

# **THE MYTH & REALITY OF OIL SPILLS:**

**An Objective Analysis of the Impacts  
of some of the World's Greatest Oil  
Spills**

**“En Passant”**

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## Abstract

The objective of this paper is to separate myth from reality by providing a factual and objective view of the reality of the effects of some of the world's greatest oil spills. It particularly deals with the geography of the region in which the spill occurred, the climatic effects on the spill, the probable volume oil spilled, the cleanup actions that followed and the long-term environmental effects.

As an introduction, Part 1 the paper deals with some of the commonly held beliefs that the world is about to run out of fossil fuels, that oil spills and leaks are universally 'environmental catastrophes' and challenges the long term view that the effects are persistent and adverse to the environment. The seemingly endless alarmism that follows each spill is highlighted and the reader is asked to read the remainder of the paper with an open mind, comparing the predictions of doom with the evidence revealed by the reality of hindsight.

It is concluded that the effects of the relatively few spills that have occurred have been exceptionally exaggerated for political purposes by both politicians and environmental activists. Both these alarmist cliques loudly report claims in every case that go far beyond the actual effect of the spill itself. Some of the unfortunate claims by scientists are also exposed as political activism unrelated to scientific method.

Finally the paper provides a 'prophesy' (based on the history of previous spills) as to the long-term results and effects of the recent BP Macondo Well blowout in the Gulf of Mexico that commenced on 20<sup>th</sup> April 2010 and was capped on 29<sup>th</sup> July 2010, 100 days later.

*Note that this paper was commenced 13 days after the Macondo well blowout commenced and was intended to provide a forecast of what would happen. In fact, (due to my first priority of paying attention to making a living) most of the predictions I intended to make have already come true and are now facts and not foretelling.*

*Note also that this paper has been written under a pseudonym simply because I have no time to enter into a debate, or to deal with any personal attacks that may result from deniers and alarmists who dispute its contents. However, I look forward to any factual corrections that readers may wish to provide. These will certainly be included in future versions as this paper is about seeking the truth and dispelling the myths that seem to be growing daily in this 'New Age of Unreason'.*

# **Part - 1**

## **Oil Spills: Perception, Myth & the Factual Reality**

**A summary of oil chemistry and  
the environmental effects of oil**

## Oil Spills: Perception, Myth & Reality

### Background

Over the years I have watched public hysteria at the alarms regularly generated by ‘experts’ to the point where I felt depressed for the world my children must inherit. In the 1970’s, while at university I read Ehrlich and the predictions of the ‘Club of Rome’ forecasting with absolute certainty the end of the world as we knew it through overpopulation outstripping food production and the exhaustion of the Earth’s finite natural resources. The book they used to support this view was their best seller “**The Limits to Growth**” (1972)<sup>i</sup>. Despite none of their predictions coming true they issued an update in 2002 simply moving the disaster date forward by 50-70 years. In short, instead of frightening me as they intended, the catastrophists instead created in me a healthy scepticism and an extreme caution when considering long-term predictions. Indeed, those who have so confidently written the many histories of the future have only demonstrated that there is an ‘iron law’ concerning ‘the perils of predictions’ and that is: it is impossible to predict the future. Futurists have been right in only a tiny fraction of cases and even then generally by accident or mistake and not by their logic. In many cases where their predictions were right it was often because they already had an observable factual basis, so the prediction was just an extension of an existing trend.

Having been vaccinated with scepticism I have therefore taken some interest in all the major doomsday predictions since the 1970’s and have spent (or wasted?) considerable time researching and investigating some of the more prominent among them. The Club of Rome prediction concerning the exhaustion of oil by 1992 at the earliest and by 2000 at the latest was sufficiently specific that I decided to monitor its progress. That fallacious prediction is worth a separate article in itself and some facts about it are considered below.

### Author’s Disclaimer

Although I do some work for the oil industry I intend to stick to the documented facts and *I will make it very clear when I express my own opinion by putting it in purple, bold italics*. I hope my opinions will logically follow the facts and will not be in opposition to them due to any personal bias! I am not an oil industry engineer so my knowledge of how oil is extracted is no better than that of any other well-read person interested in the subject. However, you do not need to have a degree to study and become intelligently knowledgeable in a subject; all you need is enough time to conduct realistic research (of different sides and views), an open mind and a logical ability to sort through the available facts. Knowledge and facts should never be overruled by ‘beliefs’ desires, personal bias or opinion.

And one final disclaimer: I have used no information that is not readily available on the public internet that anyone seeking to investigate this subject could not readily find. Wherever necessary and possible I have provided the source of my information.

### Opening your mind

I want to begin with a small test of perception versus reality. You have probably heard the term ‘**Peak Oil**’, the point at which >50% of the world’s oil & gas reserves have already been extracted. From there it is all downhill as the remainder will be harder and more costly to find and remove. On Saturday 25<sup>th</sup> June 2010 The National Geographic Channel screened a programme called ‘**Aftermath**’ which purported to explore the end of oil as a usable resource and what would happen to civilisation when it was gone. In parts it resembled the ‘Mad Max’ series of films as society broke down, transportation of food failed and chaos, tribal violence and catastrophe ensued. In the June 2004 National Geographic magazine the lead article is called ‘**The End of Cheap Oil**’ (*my emphasis in Italics*). The article is worth reading if only for its confident assertions.

Let’s begin with small quiz about the world oil and gas reserves and see how the truth equates with what you hear, your current knowledge and beliefs and the oft repeated alarms of ‘experts’. The questions are:

1. Have known oil and gas reserves increased or decreased in the past 20 years despite the increased usage through the industrialisation of India, China and Brazil?
  - a. Increased
  - b. Decreased
  - c. Stayed the same
  - d. Catastrophically declining
2. How many years' reserves of Oil & Gas are there at the current and predicted increased off-take?
  - a. <20 years supply
  - b. 50 years supply
  - c. 100 years supply
  - d. >100 years

I suspect that most people would answer “b”, or ‘d’ to the first question and “a” to the second, whereas the correct answers are “a” and “b”, “c” or “d” to the second depending on what resources you wish to include. As the Table below shows this generation of earthly inhabitants does not have a problem of supply. Current oil and gas reserves as we know them in 2010 are able to sustain the present and predicted increases in usage for some time to come. This statement flies in the face of all that we are constantly being told, yet we are made to feel guilty about consuming this natural bounty. However, there are some points worth noting:

1. Constant drilling is necessary. **There are currently 50,000 drill holes in the Gulf of Mexico and only four have leaked more than 7 tonnes.** In other words it is a far safer operation at 99.998% accident free than driving to work each day!
2. Energy companies have yet to explore huge tracts of the world, but particularly Antarctica, the Arctic, The Falklands, the Paracel Islands (disputed by China, Vietnam and the Philippines), the Great Australian Bight, northern Canada, the South American hinterland and Pacific coasts, Mongolia, China, etc. All of these regions are likely to have their share of oil and gas and if they do then the world will have centuries of supply. Here are the facts. Read into them what you will!

World Energy Resources					
	Year	Oil	Change	% Increase	Comment
<b>Reserves</b>	<b>1989</b>	<b>1,006.4</b>			Scale is in billions of barrels
	<b>1999</b>	<b>1,085.6</b>	<b>79.20</b>	<b>7.30%</b>	This is for wells in production only and does not include untapped reserves. Using all reserves extends extractable oil availability to beyond 100 years.
	<b>2010</b>	<b>1,333.1</b>	<b>247.50</b>	<b>18.57%</b>	
<b>Years of Reserves at projected usage</b>				<b>45.70</b>	
	Year	Gas	Change	% Increase	Comment
<b>Reserves</b>	<b>1989</b>	<b>122.40</b>			Scale is in trillions of cubic meters
	<b>1999</b>	<b>148.55</b>	<b>26.15</b>	<b>17.60%</b>	This is for wells in production only and does not include untapped reserves. Using all reserves extends gas availability to beyond 100 years.
	<b>2010</b>	<b>187.49</b>	<b>38.94</b>	<b>20.77%</b>	
<b>Years of Reserves at projected usage</b>				<b>62.80</b>	
	Year	Coal	Change	% Increase	Comment
<b>Reserves</b>	<b>2010</b>	<b>826.00</b>			Scale is in billions of tons
<b>Years of Reserves at projected usage</b>				<b>500+</b>	China consumes 46% of the world's output

Source: Statistical Review of World Energy in 2010

The purpose of that introduction was to ensure that everyone understood that currently propagated views that there is an energy ‘crisis’ are not factual and that the information most people accept as conventional wisdom is actually no more than disguised political propaganda. Hopefully, this has opened many readers minds to an unconventional view based on facts.

### **The Facts on some Major Oil Spills**

In this article I want to focus on three of the more infamous oil spills and analyse the reasons for their varied outcomes and then based on this previous history examine the probable outcomes of the recent fourth oil leak in the BP Macondo Well drilled in the Gulf of Mexico. This paper will therefore review:

1. The Kuwait War Oil Spill; The Persian Gulf, 1991;
2. The Exxon Valdez; Alaska, 1989;
3. The IXTOC-I Well Blowout & Leak; Gulf of Mexico, 1979; &
4. The BP Macondo Oil Well Blowout; Gulf of Mexico, 2010.

### **The Chemistry of Oil**

I will begin by dealing with some issues of oil chemistry, and in doing this I am pre-empting the conclusions that this article will reach. Due to my ongoing research as a result of reading the Club of Rome’s book I asked and answered many of the current questions forty years ago. Watching the ongoing ‘circus of ignorance’ has lead to an ongoing frustration as I read the daily dose of predictive misinformation that is never corrected when the real situation occurs and the truth is known. It is almost as if we are all on the set of the musical “Chicago” in which today’s sensation is quickly pushed aside by a new event – and nobody ever goes back to see what happened to the original ‘sensation’. The key to the mainstream media approach is to understand that they require sensation to sell their news. To do this they continually exaggerate the negative; and omit or barely mention positive events. To sensationalise the case for catastrophe they maintain that every new event is ‘historic’, unprecedented, urgent, overwhelming and ‘sensational’ – then tomorrow they move on without ever following up to find out how the previous sensation actually turned out. I live in hope that one day the public will examine these prophets and the ‘**Perils of Prediction**’.

*Last year the Telegraph in Melbourne published the Water Reservoir Levels (so we could all feel guilty as we slowly expired of thirst?). As 2010 is the wettest winter in Victoria in a decade the alarmists have quietly dropped this prediction of doom. Apparently the clock for ‘the worst drought in a thousand years’ will have to be reset at zero. That is a whole new article in itself, guided by Jarryd Diamond’s book “Collapse: How Society’s Choose to Fail” – a course the western world has decidedly begun to take through adherence to the new, ‘green’ religion.*

### **The Salty, Oily Chemical Soup called the Sea Case Study 1 – Santa Barbara, California**

California has banned offshore drilling to ‘protect the environment’ although they claim it is for safety reasons. The main objectors were the Hollywood set, lead by many prominent actors including Pearce Brosnan. Aesthetics and the view from their beachfront homes appears to have been more important than the economics of oil supply for their vehicles. Today, there are oil wells within the city limits of Los Angeles and the famous tar pits (from which hundreds sabre-tooth tigers & mastodon skeletons have been recovered) indicate the continued richness of the oil resources in the area.

As the Woods Hole Oceanographic Institution and the University of California, Santa Barbara reported in May 2009:

“Oil residue in seafloor sediments that comes from natural petroleum seeps is equivalent to between **8 to 80 Exxon Valdez oil spills**. (*My emphasis*)... There is an oil spill everyday at Coal Oil Point (COP), the natural seeps off Santa Barbara, where 20-25 tons of oil have leaked from the seafloor each day for the last several hundred thousand years.”<sup>iii</sup>

Given the current scenario of doom for the Gulf of Mexico and the scale of the ongoing natural seepage off the pristine beaches of California the researchers’ next comments are almost humorous;

‘... once the oil floated to sea surface, about 10% of the molecules evaporated within minutes. One of the natural questions is: **What happens to all of this oil?** Valentine said. “So much oil seeps up and floats on the sea surface. It’s something we’ve long wondered. We know **some of it will come ashore as tar balls**, (*my emphasis*) but it doesn’t stick around. And then there are **the massive slicks**. You can see them, sometimes **extending 20 miles from the seeps**. But what really is the ultimate fate of this oil? (*read the article for the full story, but basically they stated*) ... this oil is heavy to begin with,” Valentine said. “It’s a good bet that it ends up in the sediments because it’s not ending up on land. It’s not dissolving in ocean water, so it’s almost certain that it is ending up in the sediments. We could say with confidence that the oil we found in the sediments was genetically connected to the oil reservoir and not from an accidental spill or runoff from land. The oil that remained in the sediments represents what was not removed by “weathering,” dissolving into the water, evaporating into the air, or being degraded by microbes. **Nature does an amazing job acting on this oil**, but somehow the microbes stopped eating, leaving a small fraction of the compounds in the sediments.”

So, *at best* there is a natural disaster equal to 8 x Exxon Valdez’s a year with seepage occurring every day just offshore in California. Yet the outcry has been against capping, extracting and exploiting this natural resource. *At worst* it is ten times the scale of the Exxon Valdez spill, yet the salty chemical soup of the ocean is comfortably dealing with the situation without government intervention and without their being any intention of ever plugging the leak.

## Case Study 2 - Cooking Oil: How Sea Water and Oil React

The question the scientists from Woods Hole raised was “*What happens to all of this oil?*” And the answer is: Nature takes care of it - naturally.

The cocktail of chemicals that make up the oceans has taken millions of years to produce. Chemical reactions are ongoing as new chemicals are washed into the sea or spewed out by sub-sea volcanoes, earthquakes and landslides. Biological detritus, microbial feasting and the growth behaviour of undersea plants, algae and plankton also changes the local chemistry. Add the Sun’s ultra violet rays and heat and we have a recipe that can cause reactions and other chemical and biological events to occur. As the following short article from “**Popular Mechanics**” unemotionally declares: “*The sea has its own way of handling the problem ...*”. The issue is not whether or not nature can deal with the current situation in the Gulf of Mexico but, given that it came as a surprise, how long will it take for the microbial legions to reach the scene and multiply to the scale necessary to deal with this unexpected food source. Incidentally, the spraying of dispersant detergent chemicals may thin and distribute the oil slick, but generally they kill the beneficial microbes and spread this microbial feast probably resulting in it taking longer and being less effectively cleaned than if nothing was done. Perhaps the solution is to introduce seed microbes to the worst affected areas – then just wait. *This suggests that the tortoise solution is better than the instant gratification from seeing the hares racing around with sprays doing ‘something’. However, as all oil spills are a political issue cool thinking and the best long-term solutions (such as doing nothing) are unlikely to prevail.*

As this extract of the Popular Mechanics article explains:

‘As soon as oil hits water, the ocean begins its deconstruction. In fact, the marine environment handles oil much like a human body handles alcohol: destroying, metabolizing and depositing the excessive compounds — in oil’s case, hydrocarbons—then transforming the compounds into safer substances. In a 10-minute span after spilling into the sea, 300 gallons of oil can spread to a radius of 160 feet and create a slick a fourth of an inch deep. ... The day after it enters the water, chemicals in the oil begin to transform, both at the water’s surface and farther into the water column. Trace elements lurking in water can speed or slow the process while **the sun fuels the breakdown**, decomposing even the most complex of oil’s components over time. **The warmer the water temperature and the more sun exposure, the faster the oil breaks down. During the first few days** after a spill, between **20 to 40 percent of oil’s mass turns into gases, and the slick loses most of its water-soluble hydrocarbons.** (*my emphasis*)

... Between 10 and 30 percent of the oil is absorbed by sediments and suspended materials and deposited on the bottom of the sea. Once at the bottom, though, the decomposition rate of the oil halts almost completely because of lack of oxygen, and heavy oil fragments can be preserved inside sediments for years.

... From deep-sea sediment to bobbing clumps, oil quickly loses its original properties and breaks off into hydrocarbon components, with many different chemical compositions and existing in different forms. These forms can prove toxic to marine life, but after a time — **with weathering, feasting micro-organisms and solar decomposition — the water self-purifies, as intermediate compounds gradually disappear and water and carbon dioxide reform.** To speed the process, researchers use oil dispersants, specialized chemical agents, to change the physical and chemical composition of oil. Basically, these chemicals work to mix oil and water better than normally possible so that the oil sinks deeper into the water column. Burying the oil a little deeper means that surface slicks won't float toward shorelines as readily. However, mixing these chemicals into water has long been a controversial process, as they have proved toxic to some marine organisms.<sup>iii</sup>

How long the process of breaking down the oil into microbe and plant food takes is dependent on many factors, but the key ones are: water temperature, water chemistry (saltiness), the available microbe population and the Sun's UV rays.

As we will see with the spills discussed in this paper the answer is always the same, *so try not to be panicked again this time. 'Don't Worry, Be Happy' and all will be well in the end.*

## The Greatest Oil Leaks & Spills in History

It is impossible to accurately define what we are talking about here as every day more oil leaks into the landlocked Caspian Sea from natural seeps and leaky pipes than all but the largest ones sensationalised in the media. For instance, the already mentioned Coal Oil Point leak / seep off Santa Barbara in California emits at least 40,000,000 US gallons of oil into the ocean every year - and the activists concerned for the environment have prevented any drilling to cap and productively exploit it!

In American environmental folklore the Exxon Valdez is the benchmark for oil disaster posters, yet even in the unnatural disaster arena it does not make the top fifty spills without careful definition. In tanker disasters it is currently a lowly also-ran at No. 35!

The following eleven uncontrolled oil discharges are all massively larger than the Exxon Valdez, but generally few of them made the news and even then not to any great degree. The **Exxon Valdez** spilled <10 million gallons into Prince William Sound off the coast of Alaska whereas the smallest discharge in the list below is at least four times larger. **Globally, natural seeps account for 100-300 million gallons annually.**

### 1. Kuwait - 1991 - 520 million gallons into the Persian Gulf (860 million gallons if the oil spilt on land is included)

Iraqi forces opened the valves of several oil tankers and flooded the Persian Gulf with oil in order to slow the invasion of American troops. The oil slick was four inches (10 cm) thick and covered 6,400 sq km of the northern and central reaches along the west side of the Persian Gulf.

### 2. USA – BP Macondo Well Blowout; Louisiana, Gulf of Mexico – 2010 – 172 million gallons

On 20<sup>th</sup> April 2010 the Macondo Well blew out probably as a result of poor engineering procedures. Eleven men on the Deepwater Horizon Oil Drilling Rig were killed, the rig was set on fire and sank several days later. The well was in 1,900m of water, which made sealing operations difficult. The well was finally capped on 29<sup>th</sup> July 2010. As no monitoring devices remained operational the volume of the leak is hard to estimate accurately. The best case scenario is about 100m gallons were spilt and the worst case is up to 172m gallons of oil.

### 3. Mexico – IXTOC-I; Campeche Bay, Gulf of Mexico, 1980 - 120 million gallons

An accident in the **IXTOC-I** oil well in the same Gulf of Mexico caused an explosion that caused the oil platform to collapse. The well remained open, spilling 30,000 gallons a day into the ocean for almost a year. *Compare that to the <100 days of discharge from the Deep Horizon event at 5,000 – 40,000 gallons per day. The highest estimate (by the U.S Government puts the Macondo leak at 172M gallons.*

*However, and estimated 30% was skimmed and recovered, 25% was burned, 20% evaporated leaving about 40M gallons to cause damage. As correspondents on one website I have been following 'complain' not even 10% of that has been washed ashore – and we shall discuss the reasons for that. It is certainly possible to find slicks and tar balls on some beaches, but not on the predicted scale. Note that it is in the U.S. government's interest to amplify the scale of the leak as this increases the fines and penalties that can be imposed on BP.*

4. **Trinidad and Tobago - 1979 - 90 million gallons**

During a tropical storm off the coast of Trinidad and Tobago, a Greek oil tanker, the **Atlantic Empress** collided with another ship, and lost almost its entire cargo.

5. **Russia - 1994 - 84 million gallons**

A broken pipeline on the **Kolva River** in Russia leaked for eight months before it was noticed and repaired. Most of the oil was discharged into the Arctic Ocean.

6. **Iran - Persian Gulf - 1983 - 80 million gallons**

The super tanker **Nova** collided with a drilling platform which then collapsed into the sea. The well spilled oil into the ocean for seven months before it was repaired.

7. **South Africa - 1983 - 79 million gallons**

The **Castillo de Bellver** caught fire and was abandoned before sinking 40 km off the coast of Saldanha Bay. Its entire load was lost into the sea. None of it reached landfall.

8. **France - 1978 - 69 million gallons**

The **Amoco Cadiz** damaged its rudder in a severe storm. Despite several ships responding to its distress call, the ship ran aground and broke in two. Its entire payload was dumped into the English Channel.

*As a result of the Macondo Leak some scientists went to the French coast most damaged by the Amoco Cadiz oil but could find no signs of residual damage.*

9. **Angola - 1991 - >51 million gallons**

The **ABT Summer** super tanker exploded with the oil spilling into the sea. The ship was carrying 300,000 tonnes but much of the oil was burnt so the exact quantity spilled is an estimate only.

10. **Italy - 1991 - 45 million gallons**

The **Haven** exploded and sank off the coast of Italy after attempts to ground it failed. It continued leaking its oil into the Mediterranean for 12 years.

11. **Canada/USA - Odyssey Oil Spill - 1988 - 40 million gallons**

The **Odyssey** broke up and sank 700 nautical miles off the coast of Nova Scotia. No oil ever reached landfall

The **Exxon Valdez** oil spill was a 10m gallon local disaster as there were the 35 oil spills that were, in fact, larger and more severe. One other point worth noting is the decline in the number of 'accidental discharges' from oil tankers. Two decades ago there were over 360 tanker spills, but in the past ten years this had dropped to 172 incidents. Also, 73% of the volume of oil discharged came from just 3% of the incidents

Safety is improving with constantly advancing technology, but with bigger ships, more difficult locations being drilled, human error and extraordinary events a constant companion for oil workers, accidents can never be totally eliminated. That is just a mirror of the risks and chances of life itself.

Parts 2 – 6 of this paper will discuss:

## **Part 2 – Kuwait.**

**Part 3 – The Exxon Valdez** {not because it was particularly big, but because it attracted the most publicity and hysteria},

## **Part 4 - Ixtoc-I.**

## **Part 5 - BP Macondo Well Blowout.**

## **Part 6 – Summary and Conclusions**

### **End notes to Part 1**

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<sup>i</sup> <http://www.clubofrome.org/eng/about/4/> (***Bold Italics inserted by the author***). In 1972 the campaigning of this growing group *of like-minded individuals* gained a new worldwide reputation with the first report to the Club of Rome: "The Limits to Growth", commissioned by the Club from a group of systems scientists at the Massachusetts Institute of Technology. The Report explored a number of scenarios and stressed the choices open to society *to reconcile sustainable progress within environmental constraints*.

The international effects of this publication in the fields of politics, economics and science are best described as a 'Big Bang': *over night, the Club of Rome had demonstrated the contradiction of unlimited and unrestrained growth in material consumption in a world of clearly finite resources and had brought the issue to the top of the global agenda*.

With its focus on long-term vision and provocative scenarios, the report sold more than 12 million copies in some 30 languages worldwide.

*Building on this success*, the Club of Rome membership grew as it continued to produce reports on the global issues it identified. Particularly, the goal of raising long-term awareness among world leaders and decision-makers regarding the delicate interaction between human economic development and the fragility of the planet was achieved, contributing to the establishment of Ministries of the Environment in numerous countries. (Comment: *"Building on this success"?- As far as I am aware none of their core predictions has been proved true, so what is their criteria for success: the accuracy of their predictions or the sale of their doomsday work of fiction? My particular interest is their prediction that all oil resources would be exhausted by the year 2000. In 2010 we know where there is more untapped oil than we have used in the past 150 years.*

<sup>ii</sup> <http://www.isa.org/InTechTemplate.cfm?template=/ContentManagement/ContentDisplay.cfm&ContentID=76955>

The extract above is copied from an article published in the Intech online magazine published in May 2009 called 'Natural oil leaks equal 8-80 Exxon Valdez spills.

<sup>iii</sup> <http://www.popularmechanics.com/science/energy/coal-oil-gas/oil-spill-water-chemistry?src=rss>

The url provides the full article from 'Popular Mechanics'.