Results of the Operational Geoscience Survey 2015



Are you working on a well being drilled in the



Thanks to:

planner



- Petroleum Group of the Geological Society for providing financial support for the use of SurveyMonkey.
- The rest of the convening committee for their suggestions and support.
- And chiefly **yourselves** for completing the survey

SurveyMonkey

About the Survey

- Aim To find out who we are, what we do, how we work, how much do we earn.
- Based on responses to survey created online using SurveyMonkey.
- Responses are anonymous. Survey URL distributed and forwarded via email and through GS mailing list.
- Time frame 28th October 2015 to March 2016.
- 198 total responses, 120 complete responses, some partial.
- Results are a 'good indication' at best, probably not statistically robust.

About the Respondents

- Predominantly operational geoscientists (see below right).
- Plus biostratigraphers, trainers, student, production geologist, stratigrapher, subsurface team manager, well engineering manager, development manager and geomechanics.
- 26 countries of origin.
- 73% working on a well in the same country as working.



0

Countries of Origin

30 40

50

60

70

80

0

10

Countries Where Working

80

20

Basins and sub-basins worked



- The core of this discipline is obviously the operations geology role itself which has gradually evolved over the years, well beyond its original remit of essentially well data management and distribution predominantly during the execute phase of a well
- Includes other roles which provide both vital support and, frequently, have evolved into specialisms from operations geology itself:
 - > Well planners focussed on the planning aspects of a well but pass on the





- information to an operations geologist for the execute phase. Should have operational knowledge and experience.
- > PPFG experts who are focussed on pre-well prediction of formation pressures, also providing support during the execute phase.
- Geomechanicists wellbore stability is a key issue that needs to be addressed given the variety of well trajectories and stress environments that wells are now drilled in.
- > Wellsite geologists Senior wellsite geologists can be drafted in early to help with well planning and are obviously mainly involved in the well execute and well review phases.
- Mudlogging.
- > Operations geology management Senior operations geologists who manage and support an operations geology team.

20%

15%

10%

25%

25%

20%

20-24

Biostratigraphy, Petrophysics, LWD, wireline etc.

No real surprised where UK nationals work. Not enough data for other nationalities. All Norwegians work in Norway.



geologist:

More staff than expected? Survey bias to big companies?

20%

15%

10%

5%

0%



50% of respondents only worked 1-4 sub-basins or basins. Wider experience required?







Gender & Demographics





- Worldwide demographics similar to PESGB survey 2015.
- Still a male dominated discipline.



OG Worldwide Demographics (This survey)

Demographics from PESGB Salary Survey

"Europe" Demographics







• Partly blocking younger generation.

Tempting but unverifiable

boom as mudloggers.

operations geologists.

relationship to historic oil price?

• Large number entered industry in

Europe in late '70s early '80s

Became successful wellsite and

- Now that older generation is about to all retire!

10%

Exploration

• Company and well type results were slightly unexpected.

Appraisal

Production

Combination o

the above

- Show a bias towards respondents from the majors and large independent oil companies.
- Combining this with the knowledge that over half of the respondents work in the European arena, which is
- predominantly a mature province, then it is unsurprising that so few work on purely exploration wells.

Operational Geoscience Career Paths and Roles

20-24 25-29 30-34





Non-Europe Staff



Europe Consultants



Non-Europe Consultants



- Around 50% went via mudlogging route WSG and then OG pie charts along the bottom of the figure give an indication of education level achieved for each subset. Over two thirds following the mudlogging route are degree level.
- A proportion of those who follow this route also join oil companies and take up staff positions, later becoming subsurface team members or higher management.
- Others remain as consultants and are happy to do so, becoming experts in their field in related operational geoscience activities and, given the remuneration data analysed later, are well paid.



- Degree level is still the most common
- Evidence that some respondents, after an initial period of work, go back to college to obtain a higher degree, especially when there is an industry downturn.
- A degree in geology is still seen as a prime requirement for entry into operations geoscience.

- 30-34 35-39 40-44 45-49 50-54 55-59
- Similar age distributions for consultants and staff:
 - > Apart from a large number of aging European consultants from that '70s/'80s influx.
 - Consultants have more rotation work patterns
- > A large number of older full time consultants

Most Appropriate Career Paths (Multi-choice)



- Surprisingly, against expectation, more staff than consultants and more full time than rotational: Issue of survey bias?
- > Actual trend to staff operations geologists and as a key geoscience role?

Staff or Consultant?

59%

Consultant

Staff

- Most appropriate career path:
- Respondents generally voted for their own route first.
- > If not first then mudlogging generally second choice.
- > Clear indication that mudlogging route was preferred.
- Favoured more than 6 months offshore.

Results of the Operational Geoscience Survey 2015



Operated by

What Do Operational Geoscientists Do?

- Four well phases were surveyed.
 - Pre-Well Planning Initial review of a prospect evaluating regional and local context.
 - > Well planning From setting well objectives, evaluating final well location up to spud.
 - \succ Execute Drilling and evaluation of a well, data collation, distribution and management.
 - Review Evaluating well success compared to objectives, final well reporting and data distribution.
- For each phase common process tasks were chosen.
- Results are for full population of respondents so some may not be involved in some tasks because of their role.
- Safety critical nature of some of these tasks raises obvious questions around training, expertise and whether we are competent enough to perform them



- 55% of respondents at least contributed to pre-well planning phase.
 - Over 70% of respondents were responsible for or contributed to these well planning tasks.
 - Many are safety critical (marked with star).

PFG regional evaluation

ment Stage Gate Reviews

 Role of operations geology firmly embedded in the well planning phase.



- 'Traditional' Ops geology tasks dominate.
- Many are safety critical (marked with star).
- Petrophysical analysis surprising low not performed as much now due to ease of data transmission.



• Results indicate:

Yes

No 🛛

- > Operations geologists generally involved throughout the full life cycle of a well.
- > Involved in multiple safety critical tasks.
- Are we trained sufficiently for them?



Contribute

Responsible

- In 15-25% of cases the contracts were already in place
- A significant number were seemingly not involved in the contracting process at all!
- Operations geoscientists have a higher degree of influence over the technical specifications (scope of work) than cost for all the contract types.
- Significant percentage of respondents (35-40%) who had very little or no influence over key contractors of mudlogging and wellsite geology.
- Can't tell if influence is decreasing.

- Some describe excellent archiving, some very poor
- > Obviously be some variation due to individual company process and personal feeling.
- Respondents think that, for the industry and their last well, data archiving is only poor to adequate.
- There is a little more confidence when considering the last well but that would be expected as it is the respondents that have partly performed the archiving!
- Even they are less confident about finding the data in five years.
- Respondents from the major oil companies are much less confident about data archiving

- Monitoring the real-time data was once not an option for the office-based operational geoscientist but, clearly, now it is.
- > Virtually all respondents actively monitored the data and over 80% felt that they were performing this effectively.
- > Over 60% of respondents used a smartphone or tablet at some point, to monitor the data, but this dropped to 40% for operational geoscientists in small independent oil companies.
- On the whole real-time data are being effectively managed by all company types - maybe contradicts the findings of the data archiving questions (on left).

- Nearly 80% of companies now have a real-time data center with a 50/50 split between company own or use of a contractor.
- Some interesting questions raised:
 - > Ops geologist can monitor well when was sole WSG task.
 - Increasingly companies use realtime data centers.
 - \succ Is the shift of monitoring real-time data from wellsite to office a welcome development?

How do you prove competency?

Training

Essential Skills

- No real surprises. Many say they are experts in some topics but how do you How good are is the discipline at self-assessing its expertise? Only current consensus on proving competency is through job
- Courses in many specific A specific course on Courses in a few specific No formal training in aspects operations geology covering aspects of operations geology aspects of operations geology of operations geology. I have the main aspects of the role. (e.g. PPFG, geosteering etc) (e.g. PPFG, geosteering etc) gained all my knowledge combined with some on the combined with mostly on the through on the job training job training. iob training and experience
- 15% had no technical training all 'on the job PPFG training most popular.

Approximately what was your gross income for the last year you

worked (for staff include a good estimate of benefits such as

pension, bonuses, training, medical and cars etc)? NB: Please

convert to GB£

not to

answer

35%

309

159 109 5%

40%

35%

30%

25%

75-99K 100-124K125-149K150-174K175-199K200-249K Greate

35%

30%

25%

20%

- 3 of top 5 essential skills are 'soft skills' for which we rarely get training.
- Wellsite and operational experience are both highly rated.

Working Hours – Too many?

Remuneration **Remuneration – All**

Remuneration – Staff vs Consultants North Sea' Consultants 'North Sea' Staff Mudlogging Origin 45% 40% 35% 30% 25% 20% 20% 15%

'Rest of World' Consultants

45% 40%

35% 30%

25%

20%

10% 5%

25%

20%

024 2548 5014 1598 00124 15148 50124 15189 00248 28

New Hire Staff WSG Origin

Communications and working with inexperienced people are top challenges and frustrations. Are we appreciated or not?

Poor communications (especially with drilling personnel)

Communications and working relationships

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What do you Find Fulfilling?

Gardner, M. Fagg, R., 2016: A romp through the history of operations geology. Special publication to the Operations Geology Conferences References Herrett, T.J., Watts, T.H., Spicer P., 2016. Operations Geology: Establishing a profession fit for the 21st century. In: Special publication to the Operations Geology Conferences.

McBeath, K., Herrett. T.J. 2014: BP Operations Geology Accelerated Development Programme (ADP). Presentation at the Operations Geology Conference 2014 Smalley, A.H. 2002: Putting a value on data management. E&P magazine, Sept 2002.

Telford, C. and Archer S. 2016: Highlighting the importance of teaching operations geology: both at MSc level and as part of continuing professional development programmes. Special publication to the Operations Geology Conferences

'Rest of World' Staff

 New challenges more important than the money

Where Next? What's your next career step? enior Operations Geologist/A **Staying Operations Geologist** Project/Asset/Subsurface/Reservoi

Paper Round Start my own consultancy company

Conclusions

Operational geoscience is a wide ranging, responsible and dynamic role encompassing safety critical functions through the entire life of a well.

15-99 100-124 1.75-149 150-124 1.75-129 100-249 249*

- In Europe the discipline has an aging workforce with 60% of the respondents of the survey likely to retire in the next ten years resulting in an evident skills and experience gap.
- More effort needs to be made to attract and retain women in operational geoscience.
- Wellsite experience, of at least a year, is seen as vital by nearly all respondents.
- Mudlogging is still an important rootstock for the discipline, although maybe not as important as it was.
- Soft skills, communication etc., are as important as technical abilities but, it is these skills the discipline has the least training for.
- Communications and working with inexperienced people are seen as the two main challenges and frustrations of the role.
- Generally, operational geoscientists work too much on a daily basis and over the course of a month. This is an HSE issue.
- For the most part the discipline is well paid for working hard. However, remuneration is not the main driver in getting a job in operational geoscience, a new challenge or work experience is more important to most respondents.
- There is still an issue with the appreciation of what we do in some companies.