steep drop.<sup>4</sup> In this context, shareholders should question whether Shell's continued investment in Arctic Ocean drilling is likely to return capital in the long run. Such a return would require finding significant oil reserves at Shell's prospects and sufficiently high oil prices beyond the 2030s.

Shell's Chief Financial Officer, Simon Henry, acknowledged that Shell depends on an oil find to make profit from the Chukchi Sea project.<sup>5</sup> However, the US government has estimated the Burger Gas Discovery (Shell's prospect) to contain 14 trillion cubic feet (tcf) of dry gas and 724 million barrels (mnb) of condensate – no crude oil.<sup>6</sup> The government agency concludes: *“Even under a very optimistic set of assumptions, Burger is a marginal development opportunity.”*<sup>7</sup>

Analysis from Rystad Energy based on government estimates also suggests Burger is an uneconomical gas play. In fact, with current resource estimates and current projections of North American natural gas prices, the project is estimated to yield a negative cash flow of over \$23.5bn (see section 2.3). While proprietary data from Shell's geological assessment of Burger may encourage the company to drill for oil there, all other sources of information suggest that Burger is a high cost gas play that is unlikely to be commercial.

Even with an oil find, Shell would depend on high oil prices to justify extraction from the Chukchi Sea prospect. These prices would be determined by the oil market in the 2030s, which depends on both highly unpredictable technological changes in transportation efficiency and whether government policies will continue to fail to address global climate change. Effective climate regulation would involve reducing oil demand and result in lower oil prices, thereby making Arctic oil extraction unfeasible. Considering economic analysis by the International Energy Agency (IEA), Shell appears to be gambling on a lack of effective climate regulation, and even the IEA considers that gamble to be highly risky (see section 2.4).

### LITIGATION RISK

Corporate and government decisions to move forward with oil and gas activities in the US Arctic Ocean have generated substantial opposition and litigation by conservation organisations, local government and community bodies, and Alaska Native entities. Since 2007, successful federal court challenges have been brought at all relevant stages of the process – Five-Year Leasing Program, lease sale, and exploration.<sup>8</sup>

Most recently, the Ninth Circuit Court of Appeals invalidated the environmental impact statement underlying the government's decision to hold Lease Sale 193 – the sale in which Shell purchased the leases on which it seeks to drill in the Chukchi Sea.<sup>9</sup> The challenge was filed by Alaska Native and conservation organisations, and the ruling is the second court decision invalidating the government's 2008 analysis.<sup>10</sup> Petitioners are asking the court to invalidate the leases and, even if that request is not granted, the government will need to remedy the problems identified by the court, which may delay Shell's drilling by several years, as the previous decision did.

The strong opposition and litigation are almost certain to continue. In another pending case, Alaska Native and conservation organisations are challenging the government approvals of Shell's oil spill response plans for the Chukchi and Beaufort seas (see chapter 3).

### INADEQUATE OIL SPILL RESPONSE

The potential financial impact of a major oil spill in Arctic waters has not yet even been assessed by Shell. In addition to significant financial penalties in the form of clean-up and remediation costs (compounded by the practical challenges involved (see section 4.2)), regulatory fines and prolonged litigation in a variety of courts from a myriad of claimants, Shell would also likely face uncertain impacts on share price and credit ratings, unprecedented reputational damage, and a threat to its ability to do business in the US. Almost four years after the *Deepwater Horizon* disaster, BP is still banned from bidding for government contracts.<sup>11</sup> In order to pay the penalties and address longer lasting financial impacts, BP has sold assets worth \$38bn in the past three years.<sup>12</sup>

Since Shell is self-insured to only \$1.15bn per event,<sup>13</sup> it is likely that Shell would have to conduct a similar 'fire sale' of assets to meet the resulting financial liabilities of a major Arctic spill. At present, it is far from clear that Shell has adequate physical or financial oil spill response plans. In fact, there is no available information about how the company would address the financial implications of a major spill.

The US government estimated that there is a 40% chance of a large spill (over 1000 barrels) during the lifetime of exploration and extraction of oil in the Chukchi Sea.<sup>14</sup>

So far, no analyses have been published quantifying the specific oil spill response impediments in Shell's lease areas in the Chukchi Sea. But a study commissioned by WWF found that it would not be possible to respond to an oil spill in the Canadian Beaufort Sea for

seven to eight months of the year.<sup>15</sup> During the most favourable weather conditions (July–August), a response would only be possible 44–46% of the time, assuming that the infrastructure and workforce were readily available. A response gap analysis needs to be carried out and published to be able to accurately assess the threat that spills pose to Shell's potential operations.

Even if response efforts can be mounted, the usual techniques for controlling a spill (booms, skimmers, and dispersants) are of questionable efficacy in icy waters. Nonetheless, Shell's worst case scenario planning is based on the questionable assumption that those types of mechanical recovery equipment would recover 95% of a major spill before it could reach the shoreline<sup>16</sup> – a clean-up rate that has not been achieved for any large spill anywhere to date (see section 4.2). Less than 10% of spilled oil was recovered using these techniques after the *Deepwater Horizon* and *Exxon Valdez* spills.<sup>17</sup>

The infrastructure to mount a large-scale response to an oil spill in the Chukchi Sea simply does not exist. The nearest major road system is more than 500 miles away as the crow flies. There are no hotels or other housing capable of accommodating thousands of responders. The nearest Coast Guard station is roughly 1000 miles from the likely drilling sites (see section 4.3).

Essential safety equipment has not been tested in appropriate real-life conditions. A 2012 Freedom of Information Act request revealed that Shell's capping stack (vital equipment in case of a well blowout) was tested for less than two hours off the coast of Seattle rather than in icy water and was not attached to a simulated wellhead and blowout preventer as would be necessary in real life (see section 4.5).

Shell's 2014 Chukchi Sea exploration plan suggests that overall spill response capacity may be reduced. The previously approved oil spill response plan depends upon simultaneous operations in the Chukchi and Beaufort Seas allowing both fleets to be mobilised in the event of a spill in one sea. Shell's operational plans do not explicitly commit to bringing all of the assets proposed for response in the previous plan and do not propose increasing response capacity, despite only intending to operate in the Chukchi Sea (see section 4.4).

#### MANAGEMENT RISK

In the aftermath of Shell's numerous operational setbacks in its 2012 US Arctic programme, Shell's failures should also be viewed, in corporate governance terms, as a failure of management and board oversight. In its review of the 2012 season, the US Department of the Interior found that there were "*significant problems with contractors on which Shell relied for critical aspects*

*of its programme*" (see section 5.1). The review went on to describe the problems with contractor management and oversight as "*the most significant shortcomings in Shell's management systems.*"<sup>18</sup> It then recommended that Shell satisfy two conditions prior to being allowed to resume drilling operations in the US Arctic Ocean. While Shell published an integrated operations plan in November 2013 (fulfilling the first condition), it has not yet fulfilled the second condition: "*a full third-party audit of its management systems, including but not limited to, its Safety and Environmental Management Systems program (SEMS).*" This has resulted in a situation where the integrated operations plan refers repeatedly to management systems such as SEMS which have yet to be audited independently (see section 5.2).

Shell does not specify in its 2014 integrated operations plan what changes have been made in contractor oversight and selection practices since 2012. BOEM also requested more detailed information from Shell regarding contractors, stating that Shell's documents "*must clearly detail how Shell conducts contractor oversight to ensure that its safety and environmental protection policies and standards are implemented by its contractors.*"<sup>19</sup>

2012's operational failures stood in marked contrast to the confident statements of board members about the company's preparedness for Arctic exploration, suggesting a lack of senior executive oversight of a high risk, heavily scrutinised project. 2014's most recent development – the finding of the Ninth Circuit Court of Appeals – appears to have blindsided the company. Furthermore, the company's statements that its "*2012 exploration drilling operations in the Arctic were conducted safely, and with no serious injuries or environmental impact*" suggests that the company has chosen to make a surprisingly positive internal assessment of what to an objective observer was a failure (see section 5.5).

#### REGULATORY UNCERTAINTY

Both ConocoPhillips and Statoil identified uncertain standards as reasons for delaying exploration. In fact, ConocoPhillips announced in a press statement that it was delaying planned exploration "*given the uncertainties of evolving federal regulatory requirements and operational permitting standards*" (see chapter 6).



# Introduction

Since Shell's most recent attempts to drill for oil in the remote waters of the Chukchi Sea, the already substantial challenges facing international oil companies (IOCs) – including the lack of access to easily accessible conventional oil and the increasing pressures of climate change – continue to intensify. Despite investing more than \$5bn over nearly nine years (for both the Chukchi and the Beaufort seas),<sup>20</sup> Shell has not yet booked any reserves from these prospects. While not solely to blame, capital expenditure – of which spending on Arctic drilling is a part – has been identified by Shell as part of the backdrop to its January 2014 profit warning.<sup>21</sup>

Shell's efforts to drill exploration wells in 2012 revealed a cascade of operational problems that contradict the confident statements from board members about the company's capabilities. Among other problems, the company failed to secure timely certification of its containment barge, the *Arctic Challenger*, failed to test essential spill containment equipment successfully, violated its air permits and health and safety standards, nearly grounded one of its drilling vessels, the *Noble Discoverer*, and ultimately, failed to secure permission to drill for hydrocarbons (see section 1.3). In December 2012 Shell's situation deteriorated further when its drilling rig, the *Kulluk*, which was being transited under difficult winter conditions in part to reduce tax liabilities in Alaska, ran aground near Kodiak, Alaska. Shortly before the publication of the US Department of the Interior's investigation into Shell's activities during the

2012 drilling season, Shell announced that it was "pausing" its drilling programme "to prepare equipment and plans for a resumption of activity at a later stage".<sup>22</sup> Nearly one year later, substantial questions remain regarding the future of the oil industry in the Arctic.

Attitudes towards drilling in the Arctic are continuing to change across the industry. Other oil majors – Statoil, ConocoPhillips and Total – have all stepped back from drilling for oil in US Arctic waters – largely at the project level – for reasons of cost, as well as regulatory uncertainty (see section 1.5). Total has announced that it would not drill for oil at all in the Arctic Ocean due to the reputational risk of any spill in the region.<sup>23</sup> In addition, respected international commentators, including industry analysts such as Bernstein and Wood-McKenzie have questioned the attractiveness and profitability of projects in the region, with time frames "likely to disappoint".<sup>24</sup>

Similarly, the International Energy Agency (IEA) questions the likelihood of substantial extraction, and therefore profitability in the Arctic Ocean before 2035. In addition, this analysis has underlined an increasing debate over the continuation of growth in global oil demand. Deutsche Bank, HSBC and Citi are all now positing – for a variety of reasons, almost none of them traditional 'environmental' concerns – that there is now a very real possibility that global oil demand will peak before 2020.<sup>25</sup> Given this time frame, the viability of offshore Arctic oil extraction seems to rest on continued oil demand growth and high oil prices.

This, in turn, rests on continued inaction to address climate change and a lack of innovation in the transportation sector that is far from guaranteed (see section 2.4).

Consequently there appears to be an emerging reluctance from investors to accept ever-increasing capital expenditure (capex) in a high cost region with little or no corresponding return on investment. Commentators and asset managers are now questioning whether such high capex is actually eroding shareholder value, even in a high oil price environment<sup>26</sup> – as indicated by Shell's profit warning. It is in this highly volatile environment that Shell has sought new regulatory approvals to return to the US Arctic Ocean. Despite the failure of Shell's offshore Arctic exploration to date, the company is still the most publically committed of IOCs to offshore drilling in ice-covered waters. This report explores the many operational questions – including spill response capacity and equipment – that remain unanswered to the satisfaction of the US government and others, along with questions of real economic risks to these projects that remain unanswered to the satisfaction of analysts. Investors will need to assess this matrix of risks – operational and regulatory risk, management issues, local and global environmental challenges, unspendable capital or unburnable carbon. This report provides background to better understand those risks and poses questions to which shareholders need answers in order to assess how Shell is addressing them. These questions can be found at the end of each chapter, as well as at the end of the report.

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# 1. Shell and oil exploration in the US Arctic

This chapter sets the context for our analysis of Shell's plans to drill in the US Arctic Ocean. Despite company assurances of experience, it has never successfully extracted oil from offshore in the US Arctic. After drilling a number of unsuccessful exploration wells in the 1980s and 1990s, Shell only returned to the region in 2005. Successful legal challenges, government regulation, and management failures have prevented Shell from drilling for oil on its new leases, while other IOCs remain much more wary of Arctic drilling altogether. Shell's efforts to drill in the Arctic Ocean come at a time of growing industry and investor skepticism about the operational and economic feasibility of offshore US Arctic oil exploration and continued concern about Shell's lack of preparedness for the varied associated risks.

## 1.1 A HISTORY OF UNSUCCESSFUL OFFSHORE EXPLORATION

Until relatively recently, efforts to extract oil and gas in Alaska were focused onshore and in Cook Inlet (on Alaska's southern coast).

No oil has yet been extracted from offshore drilling in the US Arctic Ocean.<sup>27</sup> Ice, technological limits, and plentiful resources elsewhere have substantially limited corporate efforts and interest. The primary area of interest in terms of oil extraction is offshore of Alaska's North Slope – in the Chukchi and Beaufort seas.<sup>28</sup> The late 1970s until the early 1990s saw the first big push to drill for offshore Arctic oil and gas resources. In the 1980s and 1990s, companies including Shell spent billions of dollars to acquire leases in the Beaufort and Chukchi seas. By 1997, 30 exploratory wells had been drilled in the Beaufort Sea. Five additional wells were drilled in the Chukchi Sea in 1989–1991.<sup>29</sup> By 2000, the companies had

allowed almost all of the millions of acres of leases they had purchased to expire as commercially viable finds had not been made.

Shell drilled seven unsuccessful wells in the Beaufort Sea between 1985 and 1986; six of these were drilled from gravel islands rather than offshore drilling rigs. From 1989–1991, Shell drilled four of the five unsuccessful wells in the Chukchi Sea, including one at the Burger Prospect.<sup>30</sup>

## 1.2 SHELL BUYS BULK OF ALASKA LEASES IN WAKE OF RESERVES SCANDAL

The second big push to develop offshore Arctic exploration began when George W. Bush took office in 2001. Lease sales held between 2003 and 2008 are responsible for almost all of the leases currently owned by IOCs in the US Arctic Ocean. Approximately three million acres of leases were sold to IOCs for roughly \$3bn. Shell was the dominant bidder – spending approximately \$2.2bn to acquire roughly two million acres of leases.<sup>31</sup>

Shell did not participate in the first sale, Lease Sale 186, in the Beaufort Sea held in 2003. At some point after the sale, however, the company decided to invest heavily in the US Arctic Ocean. In 2005, the company purchased shares in 19 leases that EnCana owned from the sale. It also spent \$44m to acquire 180,000 acres of leases in the next sale in the Beaufort Sea in 2005. ConocoPhillips, the only other participant in the sale, spent just over \$1m to acquire 26,000 acres. Though no public statement linking the events is apparent, the timing makes it appear that this heavy investment was at least in part a response to Shell's reserves scandal of 2004, when the company was forced to slash oil and gas reserve estimates

by approximately 20% and which led to the departure of three top executives – including the Chairman, Phillip Watts<sup>32</sup> – and left the company in urgent need of new reserves.

Shell's investment dwarfs other companies' spending. For example, in the 2005 Lease Sale in the Beaufort Sea, "Armstrong bid an average of \$13.90 an acre for some 89,500 acres; ConocoPhillips bid an average of \$16.61 an acre for some 66,235 acres; North American bid an average of \$22.04 an acre for some 80 acres; and Shell bid an average of \$95.91 an acre for approximately 462,600 acres."<sup>33</sup> None of these bids overlapped – the companies were all bidding for different tracts. The minimum bid amounts were roughly \$10 or \$16 per acre, depending on exactly where the leases were located.

That pattern continued in 2008 in Lease Sale 193 in the Chukchi Sea. Shell bid more than \$10m on several leases that received no other bids. Even when there was competition, Shell's bidding often far exceeded that of other companies. For example, Shell bid more than \$6,000 per acre, for a total of more than \$34,000,000 for lease block 6913. The only other bidder, ConocoPhillips, bid just more than \$10 per acre, for a total bid of slightly over \$60,000.<sup>34</sup>

In the Beaufort Sea, Shell owns 74 leases outright and has partial ownership (shared with Eni and Repsol) of another 64 blocks.<sup>35</sup> By contrast, BP owns one block outright, and another seven are shared between Eni and Repsol.<sup>36</sup>

Several companies have let leases in the Beaufort Sea expire. ConocoPhillips, for example, allowed almost all of its Beaufort leases to expire in 2009, stating that the

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company does not “believe there is hub potential in the area... Exploration within the Beaufort Sea is cost-intensive since the targets are offshore and the area is substantially segregated from existing production infrastructure.”<sup>37</sup> Shell itself has allowed leases it purchased to expire, including 12 out of the 19 leases it purchased from EnCana in 2005.<sup>38</sup>

In 2006, Shell announced its intention to drill exploration wells in 2007–2009.<sup>39</sup> It received the necessary permits, but the plans were stopped by successful legal challenges.<sup>40</sup> The company's new plans for drilling in both the Beaufort and Chukchi seas in 2010 were stopped by legal challenges and the government's decision not to authorise drilling in the wake of the *Deepwater Horizon* disaster.<sup>41</sup> Shell sought to return to Beaufort and Chukchi seas in 2012. It did not receive all of the needed approvals and was not permitted to drill into hydrocarbon bearing zones. The company did manage to complete one top hole in each sea but, as explained in the next section, was beset by a series of problems and near disaster.

### 1.3 SHELL'S 2012 SUMMER OF DISASTER

Despite a backdrop of confident statements from board members about the company's capabilities and the absolute dismissal of concerns regarding spill response, Shell endured successive setbacks during 2012. Among other problems, the company failed to secure timely certification of its containment barge, the *Arctic Challenger*, failed to test successfully essential spill containment equipment (see section 4.5), violated its air permits and health and safety standards,<sup>42</sup> nearly grounded one of its drilling vessels, the *Noble Discoverer* (see section 5.2), and ultimately, failed to secure permission to drill for hydrocarbons. In December 2012 Shell's situation deteriorated further when its drilling rig, the *Kulluk*, which was being transited under difficult winter conditions in part to reduce tax liabilities in Alaska, ran aground near Kodiak, Alaska (see section 5.4). These problems were not limited to transport, as Shell could not detach the *Noble Discoverer* from the Chukchi Sea floor as planned and suffered from a significant lack of de-icing equipment and experienced helicopter pilots in the Beaufort.<sup>43</sup> Ultimately, the company had to dry tow both the *Kulluk* and *Discoverer* to Asia for repairs,<sup>44</sup> may scrap the *Kulluk* entirely, was subject to investigation by several US government agencies, and has been fined more than \$1m.<sup>45</sup>

Shortly before the publication of the US Department of the Interior's investigation into Shell's activities during the 2012 drilling

season, Shell announced that it was “pausing” its drilling programme “to prepare equipment and plans for a resumption of activity at a later stage”.<sup>46</sup> Nearly one year later, substantial questions remain regarding the future of the oil industry in the Arctic Ocean.

The issues with Shell's equipment and management are discussed in greater detail in sections 4.4, 4.5 and chapter 5.

### 1.4 ANNOUNCEMENT OF 2014 PERMIT APPLICATION FOR SCALED BACK PLAN SHELL'S PLANS

In October 2013, while disclosing its Q3 results, Shell announced that it would submit a drilling plan to the Bureau of Ocean Energy Management (BOEM) (subsequently submitted on 26 November) to return to drill in the US Arctic but only in the Chukchi Sea.<sup>47</sup> The company planned to drill in the Chukchi Sea, on the Burger prospect. Shell's 2014 Exploration Plan “proposes to conduct exploration drilling activities on any of six lease blocks”: 6714, 6762, 6764, 6812, 6912, and 6915.<sup>48</sup> Shell had planned to complete one well and possibly move on to a second one in 2014<sup>49</sup> with further exploration contemplated for future years. It planned to use the *Noble Discoverer* to drill those wells and had secured the *Polar Pioneer* as a backup rig to drill relief wells if necessary. The company did not seek approvals to drill in the Beaufort Sea.

#### APPROVALS REQUIRED

The plans for drilling in 2014 did not receive the necessary regulatory approval. There was some correspondence between Shell and BOEM about the plan, in which BOEM twice requested additional information from Shell.<sup>50</sup> Shell's responses to BOEM's queries did not appear to provide all of the necessary information. The correspondence between the agency and company is covered in more detail in sections 4.4, 5.1 and 5.2.

Even if its exploration had been approved, Shell would have still needed other approvals including permits from the National Marine Fisheries Service and US Fish & Wildlife Service to “harass” marine mammals. It would also have been likely to need approval from the Bureau of Safety and Environmental Enforcement (BSEE), an arm of the Department of the Interior, for substantial changes in its spill response plan and would have required an Application for Permit to Drill.

The Department of the Interior's review of Shell's 2012 drilling season resulted in several recommendations for the company

to fulfil (see section 5.1). As of the time of this writing, Shell has provided one of the requested analyses – an integrated operations plan – but it has not provided the independent audit of its management systems required by the review. BOEM has raised a number of queries related to the integrated operations plan including on the issue of contractor oversight (see section 5.2).

### 1.5 OTHER IOCS ARE MORE CAUTIOUS

Meanwhile, other IOCs – Total<sup>51</sup>, Statoil<sup>52</sup> and ConocoPhillips<sup>53</sup> – have either withdrawn from or suspended drilling projects or proposals in the US Arctic Ocean in the face of increasing uncertainty.

Both ConocoPhillips and Statoil identified uncertain standards as reasons for delaying exploration. In fact, ConocoPhillips announced in a press statement that it was delaying planned exploration “given the uncertainties of evolving federal regulatory requirements and operational permitting standards.”<sup>54</sup> Statoil's Executive Vice-President of Global Exploration, Tim Dodson said, “Costs have escalated significantly. We have to consider all the time whether the business opportunity and the subsurface risk of actually finding something – since we have no guarantee of finding anything – (is worth) the cost of drilling that single well.”<sup>55</sup> Total CEO, Christophe de Margerie, confirmed in an interview with the Financial Times that the risk of an oil spill in such an environmentally sensitive area was simply too high.<sup>56</sup>

### 1.6 MANY QUESTIONS REMAIN UNANSWERED

Shell's announcement to position itself for a possible return to the Chukchi Sea in 2014 came at a time of growing industry and investor skepticism about the operational and economic feasibility of offshore oil exploration in the US Arctic and continued concern about Shell's lack of preparedness for the varied risks associated with Arctic Ocean oil exploration. An analysis of Shell's 2014 Chukchi Sea exploration plan suggests the company has not learned the appropriate lessons from its 2012 failures.

Chapters 2–6 explore further these risks, including the potential misallocation of shareholder capital given market conditions, regulatory requirements, spill risk and management risk.

Each section includes questions for investors to ask Shell in order to assess the company's ability to identify, mitigate and manage the highlighted risks.

## 2. Economic risk

It is clear that extracting hydrocarbons from offshore in the US Arctic will require substantial capital investment, high operating costs and will incur the significant risks of disaster described in this report. Despite Shell's continued push, there remain significant questions about whether the risks and substantial costs involved in exploration and extraction in the Chukchi Sea can be rewarded with profit. Ultimately, profit depends on how much oil and gas can be extracted and whether it can be profitably brought to market.

This chapter evaluates the economically recoverable reserves at Shell's Chukchi Sea prospect as well as the macroeconomic conditions under which they might be brought to market. It suggests that the timing of Shell's substantial investment of shareholder capital into Chukchi Sea drilling appears to be counter to the interests of shareholders.

Extraction costs in the Chukchi Sea are likely to be among the highest in the world due to extremely harsh conditions that force limited operational windows, long distances to market and costly engineering solutions. Commercial viability will depend on sustained oil demand growth well into the middle of the current century and

beyond; and consequent high oil prices. Such favourable market conditions are uncertain.

Furthermore, the existence of economically recoverable reserves of oil in Shell's Chukchi Sea prospect is highly questionable, and the feasibility of particular extraction projects will depend to a significant extent on political will and available tax breaks (see section 6).

### 2.1 THE CHUKCHI SEA PROJECT: ENOUGH OIL TO JUSTIFY THE COSTS?

It seems clear that Shell is counting on a big oil find at Burger and that recovering gas is not the purpose of the project. In October 2013, Shell's Chief Financial Officer, Simon Henry, responded to questions about the project from investors during the company's Q3–2013 earnings call. He made it clear that the project hinges on an oil find: *"That allocation to Alaska will be (...) it's a bit of a binary outcome, there is either bigger oil there or there isn't."*<sup>57</sup>

If there is not *"bigger oil"*, the company will have spent more than \$5bn – and taken on significant risks for a non-commercial gas play in one of the remotest and most ecologically delicate regions of the planet. This capital could have been spent on more certain or less risky prospects or returned to shareholders. Shareholders must judge

whether, given the available information on Chukchi Sea reserves, the potential returns provide sufficient justification to continue spending capital and taking risks.

### 2.2 PUBLICALLY AVAILABLE DATA ON BURGER SUGGESTS A NON-COMMERCIAL GAS PLAY

While proprietary data from Shell's geological assessment of Burger may encourage the company to drill for oil there, all other sources of information suggest that Burger is a high cost gas play that is unlikely to be commercial.

The US government revised its estimates of resources at the Burger Gas Discovery in 2000 and published an update in January 2005.<sup>58</sup> The hydrocarbon estimates published by the government do not include any crude oil estimates. The mean estimates amount to 14tcf of dry gas and 724mnb of condensate (see figure 1).

While the economic analysis in this document is outdated, it is worth noting that the conclusion states, *"Even under a very optimistic set of assumptions, Burger is a marginal development opportunity"*.<sup>60</sup> More recently, the government argued in court that *"there is a less than 10 percent likelihood that oil development in the [Chukchi Sea] region will occur"*.<sup>61</sup>

Figure 1: US government estimates of resources for Shell's Burger prospect<sup>59</sup>

Burger conditional discovered resources – year 2000							
Fill Model	Pool Area (Acres)	Gas Resources (tcf)			Condensate (mnb)		
		F95	Mean	F05	F95	Mean	F05
Minimum	52,516	2.389	7.629	17.256	107	393	925
Most Likely	97,545	4.335	<b>14.038</b>	31.384	203	<b>724</b>	1,700
Maximum	189,803	8.496	27.472	63.210	371	1,404	3,370

### 2.3 BURGER COULD LOSE \$23BN

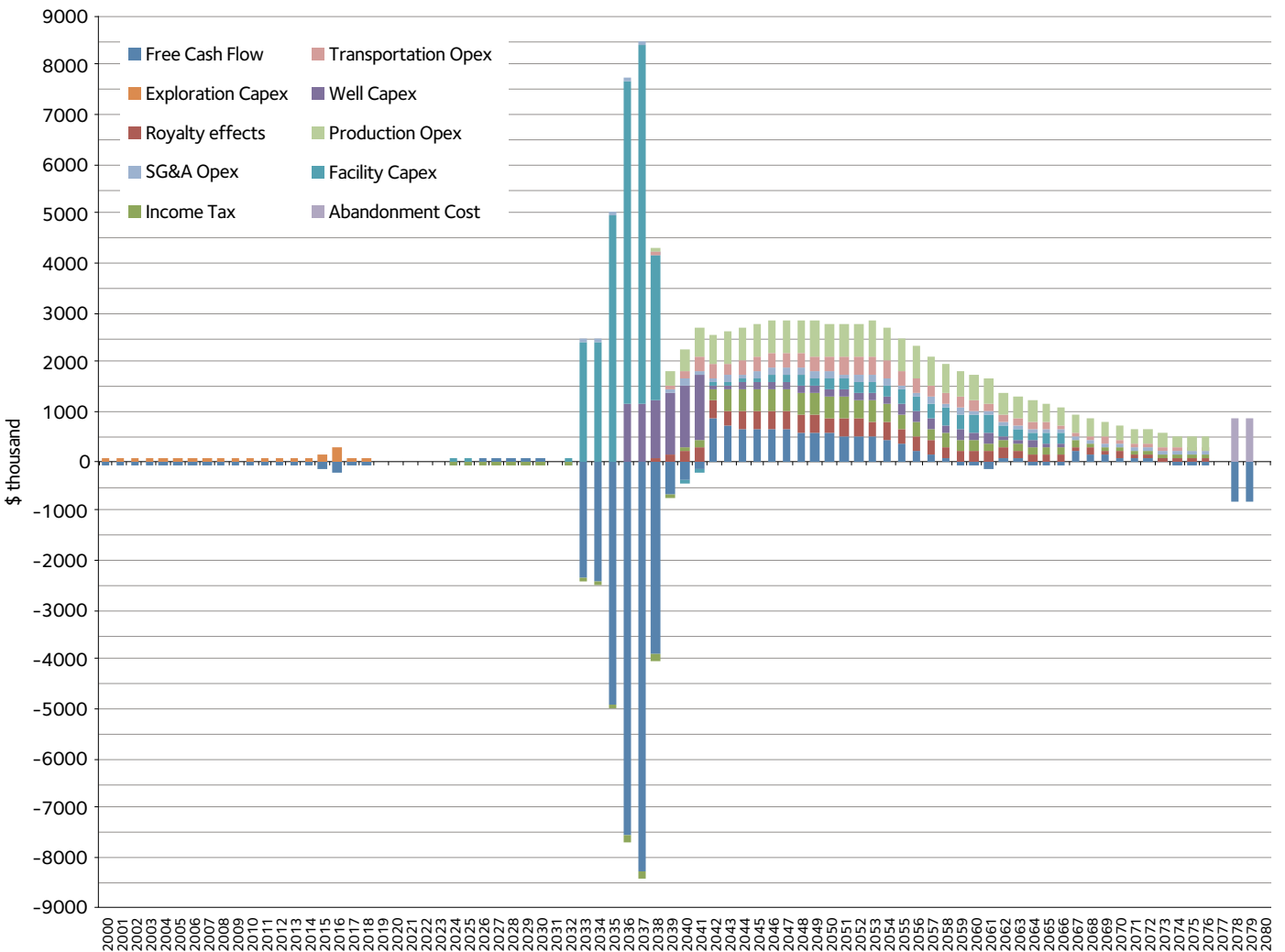
Analysis from Rystad Energy based on government data also suggests Burger is an uneconomic play. In fact, with current resource estimates and current projections of North American natural gas prices, the project is estimated to yield a negative cash flow of more than \$23.5bn. Rystad's cash flow analysis suggests that nearly \$32bn would be needed to construct and maintain surface infrastructure. More than \$11bn would be spent on drilling

wells, and over \$7.5bn would be needed to bring the gas to market (see figure 2).

Rystad further estimates that over the lifetime of the project, which would extract gas from 2038 to 2076, less than 6tcf of dry gas would be extracted and a mere 114mnb of natural gas liquids (NGLs). At peak production, daily output is estimated at around 700 million cubic feet per day (cf/d) of dry gas and 20 thousand barrels per day (b/d) of NGLs (see figure 3).

These estimates would clearly change if oil were discovered at Burger. Oil's value is much higher than natural gas, particularly in the North American market, which has been flooded with shale gas and looks to remain so for decades to come. It is clear, though, that given the high cost of establishing drilling and processing facilities in the Arctic seas and transporting the fuel to markets thousands of miles away, if Burger is a natural gas play, it is unlikely to be economical.

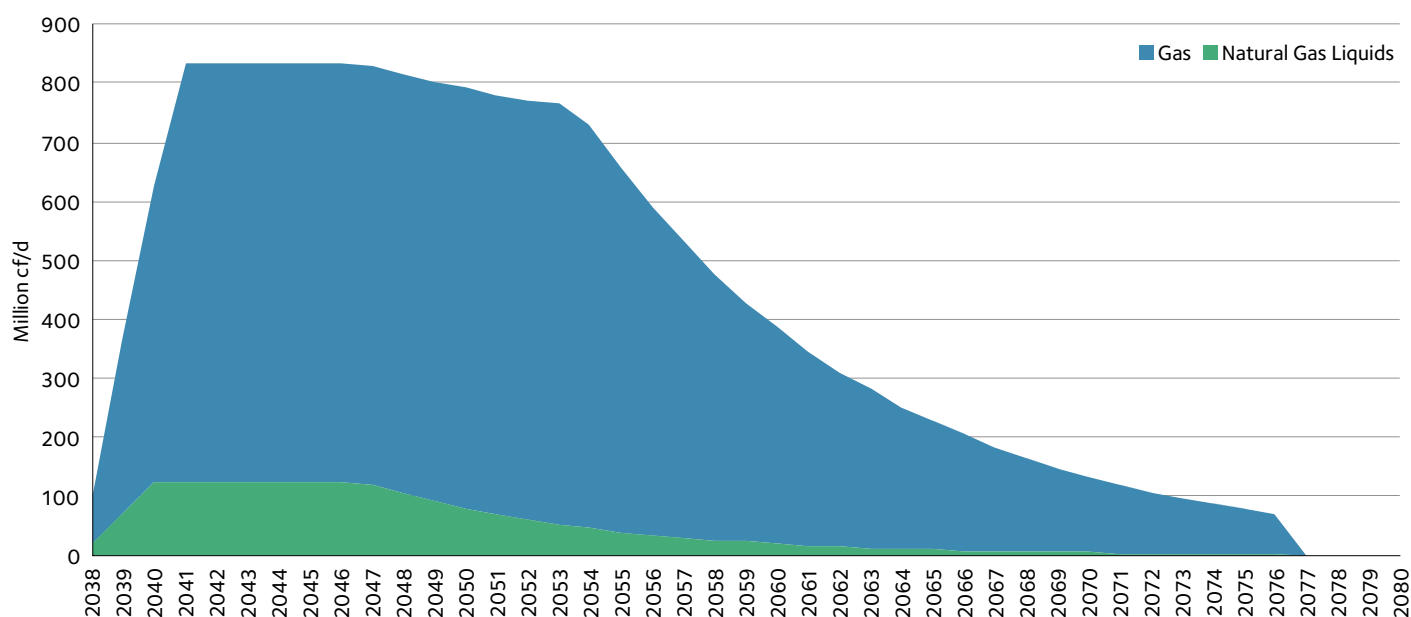
Figure 2: Cash flow analysis of Shell's Burger prospect in the Chukchi Sea



Source: Rystad Energy AS, January 2014.

The \$5bn spent on this project so far does not appear in this chart as the company has booked those expenses separately in its accounts.

Figure 3: Estimated extraction from Shell's Burger prospect in the Chukchi Sea



Source: Rystad Energy AS, January 2014.

## 2.4 WILL GLOBAL OIL PRICES SUPPORT OFFSHORE ARCTIC DRILLING?

There are also significant questions about whether even an oil find in the Chukchi Sea could be profitable. Extraction in the US Arctic Ocean is considered by most analysts to be at the top end of the global oil production cost curve and, as such, would require sustained high oil prices to return a profit. There are real risks that oil prices in the 2030s and beyond would not sustain this ambitious project.

Most analysts do not foresee oil extraction in the US Arctic Ocean until the 2030s or beyond, if it were to occur at all.

Bernstein Research excludes any Arctic oil and gas extraction from its supply predictions for the next decade, noting that “development costs will be at the high side of the industry range” and “development times are likely to disappoint”.<sup>62</sup>

Similarly, Citi does not include any offshore Arctic projects in its list of over 300 global oil and gas projects in development or pre-development with likely start-up by 2020.<sup>63</sup>

The IEA stated in 2012 that it did not expect to see a significant contribution to global oil supply from the US Arctic Ocean within the forecast period of its World Energy Outlook (WEO), which is to 2035.<sup>64</sup>

The report cited, “technical and environmental challenges and high cost of operating in extreme weather conditions, including

the problems of dealing with ice floes and shipping in water that remains frozen for much of the year”<sup>65</sup> as issues that would need to be overcome by either “technological advances and/or higher oil prices” for extraction to start.<sup>66</sup>

The trajectory of global oil prices is currently subject to much debate. While the unprecedented rise in prices during the first decade of the twenty first century led to expectations of relentlessly climbing oil prices for years to come, a different scenario is emerging in the second decade. Since 2010, global oil prices have stagnated, albeit at a historically high level. Unrest in the Middle East, particularly the Libyan civil war, led to some spikes, but the overall trajectory has been surprisingly steady with the price of Brent generally hovering around the \$100–\$105 per barrel mark since the beginning of 2011 (see figure 4).

The tight oil boom in North America has surpassed early expectations and led to some two million b/d of US light oil imports being pushed back into the international market. This influx has more than made up for reductions from Iran due to sanctions and other stoppages in Sudan, Syria and elsewhere.<sup>67</sup>

Some analysts, such as those at Citi, are predicting lower oil prices in the coming years as growing non-OPEC supply combines with natural gas substitution in transport, which in turn would slow oil demand growth.<sup>68</sup> However, these dynamics remain highly uncertain; lower

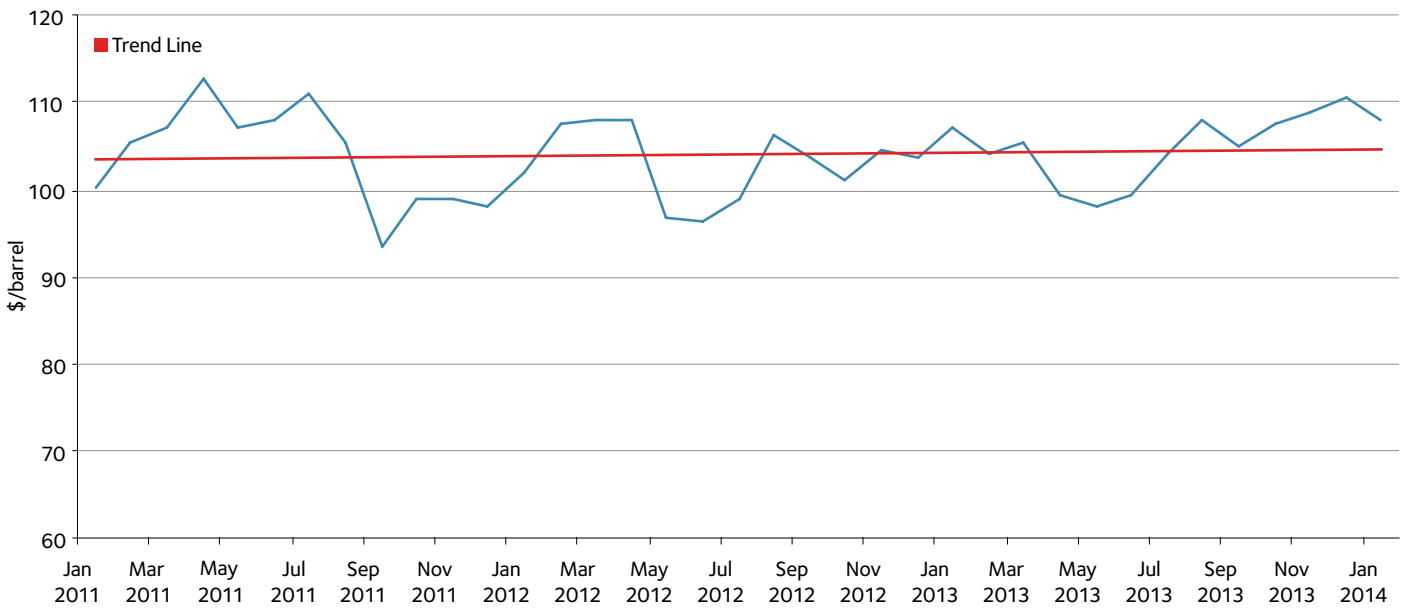
oil prices could actually slow supply growth in North America’s high cost tight oil and tar sands plays and encourage stronger demand growth if fuel prices ease in fast growing Asian economies.

While short to medium-term oil market dynamics currently appear to be highly volatile, it is the oil market of the 2030s and beyond that will govern whether high cost, capital intensive offshore Arctic oil extraction will turn a profit. This market will depend in part on highly unpredictable technological changes in transportation efficiency and the manner in which governments address global climate change. Preventing highly disruptive climate change – and certainly reaching the goal of keeping global temperature rise below the 2°C threshold for catastrophic climate disruption – will necessitate reducing oil demand and result in lower oil prices. These changes would likely undermine extraction from expensive, remote and marginal oil fields such as offshore in the US Arctic.

As figure 5 shows, the IEA expects drastically lower oil demand in a scenario in which governments take action to address climate change (450 Scenario). According to the IEA analysis, oil demand in the 450 Scenario would be some 23 million b/d less than in its New Policies Scenario, which assumes some action to improve efficiency but results in 3.6°C of warming.

Furthermore, the IEA has pointed out that no more than one third of currently proven fossil fuel reserves can be exploited by

Figure 4: The linear price trend for Brent crude oil has been almost flat since January 2011



Source: Bloomberg

2050 to keep to the 2°C target.<sup>70</sup> The agency also calculated that only about 45% of currently proven oil reserves would be exploited by 2035 in the 450 Scenario while around 48% would be exploited in its New Policies Scenario.<sup>71</sup>

No offshore Arctic oil or gas resources in the US have been booked as of today, and they are likely years away from being proven. Extracting oil in the US Arctic Ocean is clearly among the most expensive and risky prospects for oil extraction known today. If these resources were ever to become viable, it would likely only be in a scenario in which the world fails to control climate change. That would appear to be Shell's gamble

in this play and it is a gamble that even the IEA considers to be highly risky.

Although government action to date has been inadequate to meet the 2°C target, there is no guarantee that this will remain the case. As the impacts of climate change become more severe and more costly to the global economy, inaction should not be taken for granted. The IEA makes this point when discussing the difference in oil demand between its scenarios:

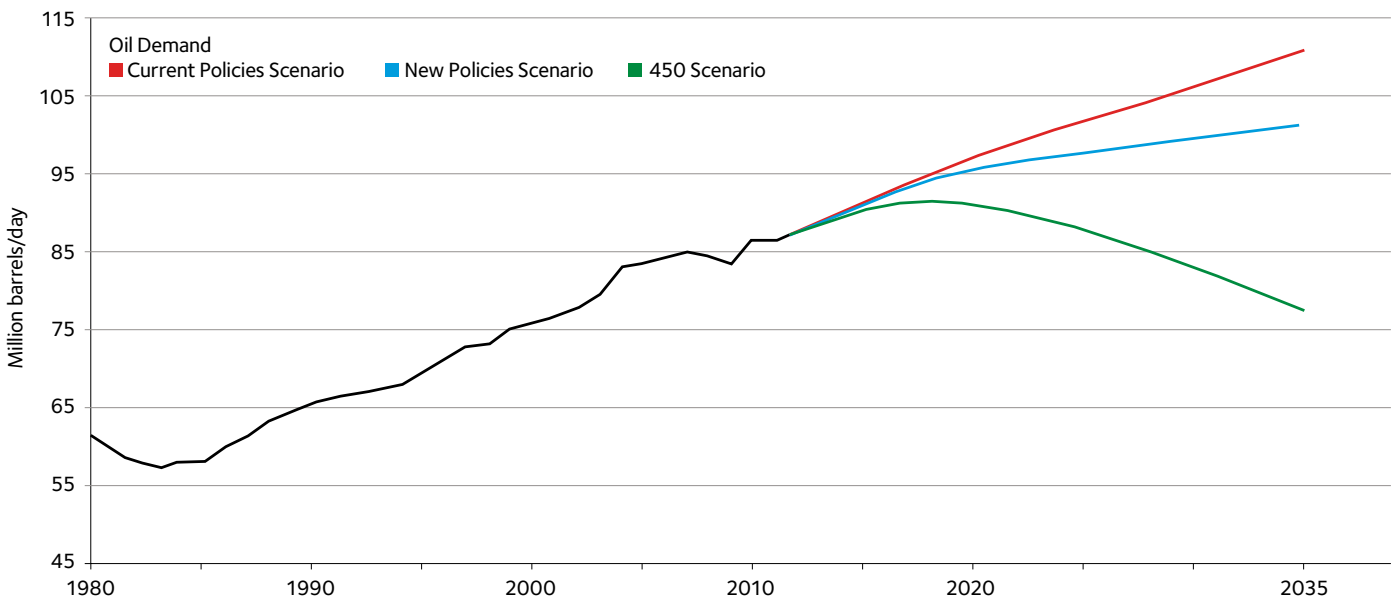
*"...in the New Policies Scenario the world misses, by some distance, the agreed target to limit the long-term increase in average global temperatures to 2°C. It is therefore reasonable for companies*

*to expect action by policymakers to address these issues through additional measures to increase fuel efficiency, reduce emissions targets from passenger vehicles and support alternative fuels."*<sup>72</sup>

A recent study of which oil resources would remain in the ground in a 2°C policy environment concluded that oil extraction in the Arctic Ocean would not proceed.<sup>73</sup>

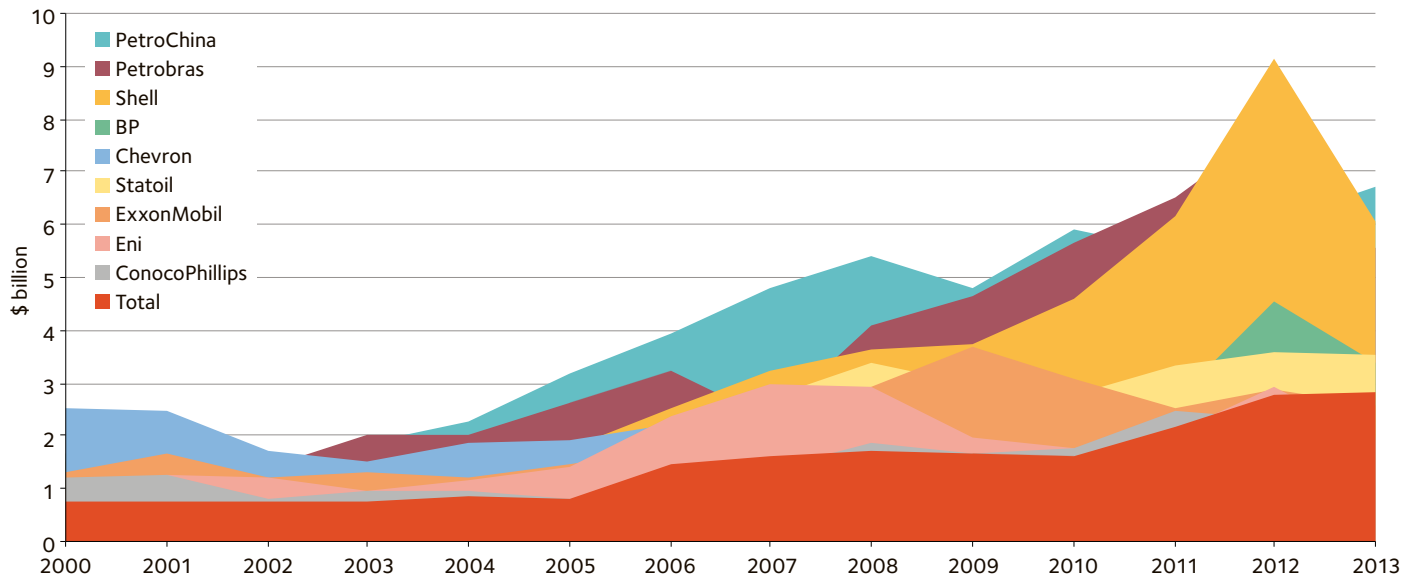
In taking a gamble on government inaction to control climate change, Shell has spent billions of dollars of shareholder capital on exploration in the Arctic. Shell's exploration capex together with its recent performance make this approach look highly unsustainable.

Figure 5: IEA estimates of oil demand by scenario. (WEO 2013)<sup>69</sup>



Source: IEA

Figure 6: Shell's exploration capex surpassed its peers in 2012



Source: Rystad Energy AS

### 2.5 SHELL'S EXTRAVAGANT SPENDING HAS NOT DELIVERED RESULTS

In the 10 years since the reserves reporting scandal that rocked the company, Shell has spent lavishly on exploring for new reserves but has delivered poor results to its shareholders.

Since 2000, Shell has spent over \$48bn on exploration capex, outspending all other wholly market owned companies.<sup>74</sup> Only two other companies, both of which are partly state-owned, spent more – PetroChina and Petrobras.<sup>75</sup>

Shell has led the way into the US Arctic Ocean buying more leases at higher prices than any of its competitors (see section 1.2). In 2012, when it embarked on its disastrous attempt to drill in the Chukchi and Beaufort seas, its exploration capex rose to an all time high for any oil company anywhere – over \$9.1bn.<sup>76</sup>

For much of the last 10 years, Shell has outspent all of the majors on exploration. The company, however, does not appear to have performed better than many of its closest peers, and recorded a steep decline in profitability in 2013.

Despite this lavish exploration expenditure, Shell's proven reserves have increased only 6% over the period.<sup>77</sup> Shell's return on capital employed (ROCE) and earnings per share (EPS) also do not appear to have benefitted from this exploration activity (see figures 8 and 9).

Finally, on 30 January 2014, after issuing a profit warning<sup>80</sup> and following a year of record capital investment, the company recorded steep declines in profitability. Year-on-year income is down \$5.8bn overall, \$5bn of which stems from the upstream segment.<sup>81</sup> Net capital investment is estimated at over \$44bn.

Figure 7: Since 2000, Shell's exploration capex has been substantially above its peers

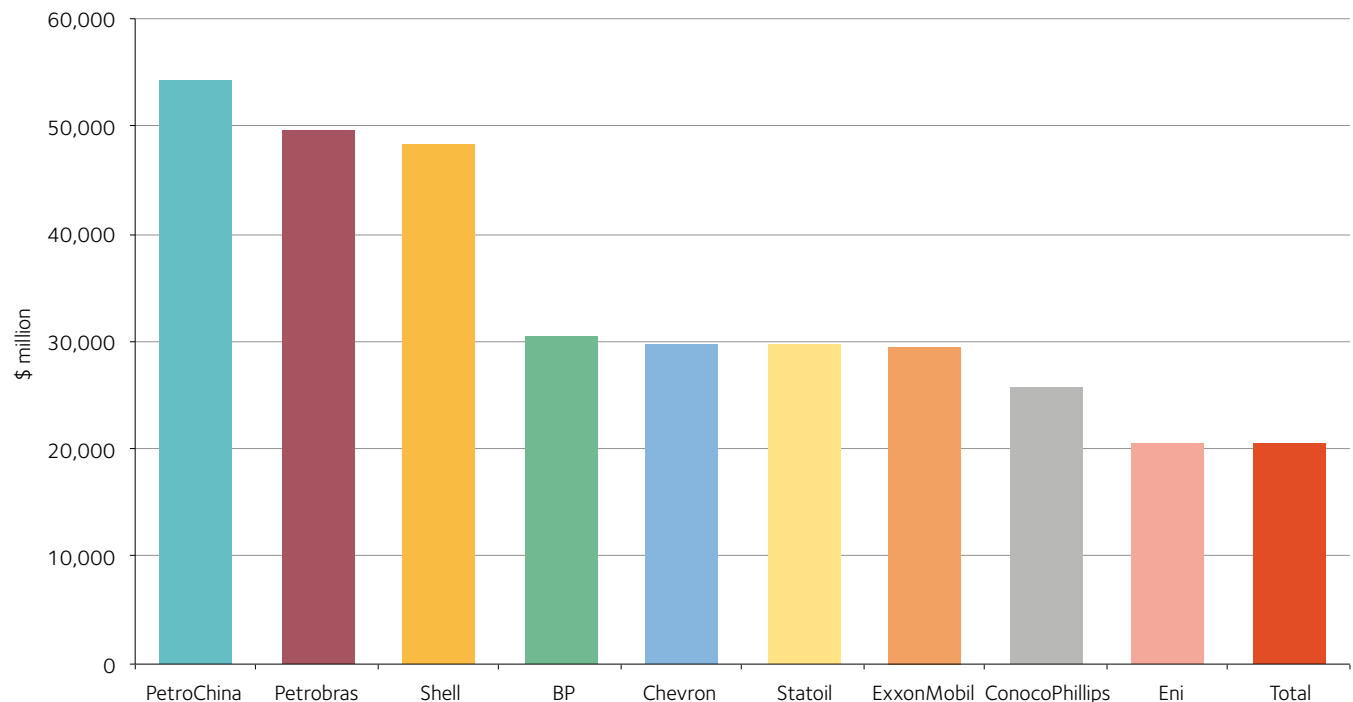
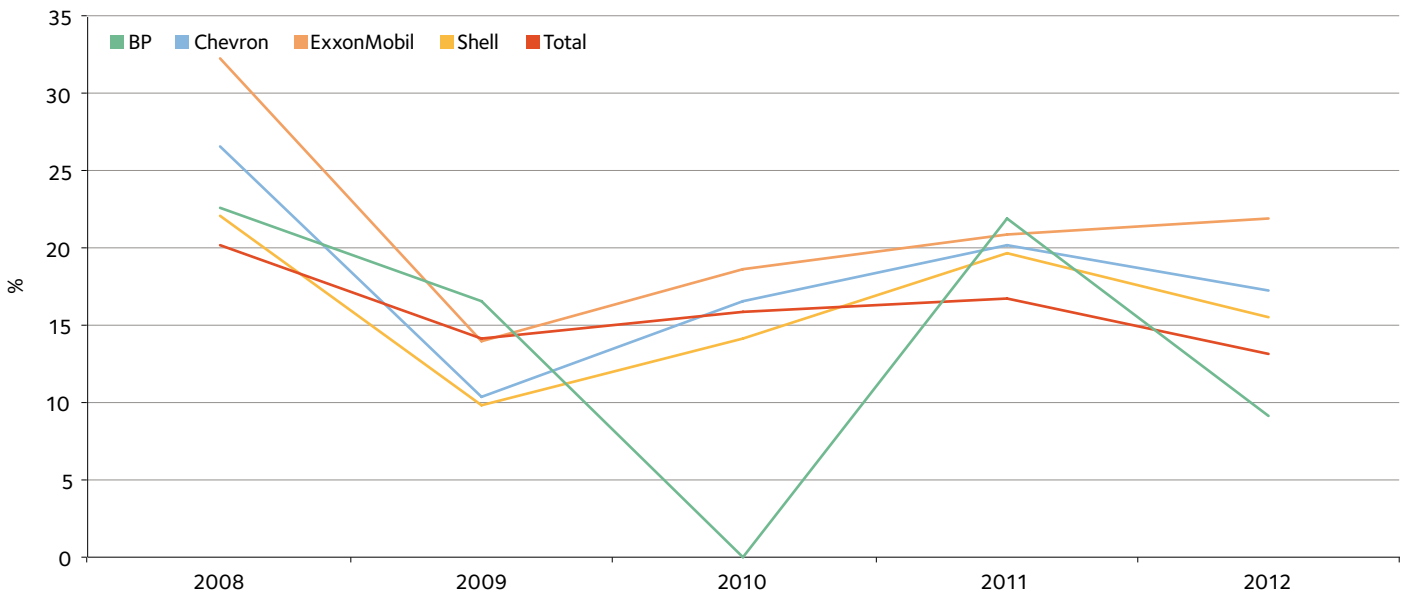
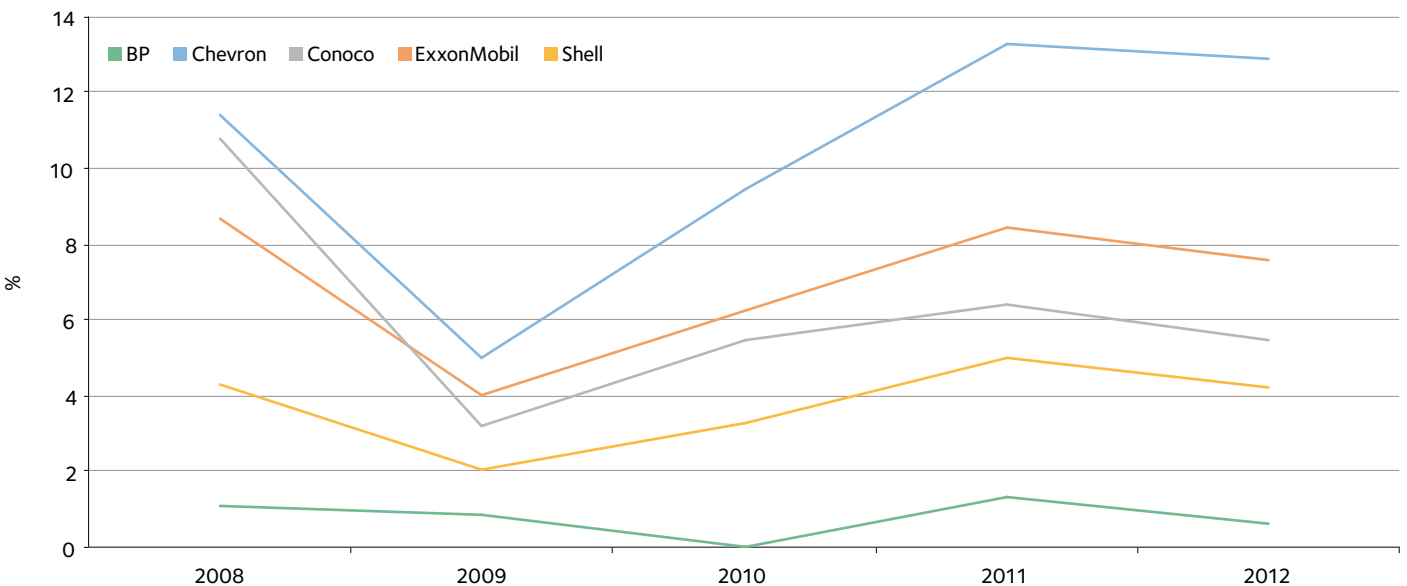


Figure 8: Oil majors ROCE 2008–2012



Source: Bloomberg<sup>78</sup>

Figure 9: Oil majors EPS 2008–2012



Source: Bloomberg<sup>79</sup>

It seems clear that Shell, like many of the oil majors, faces increasing upstream costs and uncertain commodity prices in the future. But unlike its peers, it seems determined to spend precious capital on pushing into the most remote, technically challenging and costly frontiers. Given the long time horizon associated with any extraction in the US Arctic Ocean, and the uncertainty of future oil demand growth, Shell's drilling programme in the Arctic is a high stakes gamble with a large proportion of shareholder capital. If Shell is looking for ways to cut capex in the coming years – while potentially increasing shareholder value – abandoning its Arctic plans would be an obvious place to start.

**2.6 QUESTIONS FOR SHELL**

What is the company's anticipated total capital expenditure for the lifetime of the company's offshore US Arctic projects?

When does Shell expect any of its offshore US Arctic projects to begin extraction?

What oil/gas balance is Shell expecting to find in the Burger prospect?

Does the company expect gas exports from these prospects to be economically viable, and under what circumstances?

What factors have changed Shell's view as to the economic viability of the Burger prospect since 1989?

What is Shell's assumed break-even oil price for US Arctic projects?

Please provide information to shareholders demonstrating the robustness of the company's project portfolio against a range of oil price demand and price scenarios.





# 3. Litigation risk

Corporate and government decisions to move forward with oil and gas activities in the US Arctic Ocean have generated substantial opposition and litigation by conservation organisations, local government and community bodies, and Alaska Native entities. Since 2007, successful federal court challenges have been brought at all relevant stages of the process – Five-Year Leasing Program, lease sale and exploration. In addition, successful administrative appeals have been brought challenging air emission permits awarded by the Environmental Protection Agency.<sup>82</sup> These cases have resulted in new analyses and delays in Shell's planned activities.

Most recently, on 22 January 2014, the US Court of Appeals for the Ninth Circuit invalidated the environmental impact statement underlying the government's 2008 decision to hold Lease Sale 193 – the sale in which Shell purchased the leases on which it seeks to drill in the Chukchi Sea. The Court found that the government's analysis of the potential impacts of the sale relied on an arbitrary assessment of potential activities.<sup>83</sup> The petitioners – a coalition of Alaska Native and conservation organisations – have asked the Court to invalidate the leases. If they succeed, Shell's interests in the Chukchi Sea will be voided. Even if the leases are not invalidated, the government will most likely be required to prepare a new environmental analysis, which could delay Shell's exploration by several years. This court decision and the uncertainty it generates were cited by Shell as one of the primary reasons that it would forego exploration activities in 2014.

This court decision is the second invalidating the government's decision to hold Lease Sale 193. The current court case was filed in 2008, and a lower court previously found that the government did not properly address significant missing scientific information.<sup>84</sup> That decision resulted in an injunction that prevented exploration activities. The current ruling continues the legal uncertainty about Shell's leases.

Furthermore, the strong opposition and litigation are almost certain to continue. For example, challenges were filed to government approvals of Shell's exploration proposals for 2007, 2010, and 2012.<sup>85</sup> These cases have so frustrated Shell that the company took the unprecedented step of filing three 'preemptive lawsuits', seeking declarations that government approvals were legal.<sup>86</sup> These cases were filed before any substantive challenge was filed to the approvals, and, in fact, no challenge was filed to two of the three permits Shell went to court to 'preemptively validate'.

In addition, Alaska Native and conservation organisations are challenging the government approvals of Shell's oil spill response plans for the Chukchi and Beaufort seas. The groups argue that the government did not comply with its obligation to ensure that Shell is capable of "*removing, to the maximum extent practicable, a worst case discharge*" as required by the Clean Water Act. Specifically, the petitioners argue that the government erred by allowing Shell to rely on the assumption that it will recover 95% of a spill using mechanical recovery and that, therefore, it need only have enough resources to protect the shoreline from 5% of the spilled oil. The district court ruled against the plaintiffs and the case is now on appeal before the Ninth Circuit.<sup>87</sup> If the petitioners prevail, the government approvals of Shell's exploration plans may be invalidated. Shell may not be able to proceed with exploration until and unless the government can remedy its analysis to comply with the court order. The case is likely to be decided this summer.

There are also pending challenges to the water discharge permits under which Shell would operate if exploration is allowed. Those cases are proceeding and could result in new or different discharge requirements as well as additional delay.<sup>88</sup>

## 3.1 QUESTIONS FOR SHELL

Did Shell anticipate the Ninth Court of Appeals ruling upholding a challenge to the supplemental environmental assessment?

What is the impact of this judgement on Shell's plans?

What is Shell's view on the outcome of the other case pending – the challenge to the oil spill response plans?

Who at senior management level is overseeing potential legal threats to Shell's Arctic plans?

## 4. Spill risk

In evidence to the UK House of Commons Environmental Audit Committee in 2012, Shell executives admitted that the company had not even assessed the potential environmental and financial impact of a major oil spill in Arctic waters.<sup>89</sup> The company has chosen instead to focus on the supposed low probability of such a spill, rather than prepare for its inevitable high impact. In the wake of the *Deepwater Horizon* disaster, this approach is risky.

The risk of such a strategy was reinforced by the US political, international civil society, and media reaction to the running aground of the *Kulluk* – an incident Shell attempted to downplay by labelling it a “maritime transit” issue unconnected to drilling activity.<sup>90</sup> The reaction and resulting criticism related to an incident that did not, thankfully, result in either a loss of life or an oil spill, highlights the likely financially catastrophic implications for Shell of a spill of any significance in the US Arctic Ocean.

In addition to significant financial penalties in the form of clean-up and remediation costs (compounded by the practical challenges involved (see section 4.2)), regulatory fines and prolonged litigation in a variety of courts from a myriad of claimants, Shell would also likely face uncertain impacts on share price and credit ratings, unprecedented reputational damage, and a threat to its ability to do business in the US. Almost four years after the *Deepwater Horizon* disaster, BP is still banned from bidding for government contracts.<sup>91</sup> In order to pay financial penalties and address longer lasting financial impacts, BP has been forced to sell assets worth \$38bn in the past three years.<sup>92</sup>

Shell maintains insurance subsidiaries that provide coverage to Shell entities that would pay out in the event of a spill, and these subsidiaries may seek reinsurance from outside the company. However, this

insurance is generally limited up to only \$1.15bn per event. According to Shell, “such reinsurance would not provide any material coverage in the event of an incident such as *BP Deepwater Horizon*. Similarly, in the event of a material environmental incident, there would be no material proceeds available from third-party insurance companies to meet Shell’s obligations.”<sup>93</sup> As a result, the far larger anticipated cost to Shell of an Arctic oil spill would be paid from corporate assets.

It is likely that an IOC responsible for a major spill in the US Arctic Ocean would be forced to conduct a ‘fire sale’ of assets to meet the resulting financial liabilities. A responsible IOC operating in the region, therefore, should have both an adequate physical *and* financial oil spill response plan. At present there are doubts as to whether Shell has either.

Shell’s 2012 problems support investor concerns that the company’s Alaskan exploration project lacks the key technological capabilities, infrastructure and information to be able to deal with the risk of oil spills. In this context, it is of particular concern that the Chukchi Sea exploration plan filed by Shell in November 2013 in the hopes of securing permission to drill in 2014 does not explicitly commit to the same level of spill response capacity on which its previously approved plans are premised (see section 4.3). The lack of information regarding Shell’s assessment of and planning for the financial impacts of a major spill, leave investors unable to assess the potential impact of such an event. This chapter details the outstanding concerns regarding Shell’s current spill response capabilities and preparedness.

### BOX 1: QUERIES RAISED BY UK PARLIAMENT ENVIRONMENTAL AUDIT COMMITTEE<sup>94</sup>

**Caroline Lucas MP:** I don’t doubt that you have very good measures in place, but what I am saying is that accidents will always happen. BP wasn’t expecting the *Macondo* to happen, it happened. So when accidents happen, can I just be really, really clear that you are telling me that Shell does not have any estimate financially of how much that will cost you?

**Peter Velez, head of Shell’s emergency response operations in Alaska:** We do not apply a figure to it because our responsibility, as a responsible operator, is to protect the environment and to clean it up, and we are going to do whatever it takes regardless of the cost to clean it up.

**Robert Blaauw, Shell:** The likelihood is indeed extremely, extremely small that such an incident will happen, in this case in offshore Alaska.

**Zac Goldsmith MP:** ...even though it is a big enough risk that you would have spent time modelling the possibilities, you haven’t bothered to put a figure on it, you haven’t bothered to tell your shareholders how big that risk is. That seems to me to be hugely irresponsible financially.



#### 4.1 HOW MUCH OF A RISK ARE OIL SPILLS?

The documents underlying Shell's proposals to drill exploration wells in the Beaufort and Chukchi seas have repeatedly discounted the chances of a large spill or a well blowout as so improbable as not to warrant analysis. But major spills have occurred during exploration drilling (including BP's *Deepwater Horizon* blowout in 2010 and Petronas' spill north of Australia in 2009), and well blowouts have occurred in shallow water (including Total's Elgin gas leak in the North Sea in 2012).

The remote US Arctic Ocean presents unique operating risks – limited accessibility due to storms, the presence of thick multi-year ice, a lack of daylight and the use of floating rigs rather than stationary concrete-reinforced structures.

In its 2008 draft environmental impact statement for the Chukchi and Beaufort Planning Areas, the government estimated that there is a 40% chance of a large spill (over 1000 barrels) during the lifetime of exploration and extraction of oil in the Chukchi Sea.<sup>95</sup> The probability of small spills

is close to 100% – as elsewhere, such spills are an accepted fact of oil companies' operations. But in the Arctic they will be associated with more significant technical challenges and therefore higher costs.

A spill would be most damaging if it occurred at the end of the drilling season when any response would be further impeded by ice. Limited access would mean oil companies would not have the long months that were available to those tackling the *Deepwater Horizon* disaster to find a solution to any major spill. So far, no analyses have been published quantifying the specific times during which response would be impossible in Shell's lease areas in the Chukchi Sea. Comparable analyses, however, conclude that no response efforts would be possible more than half the time. For example, a study commissioned by WWF found that it would not be possible to respond to an oil spill in the Canadian Beaufort Sea for seven to eight months of the year. During the most favourable weather conditions (July–August), a response would only be possible 44–46% of the time, assuming that the infrastructure and workforce were readily available.<sup>96</sup> Such a

'response gap' analysis should be carried out and published to be able to accurately assess the threat that spills pose to Shell's operations.

#### 4.2 LACK OF APPROPRIATE TECHNOLOGY

*"There is no comprehensive method for clean-up of spilled oil in sea ice",* according to US Geological Survey. Shell has acknowledged publicly that the usual techniques for controlling a spill (booms, dispersants, etc.) are of questionable efficacy in Arctic waters: *"As these [ice] conditions develop, the efficiency of physical containment and recovery tactics will be reduced."* Joint Industry Programme research, funded by Shell, showed that oil weathered for more than six days in field conditions was unignitable and unrecoverable with mechanical devices, that in situ burning was only a viable option for approximately five days after oil is spilled and that it is not effective at all in 30–70% ice conditions, reporting that *"after six days the oil was so mixed with slush that both mechanical recovery and in-situ burning were evaluated as not effective."* Moreover, tests of response equipment conducted in the US Arctic Ocean

in 2000 showed that boom and skimmers (machines for capturing oil on water) were ineffective in ice; the tests were deemed a 'failure' as they were being carried out.<sup>97</sup>

Even without Arctic conditions, the efficacy of mechanical response is limited, especially for any large spills. After the *Exxon Valdez* oil spill, for example, an estimated 8% of the spilled oil was recovered using mechanical recovery,<sup>98</sup> and only 3% of the spilled oil was recovered using mechanical recovery after the *Deepwater Horizon* spill.<sup>99</sup>

Shell's worst case scenario planning for a well blowout is based on capturing 95% of the spilled oil – something that has not been recorded with any major spill. Shell assumes that mechanical recovery techniques will capture 90% of a major spill at the wellhead and half of what escapes before it reaches the shore.<sup>100</sup> Government estimates, by contrast, state that "containment and recovery at sea rarely results in the removal of more than a relatively small proportion of a large spill, at best only 10 – 15 [percent] of the spilled oil and often considerably less."<sup>101</sup>

The government estimates are in line with recovery rates after the *Deepwater Horizon* and *Exxon Valdez* spills. Shareholders should question Shell's reliance on these unproven and unlikely assurances for oil spill response.

### 4.3 LACK OF APPROPRIATE INFRASTRUCTURE

Not only are there significant technological limitations on oil companies' ability to clean up a spill, the infrastructure to mount a large-scale response simply isn't in place. The US Coast Guard has admitted that no adequate infrastructure exists in the region. Admiral Robert Papp Jr, a senior Coast Guard official, said: "There is nothing up there to operate from at present... no way we could deploy several thousand people as we did in the *Deepwater Horizon* spill." Making a more general point, Lloyd's of London in its report *Arctic Opening* concluded: "In many areas infrastructure is currently insufficient to meet the expected demands of economic development."<sup>102</sup>

Distance, difficult conditions, and limited transportation options would make it very

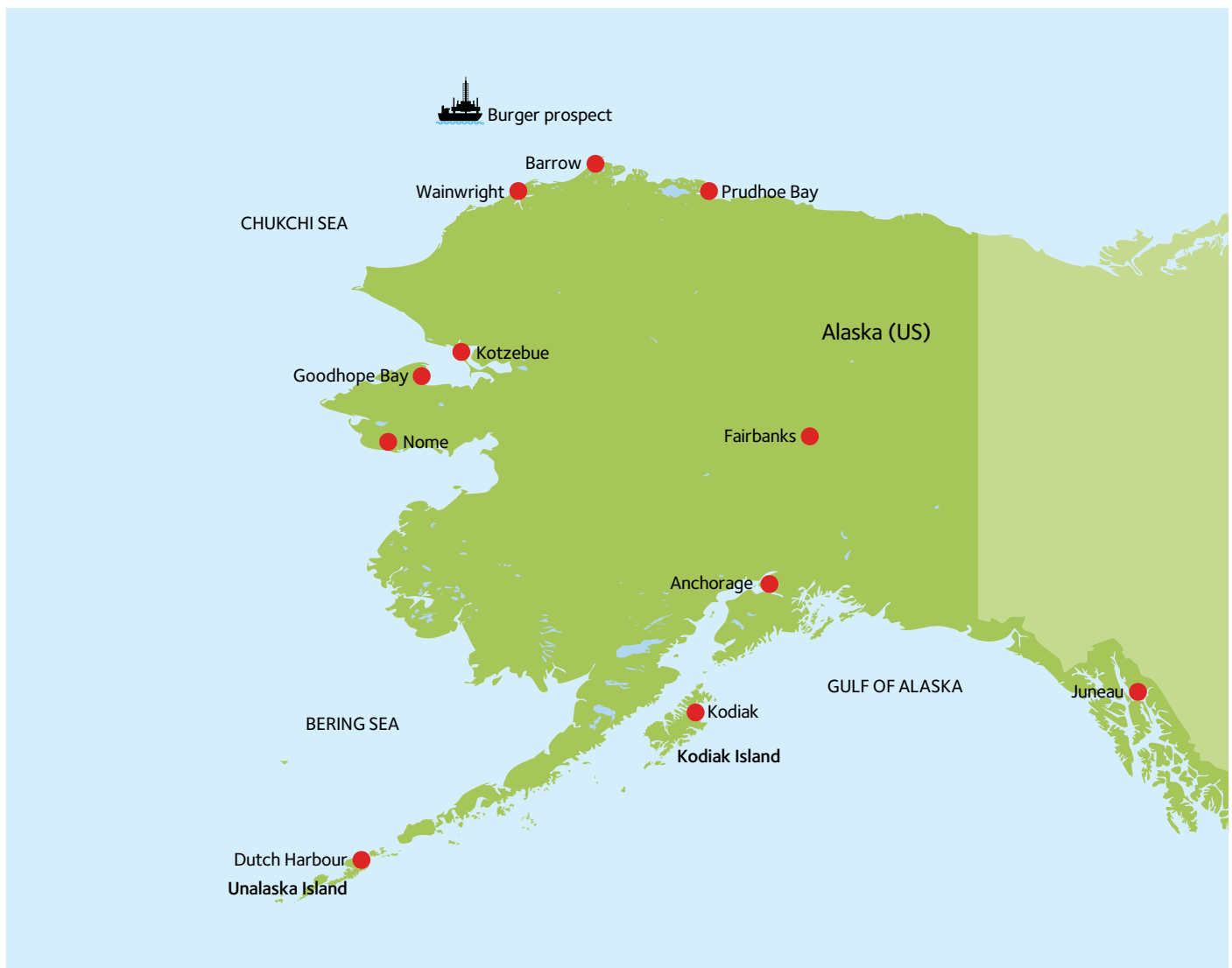
difficult to bring response and rescue equipment and personnel to the Chukchi Sea.

Wainwright, the closest village to the Burger prospect, has fewer than 600 residents. It does not have an airport capable of supporting jet service and is not connected to any other residential centre by road or rail.<sup>103</sup> The nearest airport with regular jet service is Barrow, 143 miles to the east. Barrow has approximately 4000 residents<sup>104</sup> and is not connected to any other town or village by road or rail. The nearest major road system is in Fairbanks, 597 miles away as the crow flies.

Very little response equipment is stored on the North Slope, and there are few vessels there that could assist in a response effort. US Senator Mark Begich (Alaska), for example, has pointed out that icebreakers are "sorely lacking" as well as Coast Guard "cutters, aircraft hangars, crew quarters, communication capabilities, deepwater ports and other infrastructure."<sup>105</sup>



Figure 10: Shell's remote drill site at Burger prospect and infrastructure available



It would not be easy to get substantial resources to the Arctic in the event of an accident. There are no hotels or other housing capable of accommodating thousands of responders. Nor is there an easy way to move equipment or personnel from one location to another. Moreover, the nearest Coast Guard station is in Kodiak, roughly 1000 miles from the likely locations of oil and gas drilling, and the nearest large deepwater port is hundreds of miles from Barrow, in Dutch Harbor.<sup>106</sup> Even in Dutch Harbor, the ability of the port to service drilling vessels and house people is limited.<sup>107</sup>

As an example, in 2012, the Coast Guard conducted tests off Barrow in which it deployed boom and tested a skimmer designed to recover oil in pockets of water trapped by ice.<sup>108</sup> The Coast Guard report on the exercise notes that the lack of docking facilities or ports was a challenge.<sup>109</sup> The spill response equipment had to be trucked to Prudhoe Bay, then loaded onto a shallow draft barge, then transported to the Coast Guard boat offshore Barrow. This

took nearly a week to accomplish.<sup>110</sup> The Coast Guard also encountered challenges in finding berthing facilities for training personnel – a problem that would be compounded by the much greater number of responders that would have to be housed if a spill occurred in Arctic waters and a meaningful response effort were underway.

#### 4.4 HOW SERIOUSLY IS THE COMPANY TAKING THE RISK?

Even in Shell's latest documents after the company's 2012 problems, a number of details suggest that Shell has given only casual consideration to import details:

- ☒ Shell's worst case discharge estimate more than quadrupled from 5,500 barrels a day in the 2010 Chukchi Sea plan, to 25,000 barrels a day in the 2012 plan, yet there wasn't a comparable increase in resources.<sup>111</sup>
- ☒ Shell is not transparent about how it has modelled worst case discharge scenarios. It is not clear what assumptions

or data went into creating trajectories or scenarios. It is clear, however, that Shell has not modelled a late season spill or the potential ramifications of oil remaining under ice for the entire winter.

- ☒ Shell's Chukchi Sea exploration plan states that in the event of a blowout, the drill ship *Noble Discoverer* is supposed to disengage and start drilling a relief well.<sup>112</sup> There is no evidence of any case in history where a rig involved in a catastrophic well blowout was able to drill its own relief well.<sup>113</sup>
- ☒ In case the *Discoverer's* efforts are insufficient, Shell proposes to make another drilling rig, the *Polar Pioneer*, available to drill a 'secondary' relief well. The *Pioneer* is proposed to be stationed in Dutch Harbor: 1279 nautical miles, or 1472 statute miles away from the drill site – significantly further away than having the *Kulluk* available in the Beaufort Sea as it was in 2012. According to Shell's letter to BOEM, Shell is planning for 7.5 days' towing from Dutch Harbor to the drill site based on a travel



speed of 6 knots.<sup>114</sup> In the same document Shell provides the *Polar Pioneer's* towing speed as "4–6 knots"<sup>115</sup> Shell does not confirm if the top towing speed can actually be achieved and sustained in Arctic conditions.

- ☐ Shell's 2014 Chukchi Sea exploration plan could reflect a reduction in overall spill response capacity from the regulator-approved Chukchi Sea Regional Oil Spill Response Plan. Shell's approved Chukchi spill response plan depends upon Shell conducting simultaneous operations in the Beaufort to be utilised in the case of a spill in Chukchi, meaning neither fleet is deemed sufficient for spill response if operating alone. Shell has not stated whether it will mobilise its entire Beaufort spill response fleet to support the proposed Chukchi only drilling effort. If it does not, the company would not be operating consistent with an approved plan and could have the following reduction in capacity:

- ☐ One not two oil spill tankers available;
- ☐ One not two oil spill response barges available;
- ☐ Comparable reductions in available mechanical spill response equipment.<sup>116</sup>

#### 4.5 SHELL'S INADEQUATE SPILL RESPONSE EQUIPMENT

Shell's experiences throughout 2012 provided worrying evidence that the company was not, despite broad assertions to the contrary, well prepared for the possibility of a spill with vital safety equipment failing its seaworthiness

test. This section outlines the problems with Shell's spill response equipment and inadequate testing.

Problems with Shell's oil spill response barge and dome resulted in the government refusing to allow Shell to drill into hydrocarbon bearing zones in 2012. While the barge has now been certified by the regulators,<sup>117</sup> concerns remain about the regulatory standards applied, as well as the adequacy of testing carried out on the capping stack.

Investors should insist that prior to any return to the Chukchi Sea, adequate testing has been conducted in appropriate real-life conditions.

#### SPILL RESPONSE BARGE PROBLEMS

A number of issues beset Shell's oil spill barge, the *Arctic Challenger*, in 2012, including electrical problems and hydraulic fluid discharges. In mid-July 2012, it was reported that Shell's oil spill barge the *Arctic Challenger* – designed to process and store spilled oil as part of Shell's spill response planning – was still undergoing modifications in Bellingham, Washington in an effort to get Coast Guard approval for seaworthiness.<sup>118</sup> By late August 2012, the Coast Guard revealed that roughly 400 inspection and plan review items remained to be satisfied, and Shell was seeking guidance from the Department of the Interior as to what site preparation could take place without the *Arctic Challenger* present.<sup>119</sup>

A permitting disagreement surrounded Shell's efforts to avoid having the *Arctic Challenger* evaluated "using standards for floating production installations that are anchored in one place for years at a time and must be

strong enough to withstand hurricanes and 100-year storms."<sup>120</sup> In July, it was reported that Shell had successfully requested the Coast Guard to instead evaluate the vessel under standards used for mobile offshore drilling units (MODU) "with less-stringent requirements for riding out storms, since the barge would move to escape approaching bad weather or respond to an oil spill."<sup>121</sup> By way of example, under the MODU Standards, Shell has to demonstrate the ship is capable of withstanding a 10-year storm, instead of the once-a-century event.

In October 2012, the barge was finally given regulatory approval,<sup>122</sup> but this was too late to allow it to be used in drilling activities that year, and Shell was not permitted to drill into hydrocarbon bearing zones. According to the Department of the Interior, the problems with the *Arctic Challenger* arose from "Shell's lack of rigorous and direct contractor oversight"<sup>123</sup> (see section 5.2).

#### CONCERNS OVER TESTING OF WELL-CAPPING EQUIPMENT

Shell has also committed to having a capping stack and the containment dome to respond in the event of a well blowout.<sup>124</sup>

The 'containment dome', housed on the oil spill response barge, would be hovered over a compromised well and funnel oil, natural gas and water to the barge. This Arctic Containment System – dome and barge – is required by US regulators before drilling to full target depths is allowed. The containment dome was damaged during testing, though the precise cause was unclear, with Shell stating that it would investigate whether the



problem involved the dome's design or the testing process.<sup>125</sup> Marvin E. Odum, President of Shell Oil, stated that "It's a disappointment that this particular system is not ready yet."<sup>126</sup> It has since been approved by the federal government.<sup>127</sup> Concern had also previously been expressed that Shell had no plans to test another essential piece of safety equipment in icy water – the well-capping stack. This was despite Shell CEO, Peter Voser's acknowledgement at the 2012 AGM that the company could not guarantee ice would not be present at the drilling sites.<sup>128</sup> Over the course of the summer and prior to the equipment failing in tests, further concerns were being raised about the adequacy of the testing approved by BSEE, an arm of the Department of the Interior.

Following a Freedom of Information Act (FOIA) request, the environmental NGO Public Employees for Environmental Responsibility (PEER) claimed in September 2012 that the capping stack "underwent only partial and cursory testing with no independent analysis of the results". In response to a request for all "records pertaining to results of Shell oil company's testing of its well-head capping stack that would be used in response to a well-head blowout in its Arctic drilling program", BSEE produced only a single page of notes.<sup>129</sup>

- ☐ Testing took place over less than two hours in Puget Sound on 25 and 26 June and involved only two BSEE officials and Shell.
- ☐ The capping stack was lowered to a depth of 200ft but was not attached to a simulated wellhead and blowout preventer

as would be necessary in a real-world blowout.

- ☐ Pressure tests were carried out on dry land, and were run for minutes not hours, despite the fact that any capping system would need to withstand hours, days or weeks of pressure in icy conditions.
- ☐ Testing initially lacked a low pressure test, though Shell stated it would perform this test at a later date.

No information has been provided as to what further tests have been conducted on the capping stack in the last 12 months.

#### 4.6 QUESTIONS FOR SHELL

Has the company carried out an analysis of the environmental and financial worst case spill scenario and, if so, will it be publicly available?

What is Shell's contingency for raising the necessary funds to pay all arising costs in the event of a worst case spill, eg asset disposals. Given that Shell's self-insurance covers only up to \$1.15bn per event – what is Shell's financial oil spill response plan?

Does Shell have any plans to conduct more rigorous testing of its spill response equipment (particularly well containment devices) in Arctic and simulated real-life conditions. Will the company make detailed disclosures of the conditions and results of these tests?

Will the lack of oil spill response capacity due to the lack of a second fleet operating in the

Beaufort Sea affect Shell's ability to respond to spills? Given that this change of capacity means Shell's approved oil spill response plan is out of date, has Shell submitted a revised oil spill response plan to BSEE?

Given the remoteness of the Chukchi Sea drilling sites, eg the lack of an airport with jet capacity and access to a major road system within a radius of several hundred miles, the distance of approximately 1000 miles to the nearest US Coast Guard station, and the lack of accommodation for responders to a spill – what are Shell's specific plans for managing the logistics of a response to a major spill?

What assumptions, eg travel speed, weather conditions, underlie Shell's assessment that the *Polar Pioneer* can reach a drilling site from Dutch Harbor within 8.5 days (7.5 days travel time)? What evidence does Shell have that the stated towing speed of 6 knots can be achieved in icy conditions?

Given that in previous large spills, mechanical recovery has only resulted in removal of 3–8% of a spill, what is the basis for Shell's assumption that they would capture half of the oil at surface in worst case scenario?

Has the company carried out a spill response gap analysis of its prospects in the Chukchi Sea where it hopes to drill in 2014? If so, will the company make it available publicly?

Will the company analyse the potential effects of using in situ burning or chemical dispersants and make detailed disclosure on this analysis?

# 5. Management risk

Shell's 2012 US Arctic programme began ominously in July 2012 with one of its rigs dragging its anchor and ended with its other running aground on 31 December 2013. In between, the company suffered what The New York Times labelled "*Shell's repeated and early misadventures*".<sup>130</sup> In the aftermath, it has become clear that Shell's Arctic failures in 2012 should also be viewed, in corporate governance terms, as a failure of management and board oversight. The extent of these management failures came to light following US government investigations into Shell's 2012 activity. According to statements to the Coast Guard investigation by a Shell representative, the decision to move the *Kulluk* in volatile weather season with predictable consequences was due in part by the company's desire to limit a tax bill.<sup>131</sup> A US Department of the Interior review reveals a troubling lack of preparation, "*significant problems with contractors*,"<sup>132</sup> and a failure by Shell to grasp the severity of problems sufficiently early to address them. This issue requires further examination. Lack of contractor oversight was, after all, one of the root causes of the *Deepwater Horizon* disaster.<sup>133</sup>

David Lawrence, who had responsibility for Alaskan operations, left Shell in March 2013 by "*mutual consent*".<sup>134</sup> Doubts remain as to whether Shell is adequately prepared from a project management and board oversight point of view particularly given Shell's own analysis of its 2012 operations as set out in its annual report.

The US Department of the Interior recommended that Shell satisfy two conditions prior to its resuming drilling operations in the US Arctic, and BOEM is requiring Shell to satisfy both before drilling plans are approved.<sup>135</sup> While Shell published an integrated operations plan in November 2013, it has not yet fulfilled the second condition: the completion of "*a full third-party audit of its management systems, including but not limited to, its Safety and Environmental Management Systems program (SEMS)*".<sup>136</sup>

At the time of writing, questions remain as to the adequacy of Shell's contractor management, and BOEM has requested more detailed information (see section 5.2).

This chapter outlines the various outcomes of management failures in Shell's 2012 US Arctic operations, assesses Shell's 2014 efforts to address these failings, and proposes a number of questions for investors to ask to determine whether management and board oversight processes have been adequately improved.

## 5.1 DEPARTMENT OF THE INTERIOR REVIEW

On 8 January 2013, then US Secretary of the Interior, Ken Salazar, announced a 60-day review of Shell's 2012 US Arctic offshore drilling programme "*to review practices and identify challenges as well as lessons learned*." The Review was to "*look at Shell's safety management systems, its oversight of contracted services, and its ability to meet the strict standards in place for Arctic development*".<sup>137</sup> On 8 March 2013, the Review was published. It is highly critical of Shell. It identifies seven key principles and prerequisites for safe and responsible offshore drilling in the US Arctic, of which five apply to industry. The Review finds that Shell fell short on all but one of those five principles.<sup>138</sup>

The Review states that prior to resuming its drilling programme in the US Arctic, Shell should:

- ☒ Develop a comprehensive and integrated operations plan; and
- ☒ Commission and complete a full third-party audit of its management systems, including but not limited to, its safety and environmental management systems (SEMS) programme.

As of the time of writing, Shell has submitted an integrated operations plan to BOEM, but has not carried out the third party audit.<sup>139</sup> It is worth noting that the integrated operations

plan makes repeated reference to the as yet unaudited Alaska facility SEMS. For example it states that "*contractors are identified for SEMS applicability when contracted*..."<sup>140</sup>

## 5.2 CONTRACTOR OVERSIGHT

The Review finds that there were "*significant problems with contractors on which Shell relied for critical aspects of its programme*". The Review describes the problems with contractor management and oversight as "*the most significant shortcomings in Shell's management systems*".<sup>145</sup> It is also worth noting that the need for stricter monitoring of contractors carrying out remediation works has been identified as an issue requiring attention at Shell's Nigerian subsidiary in a recent International Union for the Conservation of Nature report commissioned by Shell.<sup>146</sup>

The Review examined two contractor relationships in depth:

### SUPERIOR ENERGY SERVICES

Shell contracted with Superior Energy Services (Superior) to design, fabricate, own and operate the Arctic Containment System (ACS). The ACS is a containment system designed to capture oil and gas from a blown out well. The ship the *Arctic Challenger* was chosen as the surface support vessel for the ACS.

The Review criticises Shell's selection of Superior as a contractor. It notes that the selection appears to have been based on a long-term relationship rather than informed "*by a robust analysis of the scope and risks of the ACS project specifically*".<sup>147</sup>

Shell was not actively involved in overseeing Superior's progress, and in developing solutions to emerging problems, during most of the refurbishment and classification process for the *Arctic Challenger*. Shell did not have naval or marine engineering expertise to advise on the *Arctic Challenger* refurbishment and to identify and troubleshoot problems alongside Superior. The Review states that Shell personnel described Superior's work on the ACS during late 2011 and the first half of 2012 as a "*black box*". It was not until



## The Review describes the problems with contractor management and oversight as “the most significant shortcomings in Shell’s management systems.”

### BOX 2: REVIEW HIGHLIGHTS LACK OF PREPARATION

Shell entered the drilling season not fully prepared in terms of fabricating and testing certain critical systems (including its spill containment systems) and establishing the scope of its operational plans.

#### Examples

- ❑ Even though Shell committed to building and deploying a sub-sea containment system in mid-2010, work on designing and fabricating this system did not begin until late 2011, less than nine months before the intended drilling season.<sup>141</sup>
- ❑ It was not until March 2012 – only four months before the planned start of the Arctic drilling season – that the oil spill response barge *Arctic Challenger* was moved to Washington for essential works.<sup>142</sup>
- ❑ “In submissions to the Department of the Interior, Shell consistently underestimated the length of time required to complete each step of its drilling operations. The timelines provided by Shell proved to be unrealistic and did not account for complications and delays that should be budgeted for when operating in the Arctic.”<sup>143</sup>
- ❑ The Review identifies the following factors as contributing to Shell’s inability to obtain certification of the *Arctic Challenger* in time:
  - ❑ the selection of a vessel in need of significant retrofitting;
  - ❑ the late start of design and construction operations, all contributing to unrealisable timelines for construction, testing and obtaining Federal approvals;
  - ❑ insufficient engagement by Shell management and technical personnel; and
  - ❑ turnover of certain contractor staff.<sup>144</sup>

June 2012 that Shell engaged directly and at a high level on the problems with the *Arctic Challenger*. By the time certification was received, the drilling window had closed.

The Review, in analysing problems with another component of the ACS, the containment dome, refers to the “significant communication problems between Shell and Superior”. It also states that during the testing of the containment dome on the *Arctic Challenger*, officials “observed the absence of clear lines of authority on the vessel”.<sup>148</sup>

The Review finds that the delays in the completion of the *Arctic Challenger* and the failure of the containment dome

arose from Shell’s “lack of rigorous and direct contractor oversight.”<sup>149</sup>

#### NOBLE CORPORATION (NOBLE)

Noble is the owner of one of Shell’s drilling rigs, the *Noble Discoverer*. The Review states that failings can be attributed in part to Shell’s failure to adequately monitor Noble’s compliance with the appropriate management systems on board the vessel.

On 14 July 2012, the drill ship *Noble Discoverer* came adrift from its moorings in the sheltered waters of Dutch Harbor, Alaska.<sup>150</sup> News reports varied on how close to the shore it came, with Shell’s spokesperson Curtis Smith stating that

it had “stopped very near the coast”<sup>151</sup> and the harbour captain Kristjan Laxfoss saying “There’s no question it hit the beach... that ship was not coming any closer. It was on the beach”.<sup>152</sup> According to the Department of the Interior report, “the *Noble Discoverer* dragged its anchor in Dutch Harbor, drifted nearly 700 yards, and came within 100 yards of grounding”.<sup>153</sup> Shell stated that its investigation found that the drifting stemmed from Noble’s use of only the minimum amount of anchor chain and the absence of contingency plans to sufficiently address weather conditions.<sup>154</sup>

In November 2012, as the *Noble Discoverer* re-entered Dutch Harbor, the vessel briefly caught fire. After maintenance issues it appears its engine backfired and caused a blaze in the smokestack that was eventually brought under control by the crew.<sup>155</sup>

On 27 December 2012, Noble Corporation, the owner of the rig, released a statement confirming that “it is working cooperatively and diligently to rectify deficiencies and maintenance issues raised by the U.S. Coast Guard during a recent inspection of the Company’s drillship, the *Noble Discoverer*”.<sup>156</sup> The statement confirmed that the issues identified by the Coast Guard include the ship’s propulsion and safety management systems. Noble Corporation also confirmed in its press release that it had discovered other “potential regulatory non-compliance issues” including possible unauthorised discharges.<sup>157</sup>

On 4 January 2013, CBS News reported that the US Coast Guard had called in their criminal investigation team to investigate whether federal laws had been broken. CBS quoted a US Coast Guard spokesperson as saying “the Coast Guard continues to review evidence and the investigation is ongoing”.<sup>158</sup> According to the Department of the Interior report, the Coast Guard had referred its *Noble Discoverer* case for potential violations of international law on marine vessel pollution to the Department of Justice for investigation.<sup>159</sup>

## QUESTIONS REMAIN ABOUT CONTRACTOR MANAGEMENT IN 2014

The Department of the Interior Review concludes with a recommendation that before being allowed to drill in the US Arctic Ocean, Shell carry out a third party management system review, which Shell has not yet completed, according to the BOEM letter dated 14 January 2014.<sup>160</sup>

Shell's 2014 integrated operations plan contains a section entitled "Contract Management" where it outlines its approach to contractor engagement and management. While the section runs to several pages, it is general in tone and does not specify what changes have been made in oversight and selection practices since 2012.<sup>161</sup>

BOEM, in its January letter has sought more specific information from Shell regarding contractors.

BOEM's letter states: "Since Shell relies primary [sic] on contractors to meet its 2014 objectives, [Shell's Integrated operations Plan] must clearly detail how Shell conducts contractor oversight to ensure that its safety and environmental protection policies and standards are implemented by its contractors." The regulator has asked Shell to identify:

*"who within the company is responsible for the completion of the work, who possesses decision-making authority when faced with unplanned interruption to planned 2014 drilling operations. (Provide the job title/ personnel position for person(s) that would be in charge of the Noble Discoverer.)"*

*...how Shell ensures that communication and lines-of-accountability between Shell and the contractors are clearly established; and how Shell holds contractors responsible for their safety performance and safety culture."<sup>162</sup>*

In this letter BOEM is also "seeking assurance from Shell that not only have the physical deficiencies been resolved, but also if Shell's management/oversight deficiencies that allowed the physical deficiencies to remain undedicated or unresolved throughout the course of operations have been fixed. What adjustments or changes has Shell made to its project management/implementation/assurance plans to ensure that operational deficiencies, should they occur in the future, will be quickly detected and fixed?"<sup>163</sup>

## 5.3 FAILURE TO MEET EMISSIONS LIMITS

Prior to 2011, companies seeking to drill exploration wells in the US Arctic Ocean

had to comply with the Clean Air Act's strict controls on emissions of air pollution. Shell first sought a permit from the US Environmental Protection Agency (EPA) pursuant to this statute in 2007.<sup>164</sup> EPA approved emissions for the company's proposed exploration in 2007–2009, 2010, and 2012. In 2007 and 2010, Alaska Native and conservation organisations filed successful administrative appeals of these permits. These appeals had the effect of rendering the permits invalid and, therefore, precluding Shell from drilling.<sup>165</sup>

For its 2012 drilling, Shell was awarded permits by EPA for operations of the *Kulluk* and *Noble Discoverer*. The permitting process was a continuation of the process begun in 2007 and was successfully delayed by administrative appeals. It was completed in January 2012 after two years of negotiations with EPA.<sup>166</sup> Nonetheless, on 28 June 2012, Shell asked the Environmental Protection Agency (EPA) for a last minute revision of its air emission permits. It conceded that it had not been able to meet the requirements for nitrogen oxide and ammonia despite having spent at least \$30m on state-of-the-art technology for the generators in question. EPA granted Shell's request in late August and issued a compliance order that permitted Shell to emit higher levels of pollutants than originally allowed.<sup>167</sup>

Shell's operations in 2012 repeatedly violated even the terms of the compliance order. Both the *Discoverer* and the *Kulluk* were cited by EPA for violating "numerous" conditions of the air permits. The violations included failure to install some required air pollution control equipment, failure to properly calibrate some air pollution monitoring equipment, operation of unpermitted propulsion engines, numerous violations of emission limits, and the failure to timely report such violations.<sup>168</sup>

In September 2013 the US Environmental Protection Agency (EPA) announced settlements with Shell Gulf of Mexico Inc. and Shell Offshore Inc. for violations of their Clean Air Act permits for Arctic oil and gas exploration drilling in the Chukchi and Beaufort Seas.<sup>169</sup>

Based on EPA's inspections and Shell's excess emission reports, EPA documented numerous air permit violations for Shell's *Noble Discoverer* and *Kulluk* drill ship fleets, during the approximately two months the vessels operated during the 2012 drilling season. The settlements totalled Shell \$710,000 for violations of the *Noble Discoverer* air permit and \$390,000 for violations of the *Kulluk* air permit.<sup>170</sup>

## 5.4 THE RUNNING AGROUND OF THE KULLUK

On 21 December 2012, the 266 foot drilling rig, the *Kulluk* began its journey from Alaska to Seattle. Having no propulsion system of its own the rig was being towed by the tow vessel, the *Aiviq*. Following engine failure on the *Aiviq* a second towing vessel, the *Alert*, was brought to assist the *Aiviq* in towing the *Kulluk*.<sup>171</sup> On 31 December in the midst of difficult weather conditions the *Kulluk* broke free from the *Aiviq*. Fearing for the safety of the crew of the *Alert*, the tow line to that vessel was disengaged. The *Kulluk* ran aground on Sitkalidak Island less than an hour later.<sup>172</sup>

A major salvage operation was launched from the US Coast Guard air station on Kodiak Island 40 miles away.<sup>173</sup> It is important to note that Shell's drilling lease areas are 1,000 miles from a US Coast Guard air station calling into question the ability to deal with an incident in a drilling area.<sup>174</sup>

Initial concern focused on the potential of a leak from approximately 140,000 gallons of ultra-low sulphur diesel and about 12,000 gallons of combined lube oil and hydraulic fluid on board.<sup>175</sup>

On 4 January 2013, the Independent published a story claiming that Shell's decision to move the *Kulluk* in late December was "motivated by a desire to avoid \$7m (£4.3m) of Alaskan state taxes."<sup>176</sup>

The US Coast Guard is preparing a report from a marine casualty investigation into the grounding of Shell's *Kulluk* drilling rig after the *Aiviq*'s failed effort to safely tow the rig.<sup>177</sup>

Shell issued a statement to say that favourable weather forecasts had mattered more than the tax environment, but speaking to the marine casualty investigation, Shell's Alaska operations manager Sean Churchfield confirmed that the potential tax bill was one of the primary factors in the decision to tow the *Kulluk* during volatile weather season.<sup>178</sup>

On 7 January 2013, Shell confirmed that the *Kulluk* "has been safely towed to a safe harbour on Kodiak Island in the Gulf of Alaska, where it will undergo a thorough safety assessment before resuming its journey to its winter harbour for repairs and maintenance".<sup>179</sup> The *Kulluk* was subsequently towed to South Korea to undergo repairs. On 31 October 2013 Shell announced that it was preparing to scrap the *Kulluk* and would contract Transocean's

*Polar Pioneer* instead.<sup>180</sup> Built in 1983 and previously used in the Norwegian North Sea,<sup>181</sup> the *Polar Pioneer* will be on standby in Dutch Harbor (see section 4.4).

According to the BOEM letter dated 14 January 2014, the *Aiviq* suffered four engine failures during the operation.<sup>182</sup> Shell has not explained what steps or procedures it has adopted to ensure that similar problems will not be repeated in the future, explained their causes or what changes to procedures and practices would be implemented following this.

## 5.5 SHELL'S ANALYSIS OF ITS 2012 ARCTIC PROGRAMME

8 March 2013 also saw the publication of Shell's annual report. Shell's summary of its US Arctic programme in the report does not acknowledge:

- ⊖ The fact that the US Department of the Interior was conducting its review;
- ⊖ the problems with contractors; or
- ⊖ the multiple problems with the drilling rig the *Noble Discoverer*.

Shell in its annual report claims that it has “developed a thorough oil spill response capability that includes capping and containment equipment, and oil spill response vessels”,<sup>183</sup> which is in stark contrast to the Department of the Interior Review: “Shell entered the drilling season not fully prepared in terms of fabricating and testing certain critical systems and establishing the scope of its operational plans.”<sup>184</sup>

In response to an investor question at the company's 2013 AGM, Shell CEO Peter Voser confirmed that he believed the annual report gave a fair account of the 2012 US Arctic drilling programme.

Shell's annual report together with the statement in its revised exploration plan that “Shell's 2012 exploration drilling operations in the Arctic were conducted safely, and with no serious injuries or environmental impact”<sup>185</sup> suggests that the company has a surprisingly positive internal assessment of what to an objective observer was a failure. The seeming lack of an appreciation of the scale of the setbacks and the level of improvement required is evident too in some of the company's response to questions from BOEM. In response to BOEM's questions about how Shell has addressed failures and violations in 2012 on three key components of its exploration plan – the

*Aiviq* support vessel, the *Discoverer* drillship, and the Arctic Containment System, Shell provided identical boilerplate responses that the company will obtain Coast Guard certifications for the vessels and provide these certifications to BOEM.<sup>186</sup>

## 5.6 COST OVERRUNS IN ARCTIC OIL AND GAS PROJECTS

While the cost of Arctic oil and gas exploration and development is expected to be high, project developers often underestimate these large capital expenditures. According to Ernst and Young, with the exceptionally long Arctic project lead-time, “the risk of cost overruns increases dramatically. The investment cycle will necessarily be long and gaining funding for these types of projects may prove challenging in the current economic climate”.<sup>187</sup> For example, cost estimates for the Shtokman gas field in Arctic Russia was \$6bn in 1994, and skyrocketed to \$40bn in 2011, a dramatic increase even accounting for inflation.<sup>188</sup> Shell also has a history of underestimating Arctic exploration and construction costs. For example, costs for the Sakhalin II project in sub-Arctic waters off the Russian Far East were originally estimated to be \$10bn, but ballooned to \$20bn by 2005.<sup>189</sup> According to some estimates, the eventual cost rose to \$24.5bn.<sup>190</sup> So while investors are concerned about high estimated Arctic oil and gas capex outlays, they should be equally, if not more concerned about dramatic cost overruns once a commitment to a project has been made.

### QUESTIONS FOR SHELL

What level of oversight did Royal Dutch Shell plc's board of directors exercise over the company's 2012 US Arctic plans and has this oversight increased?

Cost overruns are typical for Arctic oil and gas projects with long lead times. What is Shell doing to avoid this given Shell's experience with Sakhalin II where costs more than doubled?

What changes have been made to internal reporting structures to address the obvious disconnect between the operational reality of ill-preparedness and the confident statements about the company's ability to carry out its 2012 Arctic plans made by Royal Dutch Shell board members including the Chairman and Peter Voser?

Why did Shell not complete the third party audit of its management systems including the SEMS prior to submitting its integrated operations plan?

Contractor oversight at the Shell Group has been identified as an issue in both the Review and at its Nigerian operations. What specific steps is Royal Dutch Shell taking to ensure adequate contractor monitoring across the Shell group?

What specific changes has Shell made to its contractor selection and oversight policies and practices since 2012?

Royal Dutch Shell held a number of individual and group meetings with investors to discuss progress and setbacks in its US Arctic operations during 2012. Why were the issues with contractors not highlighted by the company?

Has Shell reviewed its processes for contractor selection in light of the criticisms in the Review of the company's selection of Superior who lacked appropriate certification for ship design and build work?

What steps is Shell taking to ensure no future breaches of air emission permits which have resulted in fines to date in excess of \$1,000,000?

Is Shell able to provide the specific information requested by BOEM in respect of contracted work?

- ⊖ who within the company is responsible for the completion of the work?
- ⊖ who possesses decision-making authority when faced with unplanned interruption to planned 2014 drilling operations. (Provide the job title/personnel position for person(s) that would be in charge of the *Noble Discoverer*.)?
- ⊖ how does Shell ensure that communication and lines-of-accountability between Shell and the contractors are clearly established; and how does Shell hold contractors responsible for their safety performance and safety culture?

What steps or procedures has Shell adopted to ensure that similar problems to those that occurred with the towing of the Kulluk will not be repeated in the future?

Why did Shell not disclose specific information in its annual report's Arctic summary regarding contractor failings given that contractor risk is specifically identified as a risk factor in the general risk factor section?



## 6. Regulatory risk

The exposure of inadequate regulation in the wake of the *Deepwater Horizon* tragedy, increased world attention on the Arctic region, Shell's multiple (see section 4) problems in 2012 and President Obama's commitment to address climate change have created uncertainty about the regulatory regime that may govern future oil exploration and development in the US Arctic Ocean. This uncertainty is so great that both ConocoPhillips and Statoil cited it as the reason for suspending planned exploration. In fact, ConocoPhillips "announced it will put its 2014 Alaska Chukchi Sea exploration drilling plans on hold given the uncertainties of evolving federal regulatory requirements and operational permitting standards."<sup>191</sup>

The Department of the Interior has committed to implementing new safety and operational standards for exploration and development in the US Arctic. These standards come in part as a result of the agency's review of Shell's problems in 2012. The agency has accepted public comment on the proposed rules, but their completion has been delayed, and they are now not expected until at least early 2014.<sup>192</sup> The Obama administration has also been asked to update the regulations under which BOEM and BSEE operate.<sup>193</sup>

Offshore Arctic oil exploration is expensive and, accordingly, relies on fiscal and political support. Increasingly unpredictable US budget negotiations have included questions about some forms of this support. In particular, President Obama has called for an end to subsidies and tax breaks for companies engaged in oil exploration and extraction.<sup>194</sup>

More broadly, the current administration has committed to do more to combat climate change.<sup>195</sup> Recognising Congress's inaction, President Obama has committed to taking steps within his executive authority. These steps may include regulations that will result in additional costs.

### QUESTIONS FOR SHELL

How comfortable is the company that it can meet what ConocoPhillips has termed "evolving federal regulatory requirements and operational permitting standards" in the US Arctic Ocean over the next several years?

What impact would a reduction in subsidies and fiscal incentives currently available to the company have on its US Arctic operations?

# 7. Conclusion

Shell's continued public commitment to Arctic drilling sits uneasily with its operational track record in the region and with growing industry and investor skepticism about the operational and economic feasibility of offshore US Arctic oil exploration.

While other IOCs have publicly retreated from the US Arctic, citing regulatory uncertainty and technological difficulty, Shell chose to lift the 'pause' button and to attempt to position itself for a possible return to the Chukchi Sea as early as the summer of 2014.

While these plans have now been abandoned following successful court challenges by Alaska Native and conservation groups, investors should be concerned that an examination of Shell's 2014 Chukchi Sea exploration plan indicated that the company has not learned the appropriate lessons from its 2012 failures.

Those issues which lay at the heart of Shell's 2012 setbacks remain unresolved:

- ⊗ a refusal to test essential safety equipment in real-life conditions;
- ⊗ a reliance on spill clean-up technology that industry research and Shell itself acknowledge will not be sufficiently effective in icy waters;
- ⊗ a failure to conduct analyses of the ability to respond to a major spill in a remote area in challenging conditions;
- ⊗ a lack of specificity on contractor selection and management;
- ⊗ an outright refusal to disclose assessments of and contingency plans for the financial impacts of a worst case scenario spill.

And while the risks of such projects are many and identifiable, the potential returns from such projects remain highly uncertain – doubts over the level of commercially recoverable reserves; no substantial extraction before 2035; and profitability likely to require unsustainably high oil prices. Investors must question whether this represents an appropriate risk/return matrix.

This report is intended to inform investors of the specific risks facing Shell as it maintains a public commitment to offshore Arctic. It presents a summary of Shell's setbacks in 2012 and assesses the company's attempts to address the underlying issues. We suggest a number of questions investors should ask Shell, to enable them to understand whether the company has adequately assessed the various risks it faces and is taking appropriate steps to mitigate and manage them.

## BOX 3: QUESTIONS FOR SHELL

### ECONOMIC RISK

- ⊗ What is the company's anticipated total capital expenditure for the lifetime of the company's offshore US Arctic projects?
- ⊗ When does Shell expect any of its offshore US Arctic projects to begin extraction?
- ⊗ What oil/gas balance is Shell expecting to find in the Burger prospect? Does the company expect gas exports from these prospects to be economically viable, and under what circumstances? What factors have changed Shell's view as to the economic viability of the Burger prospect since 1989?
- ⊗ What is Shell's assumed break-even oil price for US Arctic projects?
- ⊗ Please provide information to shareholders demonstrating the robustness of the company's project portfolio against a range of oil price demand and price scenarios.

### LITIGATION RISK

- ⊗ Did Shell anticipate the Ninth Court of Appeals ruling upholding a challenge to the supplemental environmental assessment?

- ⊗ What is the impact of this judgement on Shell's plans?
- ⊗ What is Shell's view on the outcome of the other case pending – the challenge to the oil spill response plans?
- ⊗ Who at senior management level is overseeing potential legal threats to Shell's Arctic plans?

### SPILL RISK

- ⊗ Has the company carried out an analysis of the environmental and financial worst case spill scenario and, if so, will it be publicly available?
- ⊗ What is Shell's contingency for raising the necessary funds to pay all arising costs in the event of a worst case spill, eg asset disposals. Given that Shell's self-insurance covers only up to \$1.15bn per event – what is Shell's financial oil spill response plan?
- ⊗ Does Shell have any plans to conduct more rigorous testing of its spill response equipment (particularly well containment devices) in Arctic and simulated real-life conditions. Will the company make detailed disclosures of the conditions and results of these tests?

- ⊗ Will the lack of oil spill response capacity due to the lack of a second fleet operating in the Beaufort Sea affect Shell's ability to respond to spills? Given that this change of capacity means Shell's approved oil spill response plan is out of date, has Shell submitted a revised oil spill response plan to BSEE?
- ⊗ Given the remoteness of the Chukchi Sea drilling sites, eg the lack of an airport with jet capacity and access to a major road system within a radius of several hundred miles, the distance of approximately 1000 miles to the nearest US Coast Guard station, and the lack of accommodation for responders to a spill – what are Shell's specific plans for managing the logistics of a response to a major spill?
- ⊗ What assumptions, eg travel speed, weather conditions, underlie Shell's assessment that the *Polar Pioneer* can reach a drilling site from Dutch Harbor within 8.5 days (7.5 days travel time)? What evidence does Shell have that the stated towing speed of 6 knots can be achieved in icy conditions?
- ⊗ Given that in previous large spills, mechanical recovery has only resulted in removal of 3–8% of a spill, what is the basis for Shell's assumption that it would capture half of the oil at surface in worst case scenario?
- ⊗ Has the company carried out a spill response gap analysis of its prospects in the Chukchi Sea where it hopes to drill in 2014? If so, will the company make it available publicly?
- ⊗ Will the company analyse the potential effects of using in situ burning or chemical dispersants and make detailed disclosure on this analysis?

## MANAGEMENT RISK

- ⊗ What level of oversight did Royal Dutch Shell plc's board of directors exercise over the company's 2012 US Arctic plans and has this oversight increased?
- ⊗ Cost overruns are typical for Arctic oil and gas projects with long lead times. What is Shell doing to avoid this given Shell's experience with Sakhalin II where costs more than doubled?
- ⊗ What changes have been made to internal reporting structures to address the obvious disconnect between the operational reality of ill-preparedness and the confident statements about the company's ability to carry out its 2012 Arctic plans made by Royal Dutch Shell board members including the Chairman and Peter Voser?
- ⊗ Why did Shell not complete the third party audit of its management systems including the SEMS prior to submitting its integrated operations plan?
- ⊗ Contractor oversight at the Shell Group has been identified as an issue in both the Review and at its Nigerian operations. What specific steps is Royal Dutch Shell taking to ensure adequate contractor monitoring across the Shell group?

- ⊗ What specific changes has Shell made to its contractor selection and oversight policies and practices since 2012?
- ⊗ Royal Dutch Shell held a number of individual and group meetings with investors to discuss progress and setbacks in its US Arctic operations during 2012. Why were the issues with contractors not highlighted by the company?
- ⊗ Has Shell reviewed its processes for contractor selection in light of the criticisms in the Review of the company's selection of Superior who lacked appropriate certification for ship design and build work?
- ⊗ What steps is Shell taking to ensure no future breaches of air emission permits which have resulted in fines to date in excess of \$1,000,000?
- ⊗ Is Shell able to provide the specific information requested by BOEM in respect of contracted work?
  - ⊗ who within the company is responsible for the completion of the work?
  - ⊗ who possesses decision-making authority when faced with unplanned interruption to planned 2014 drilling operations. (Provide the job title/personnel position for person(s) that would be in charge of the *Noble Discoverer*)?
  - ⊗ how does Shell ensure that communication and lines-of-accountability between Shell and the contractors are clearly established; and how does Shell hold contractors responsible for their safety performance and safety culture?
- ⊗ What steps or procedures has Shell adopted to ensure that similar problems to those that occurred with the towing of the *Kulluk* will not be repeated in the future?
- ⊗ Why did Shell not disclose specific information in its annual report's Arctic summary regarding contractor failings given that contractor risk is specifically identified as a risk factor in the general risk factor section?

## REGULATORY RISK

- ⊗ How comfortable is the company that it can meet what ConocoPhillips has termed "*evolving federal regulatory requirements and operational permitting standards*" in the US Arctic Ocean over the next several years?
- ⊗ What impact would a reduction in subsidies and fiscal incentives currently available to the company have on its US Arctic operations?

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- 195 President Barack Obama, State of the Union Address (Jan. 28, 2014), [www.whitehouse.gov/the-press-office/2014/01/28/president-barack-obamas-state-union-address](http://www.whitehouse.gov/the-press-office/2014/01/28/president-barack-obamas-state-union-address) ('But the debate is settled. Climate change is a fact. And when our children's children look us in the eye and ask if we did all we could to leave them a safer, more stable world, with new sources of energy, I want us to be able to say yes, we did.')

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