Zeitschrift: Swiss bulletin für angewandte Geologie = Swiss bulletin pour la géologie appliquée = Swiss bulletin per la geologia applicata = Swiss bulletin for applied geology

Herausgeber: Schweizerische Vereinigung von Energie-Geowissenschaftern; Schweizerische Fachgruppe für Ingenieurgeologie

Band: 17 (2012)

Heft: 2

Artikel: Gulf of Mexico Macondo blow-out : two years later or how safe is safe and how big is big?

Autor: Seemann, Ueli

DOI: https://doi.org/10.5169/seals-349240

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Siehe Rechtliche Hinweise.

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. Voir Informations légales.

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. See Legal notice.

Download PDF: 02.02.2025

ETH-Bibliothek Zürich, E-Periodica, https://www.e-periodica.ch

Swiss Bull. angew. Geol. Vol. 17/2, 2012 S. 25-29

Gulf of Mexico Macondo blow-out: two years later or how safe is safe and how big is big?

Ueli Seemann[1]

Summary of a presentation given at the SASEG annual convention 2012 in Lucerne, Switzerland

Introduction

More than two years have passed since the dramatic blow-out of BP's «Macondo» Deepwater Well in the Gulf of Mexico. Whilst the public was shocked and a global outcry against the Oil and Gas (O & G) Industry at large was triggered by this event, nowadays there is very little preserved in terms of public / corporate memory. This is most likely due to a natural phenomenon, which could be referred to as «human priority shifting».

From an O & G Industry point of view the «Macondo Events» deserve more than such short-lived attention. In a paper presented at the Annual Convention of SASEG (Swiss Association of Energy Geoscientists) in Lucerne (23rd June, 2012) a detailed lookback was presented. From this presentation, two particularly relevant aspects for the O & G Industry are – considered in the present paper – the safety aspects and the oil spill aspects.

Safety aspects – or how safe is safe?

The most important safety-related aspect of «Macondo» is that as a consequence of the blowout 11 workers lost their lives. Typically, nowadays the public at large, is not (no longer) aware of this sad fact. Another relevant fact which is often overlooked is that «Macondo» is one of over 18,000 technically very demanding deepwater wells that were drilled up to 2010, globally.
When the blowout occurred in April 2010 there was a «global consensus» about the dangerous and unsafe conditions in which the O & G Industry is operating. The actual article aims at putting safety standards and conditions of the O & G Industry into perspective and correlating them with other industries.

As starters: yes, the working conditions of O & G workers are harsh, demanding and require constant alertness. This has been noted by the O & G Industry already in the early years of operations. As a result, stringent safety rules, regulations, checks etc. have been developed over time. Also, the OGP-Organisation issues annually, global safety statistics with 22 contributing companies, representing over 2 million O & G Industry workers. The analysis of the 2011 OGP report yields the following conclusions (Fig. 1):

- The O & G Industry has seen a drastic increase in total, global working hours since 2000, reaching over 3 billion in 2010.
- During the same period, the number of working-incidents (per working time unit; i. e. per one million working hours) has decreased significantly from 5 to 3. This is a remarkable achievement and somewhat contrary to expectations. One conclusion that can be drawn from this trend is that the O & G Industry appears to be a «fast learning» industry.

[1] SASEG, member of the board

The crucial test of how safe or unsafe the O & G Industry really is, is to compare its performance with other industries and sectors thereof. One obvious challenge of comparing performances across various businesses and sectors thereof, is the fact that different business/industry sectors might apply different safety assessment methods. Still it is felt, that orders of magnitudes and general trends can be analysed and compared despite of such methodological differences.

The comparison across sectors yields the following results (Figs. 2, 3):
The *incident* rate of 3 per one million working hours for the O & G Industry compares favorably with the averaged «All Industry Rate» of all EU countries and of Switzerland which are distinctly higher - 15 and 16 respectively.
The O & G Industry rate is closest to the lowest «All Industry Rate» of individual EU countries, which is England with a rate of 5.
Also, the O & G Industry rate of 3 is significantly lower than the rate of specific industry sectors, e. g. the «Swiss Construction Sector» with a rate of ± 25. (Comparing the O & G Industry rate with the «All Industry Rate» is somewhat problematic, since the «All Industry» figures comprise higher and lower risk industry sectors. Figures for individual industry sectors are sparsely documented. The nearest approximation can be derived from the compilation of the Swiss Industry Worker Insurance SUVA).

Regarding *fatality* risks, the O & G Industry exhibits a low number of 5, meaning that on average every fatality is preceded by only 5 «fore-runner» incidents («warnings»). This is a distinctly lower number compared to the Swiss all industry number which is ± 1,000 or the Swiss «Construction Sector» which is ± 700.

In conclusion it can be stated that the global O & G Industry represents a low incident risk industry with a healthy safety standard; but working incidents (particularly in frontier jobs) carry a very high severity potential. These conclusions are not fundamentally new, but they are presented here underpinned with rather solid statistical evidence.

Oil spill aspects – or how big is big?

The dimension of the «Macondo» oil spill caused, understandably a sense of fear amongst the local population and the general public. Also, quick accusations against the O & G Industry were made, and exaggerated claims regarding the magnitude of the blowout were propagated. As a result of «Macondo» a temporary governmental ban on all offshore exploration activities was issued.
The present paper tries to put the «Macondo» oil spill in perspective, without denying the fact that this spill should never have occurred and that it indeed caused consid-

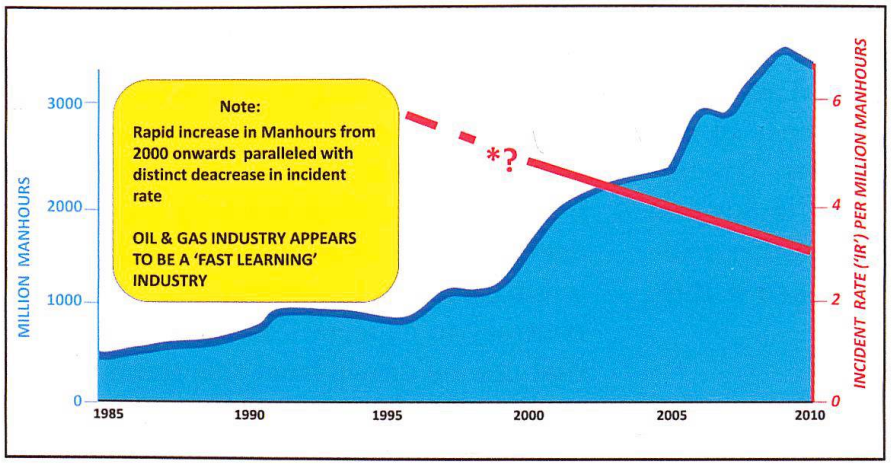


Fig. 1: Oil & Gas Industry – manhours vs. incident rate. (Sources: OGP 2011 [OGP: International Organisation of Oil & Gas Producers, 42 contributing companies, covering some 2.2 million workers], Seemann 2012).

erable damage to the local environment and economy.

How big was the spill?

The total amount of «Macondo» crude oil spilling from the beginning (20.04.2010) until the successful «kill-operations» (15.07.2010) was 4.9 MMBBL (million barrels of oil). What does this figure of 4.9 MMBBL mean, both in terms of a historical size-comparison and in terms of visualised size?
If one looks at the historical record of the largest spills over the last 100 years (Fig. 4) «Macondo» ranks high (4th position) but not on the widely claimed position of «Macondo being by far the largest spill, ever». The historical look-back also reveals a clear grouping into two sizes of spills: the smaller, tanker spills (Exxon Valdes, Amoco Cadiz, etc. – the spill comes to a halt, at the latest when a tanker is emptied) whilst the larger platform/pipeline spills often require time-consuming and technically demanding «killing operations».

What was the extent of the spill and how did the clean-up work?

The 4.9 MMBBL «Macondo» oil spill repre-

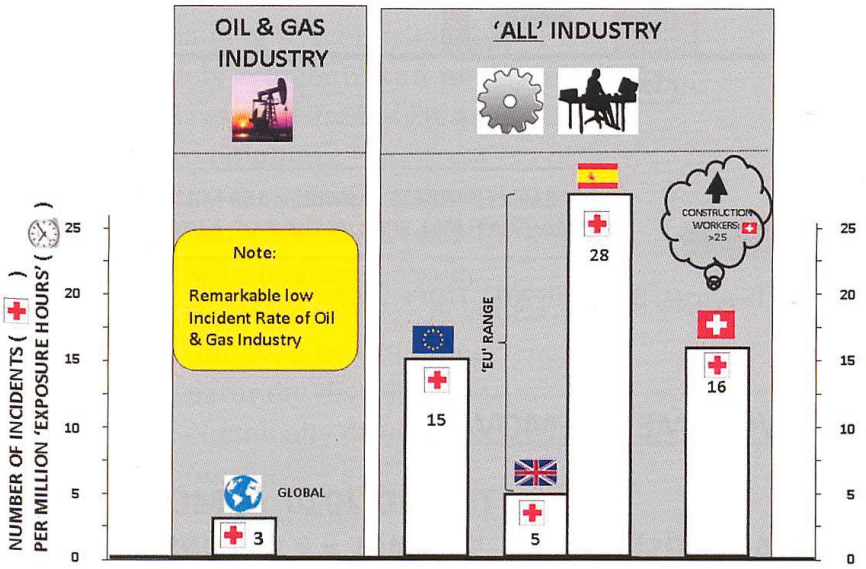


Fig. 2: Incident rate per million «exposure hours». (Sources: OGP 2011; Seemann 2012; SUVA 2011; SUVA Unfallstatistik 2003 – 2007, fig. 12.1, p. 102, [SUVA covered some 3.8 million workers]).

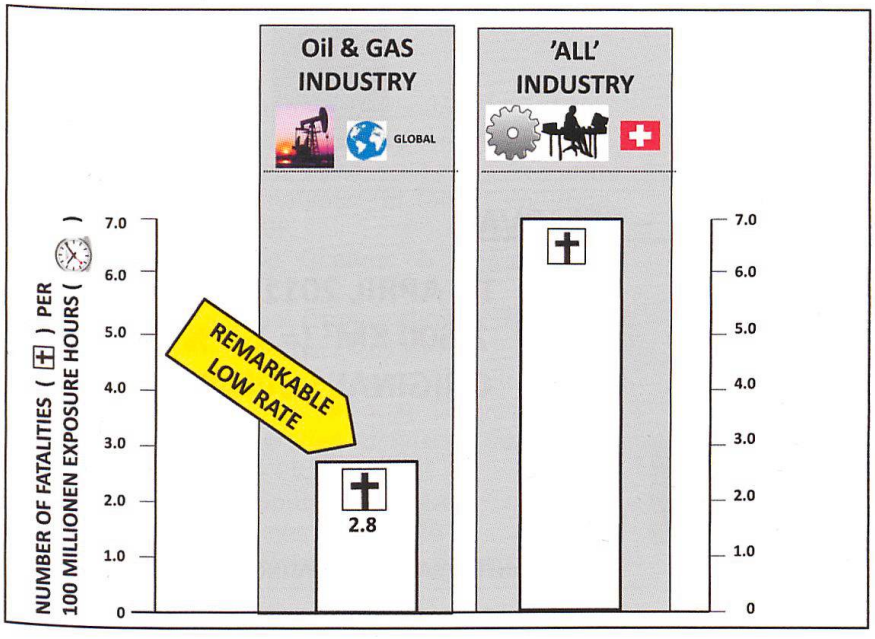


Fig. 3: Fatalities per 100 million exposure hours. (Sources: see Fig. 2).

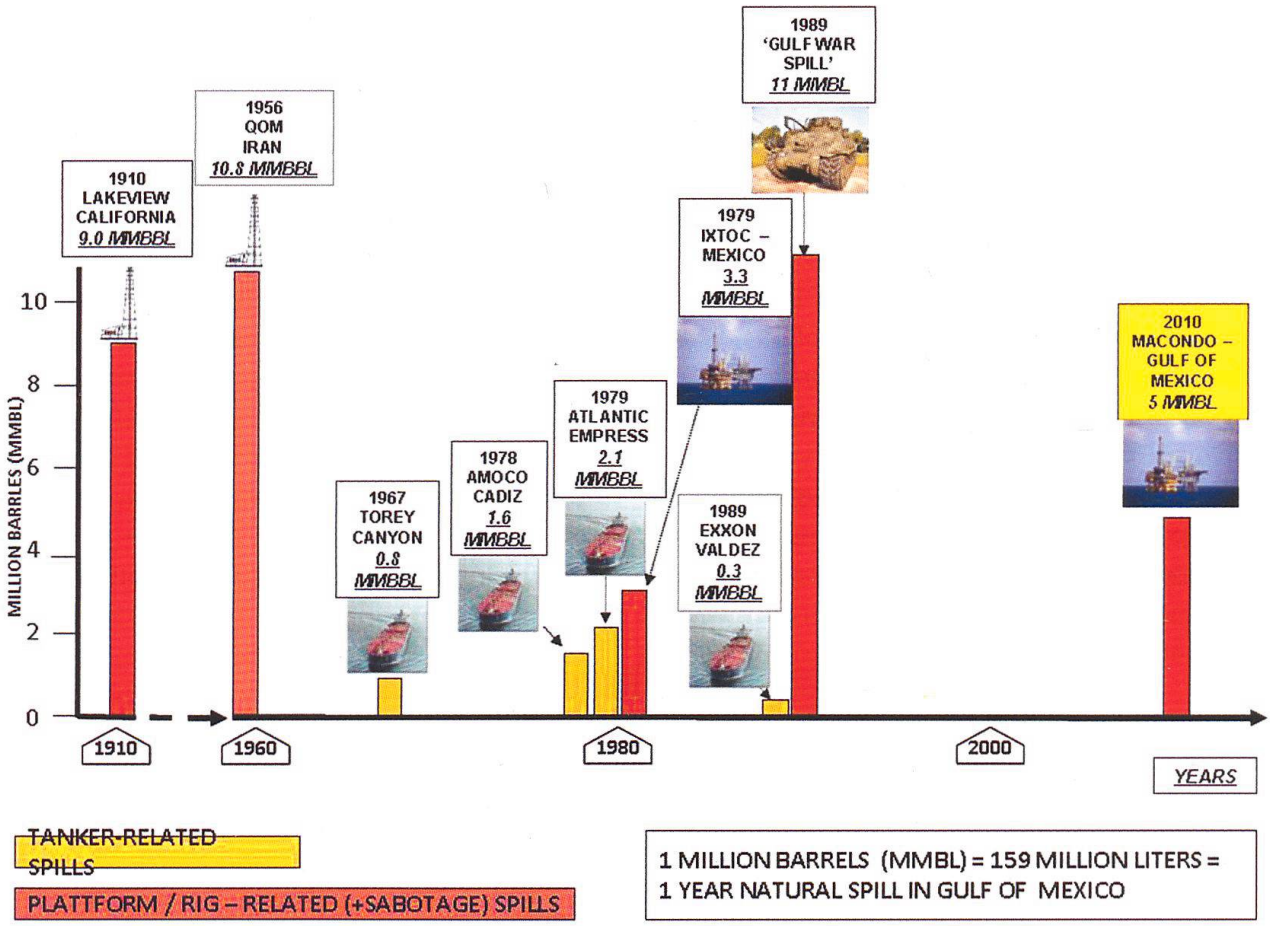


Fig. 4: «Macondo» oil spill: how big is big? (Sources: Beckwith 2012, ITOPF 2009; NOAA 2012; Seemann 2012; Smith 2012; SPE 2012).

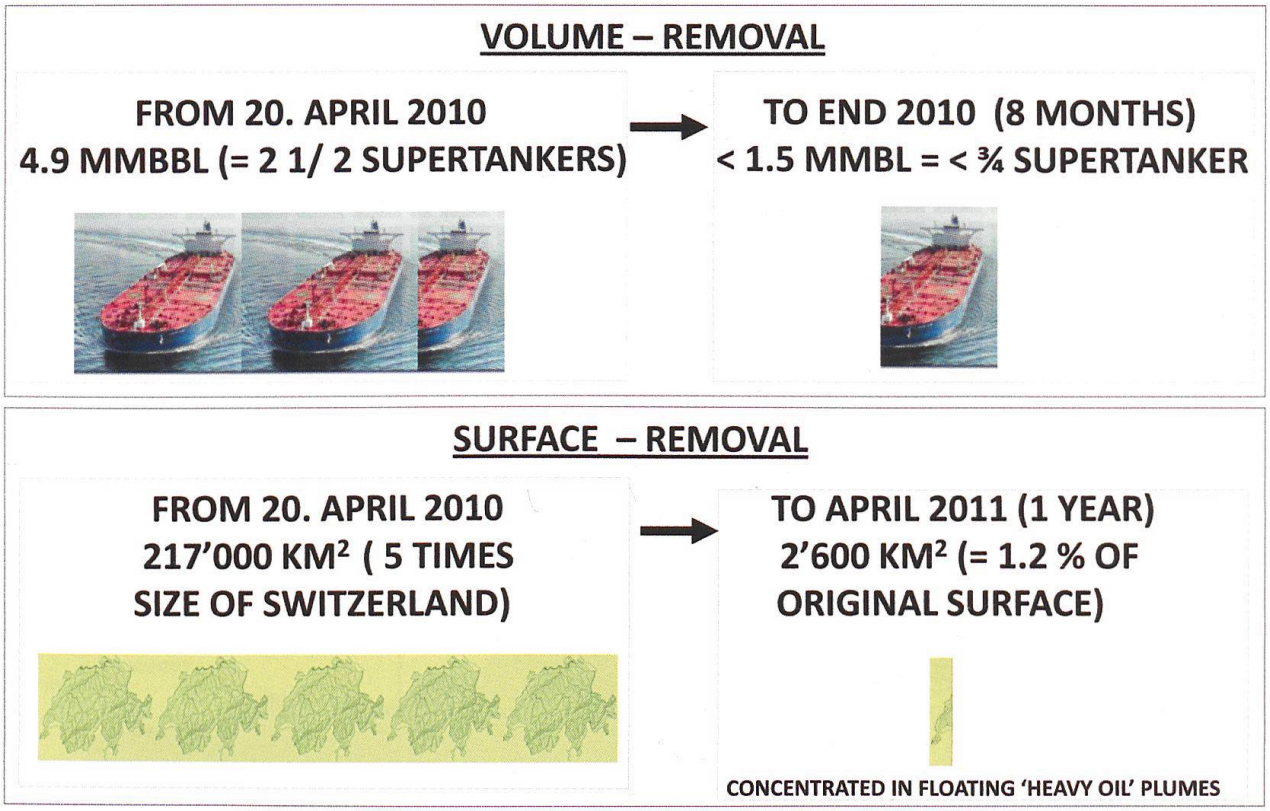


Fig. 5: «Macondo» oil spill: the clean-up results. (Sources: BP 2012; Seemann 2012; Smith 2010).

sents a volume equal to 2½ supertanker fillings. This spill was initially spreading over an area 5 times equal to the surface of Switzerland. The «Macondo» spill triggered a clean-up operation of dimensions hitherto unheard of, for instance: an armada of over 6,000 vessels and 120 airplanes were mobilised; at peak activity levels some 50,000 people were involved in the clean-up operations.

Recorded progress was as follows:

- Until end 2010 (after 8 months) 75% of spill volume was processed away
- Until April 2011 (after one year) the areal extent of the spill was reduced down to 2% of the initial, maximum extent. The above quoted remaining 25% of residual spill volume is largely concentrated in this relatively small residual area of 2% as floating, coagulated oil-plumes.

Various removal processes and methods were applied, with following results:

- 1.2 MMBBL removed through evaporation;
- 0.8 MMBBL removed by skimming;
- 0.8 MMBBL naturally dissolved;
- 0.4 MMBBL chemically dissolved;
- 0.2 MMBBL burnt;
- 1.5 MMBBL residual spill.

The above figures represent the status as per December 2010. Beyond that date, further officially verified progress reports are not readily available (waning public interest?). However, one observation can be made: the size of the residual spill amounts to roughly 1½ times the annual volume of natural oil seeps throughout the entire Gulf of Mexico. This comparison is quoted here, not to downplay the volumes spilled by the dramatic «Macondo blowout», but it is meant as a final observation to put the residual spill volume into «natural» perspective.

References

Beckwith, R. 2012: The post-Macondo World. Journal of Petroleum Technology, 36-46, May 2012.

BP 2012: Annual Report, 2012.

ITOPF 2009: The International Oil Tanker Pollution Federation LTD., 2009.

NOAA 2012: National Oceanic & Atmospheric Administration, US, 2012.

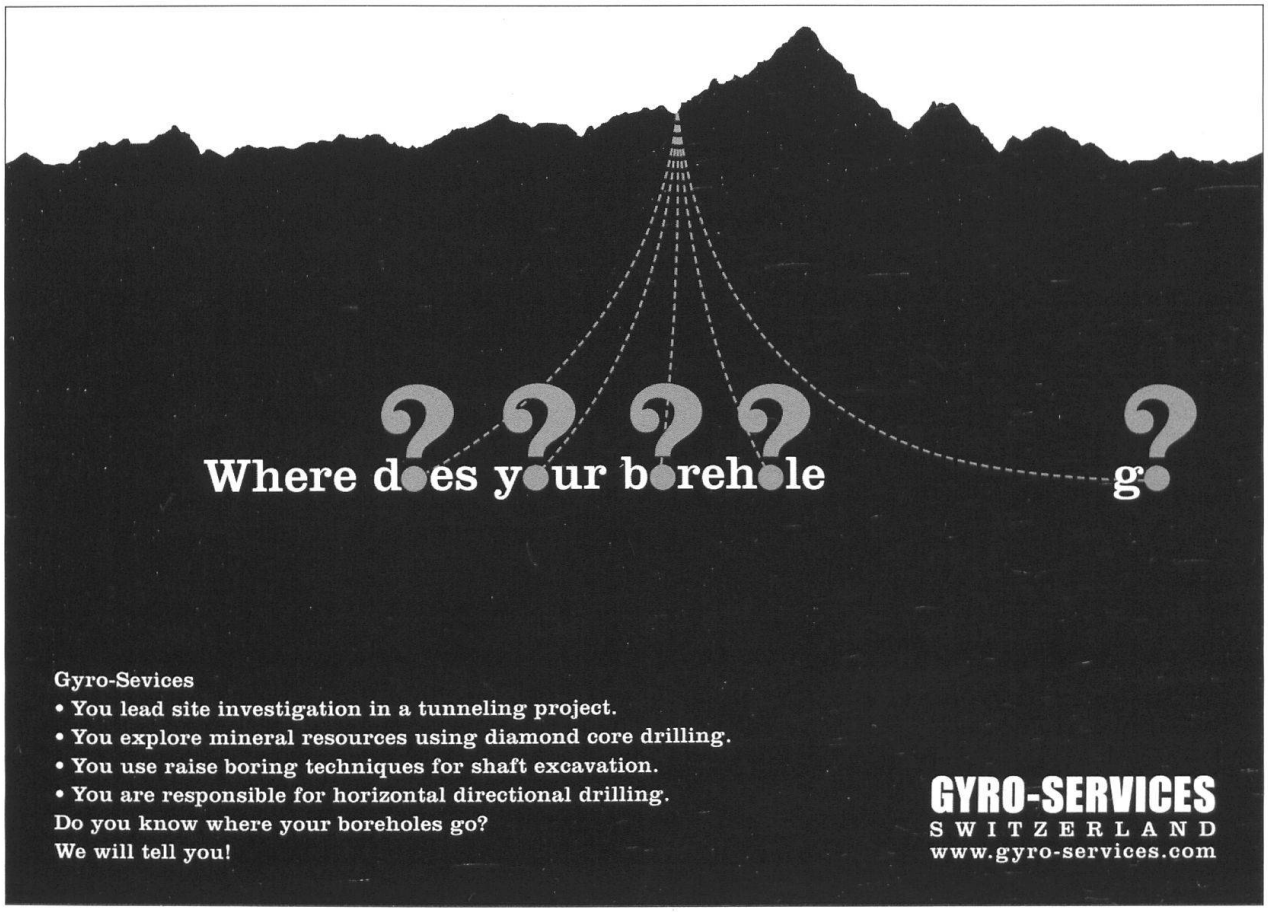
OGP 2011: International Organisation of Oil & Gas Producers; Annual Report, 2011.

Seemann, U. 2012: Gulf of Mexico – An Unconventional Look-Back; 75. Annual Convention of SASEG (Swiss ASociation of Energy Geoscientists), Lucerne, 23. - 25. July, 2012.

Smith, A. 2010: Oil Spill Contingency Company, Petroleum Cub Geneva, 03.11.2010.

SPE 2010: Society of Petroleum Engineers, News, 05.07.2010.

SUVA Unfallstatistik, Annual Report, 2011


Where does your borehole go?
Gyro-Sevices
• You lead site investigation in a tunneling project.
• You explore mineral resources using diamond core drilling.
• You use raise boring techniques for shaft excavation.
• You are responsible for horizontal directional drilling.
Do you know where your boreholes go?
We will tell you!
GYRO-SERVICES
SWITZERLAND
www.gyro-services.com