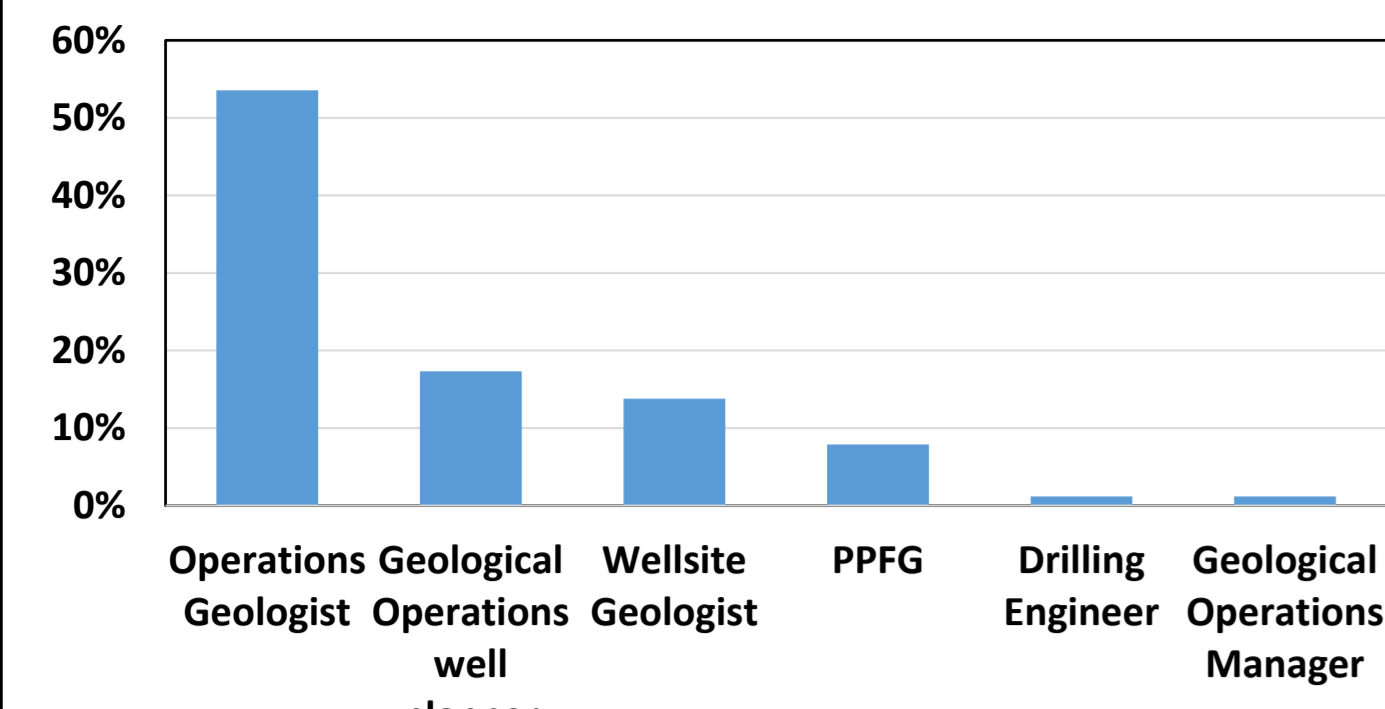
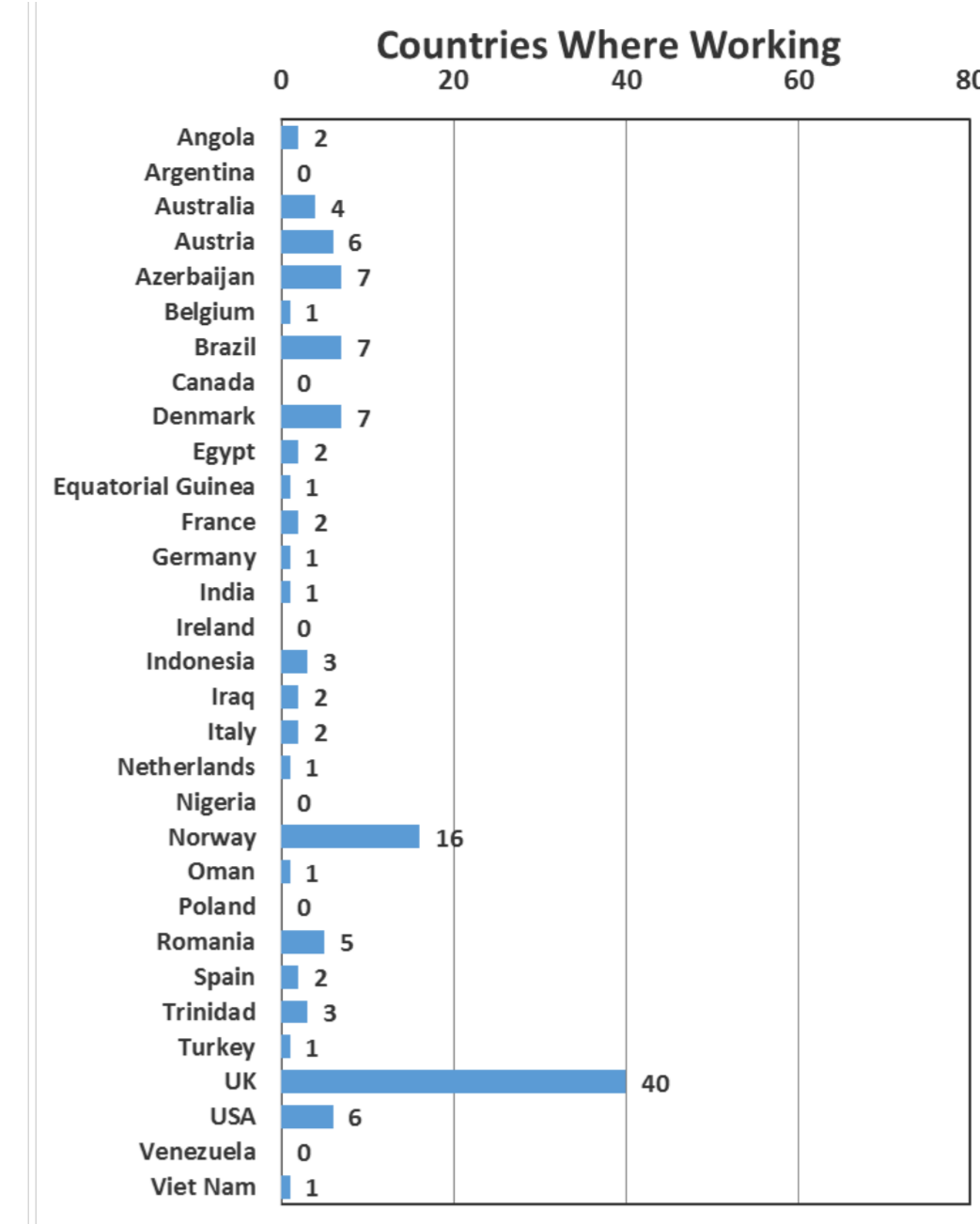
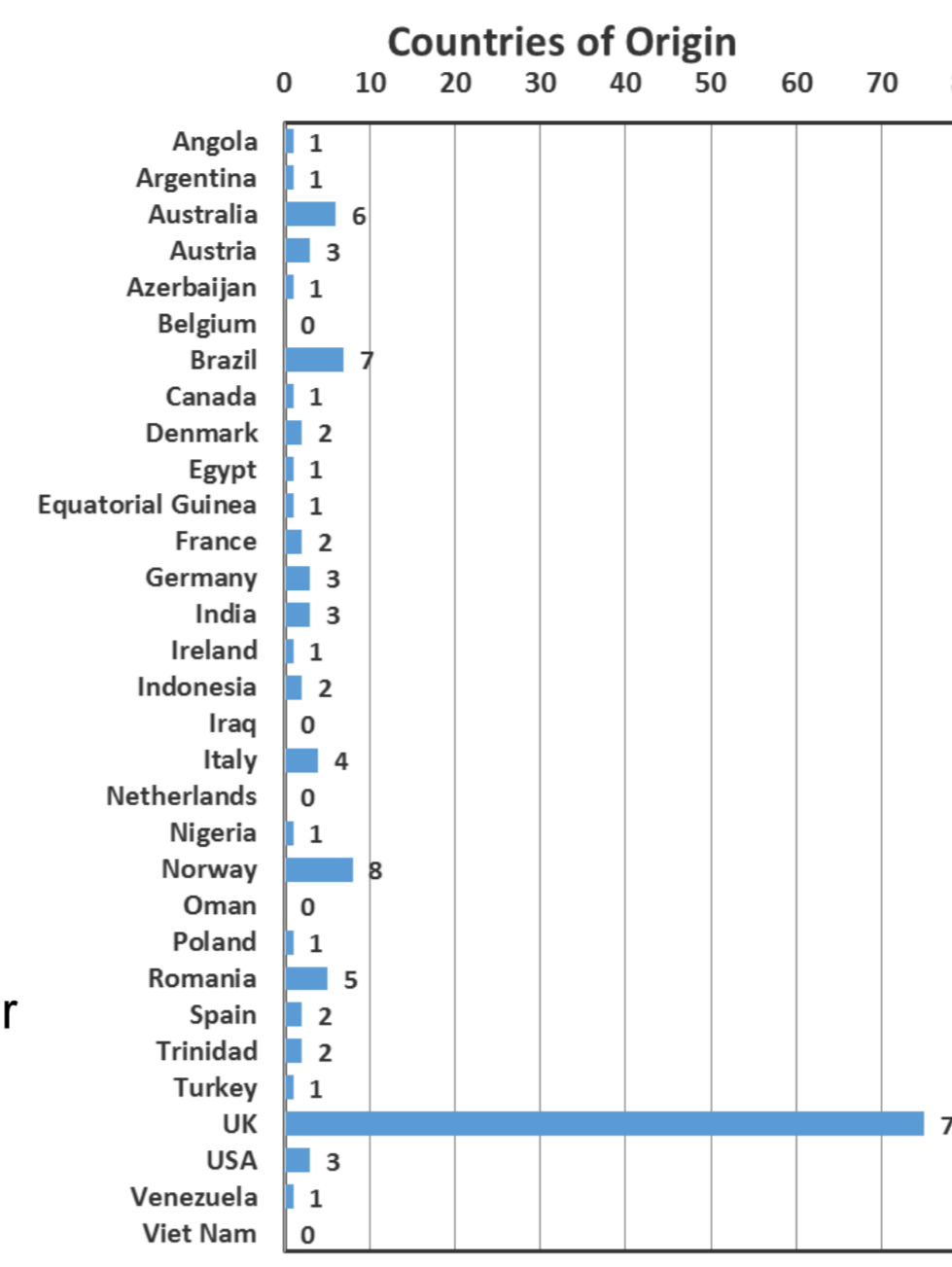


Results of the Operational Geoscience Survey 2015

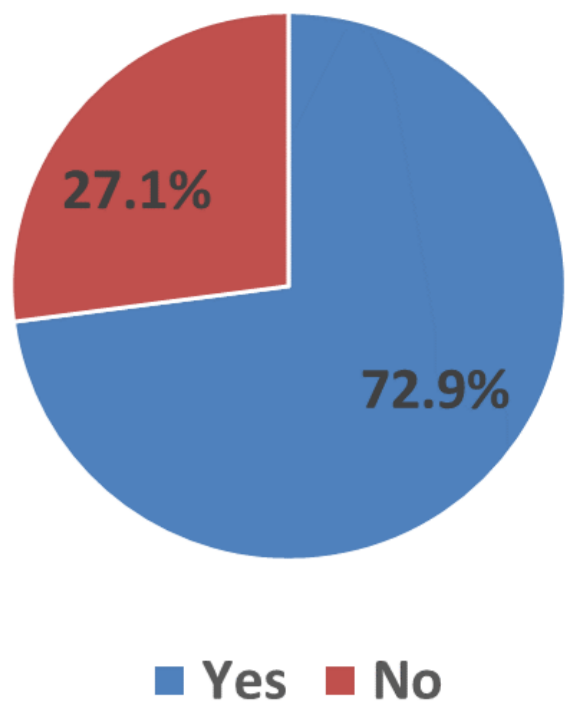


About the Survey

- 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.



Are you working on a well being drilled in the same country in which you are working?



Thanks to:

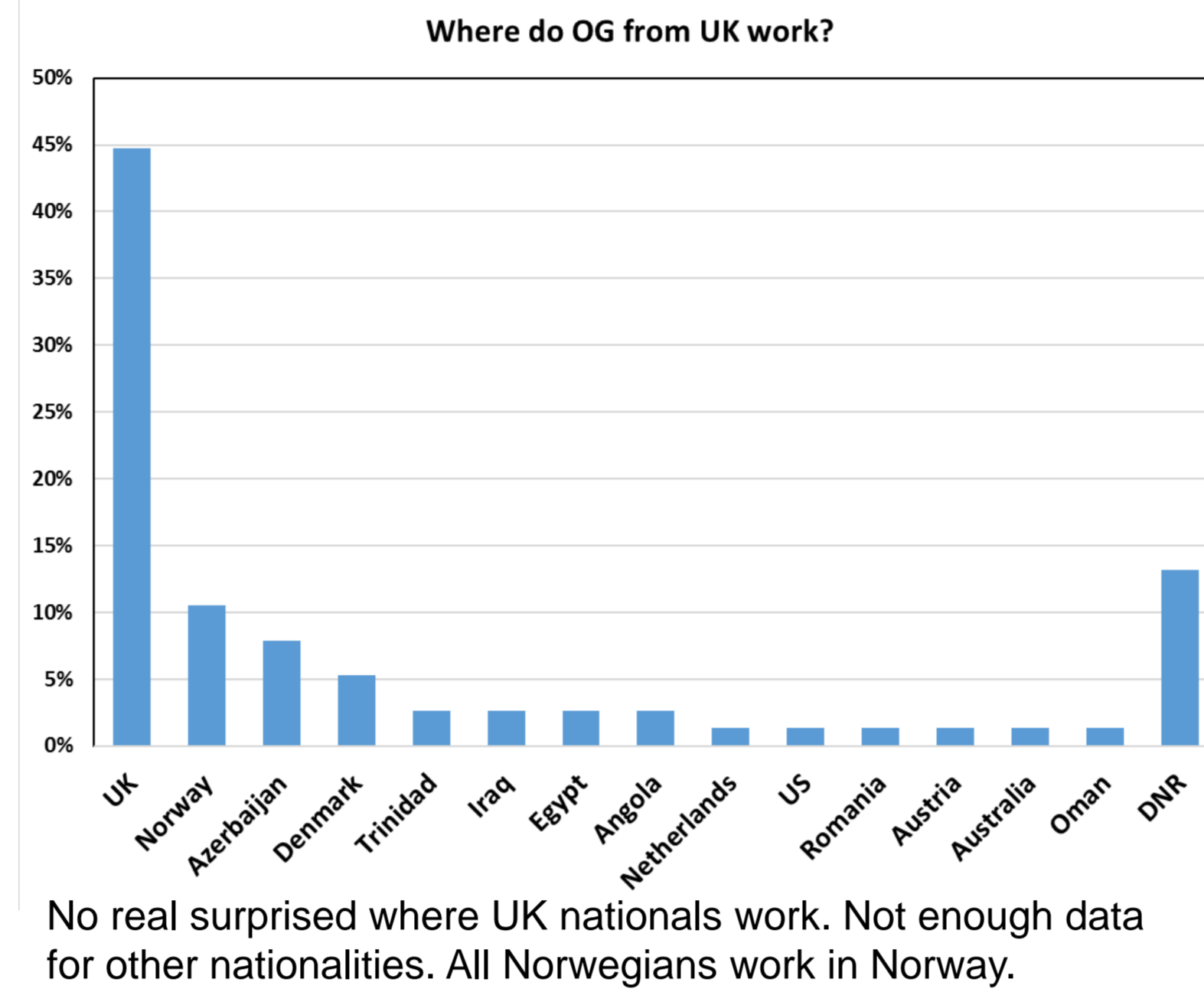
- Petroleum Group of the Geological Society for providing financial support for the use of SurveyMonkey.
- The rest of the convening committee for their suggestions and support.
- And chiefly yourselves for completing the survey.

About the Respondents

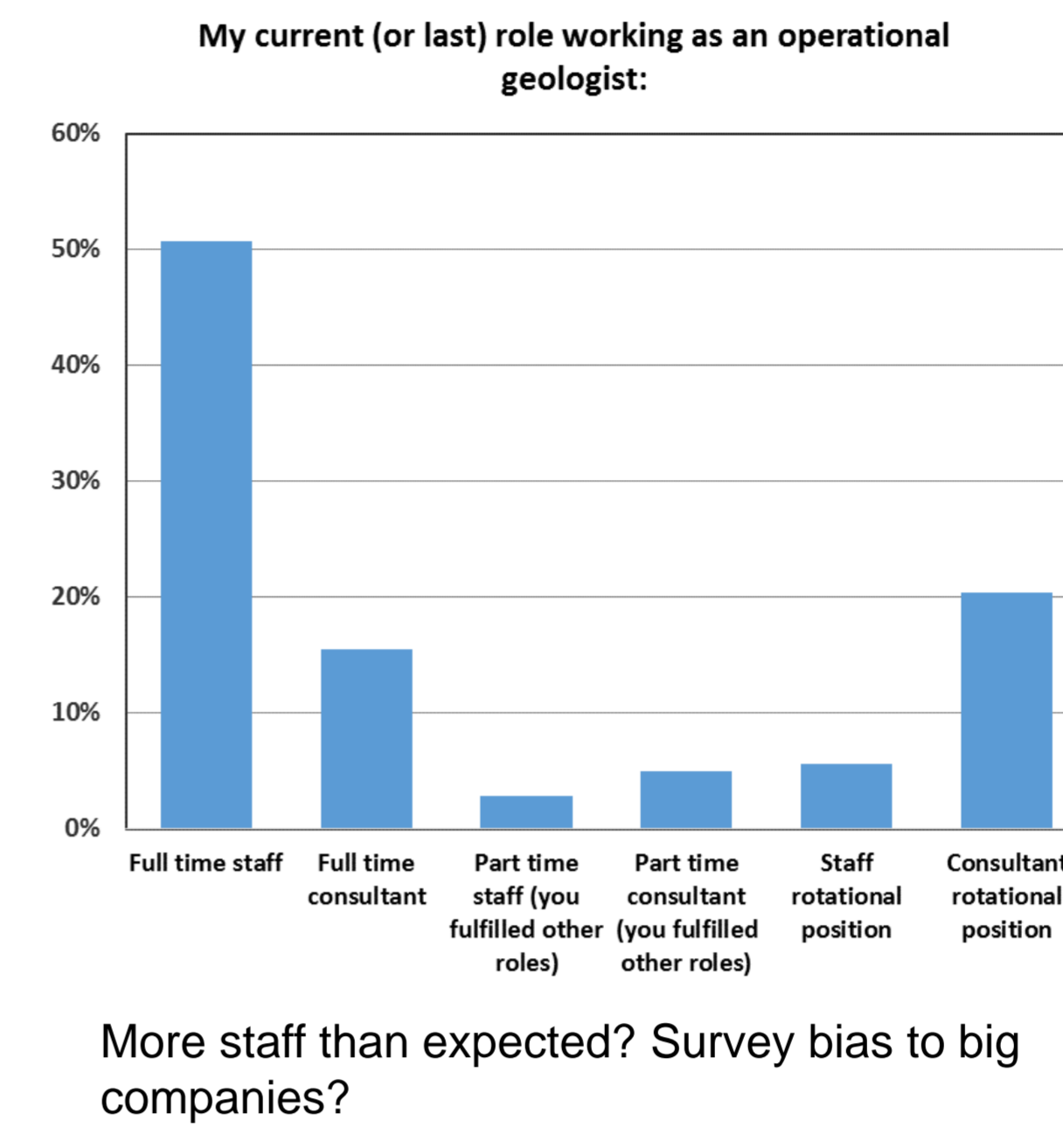
- Predominantly operational geoscientists (see below right).
- Plus biostratigraphers, trainers, student, production geologist, stratigrapher, subsurface team manager, well engineering manager, development manager and geomechanics.
- 26 countries of origin.
- 73% working on a well in the same country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

Operational Geoscience

- 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.
 - Biostratigraphy, Petrophysics, LWD, wireline etc

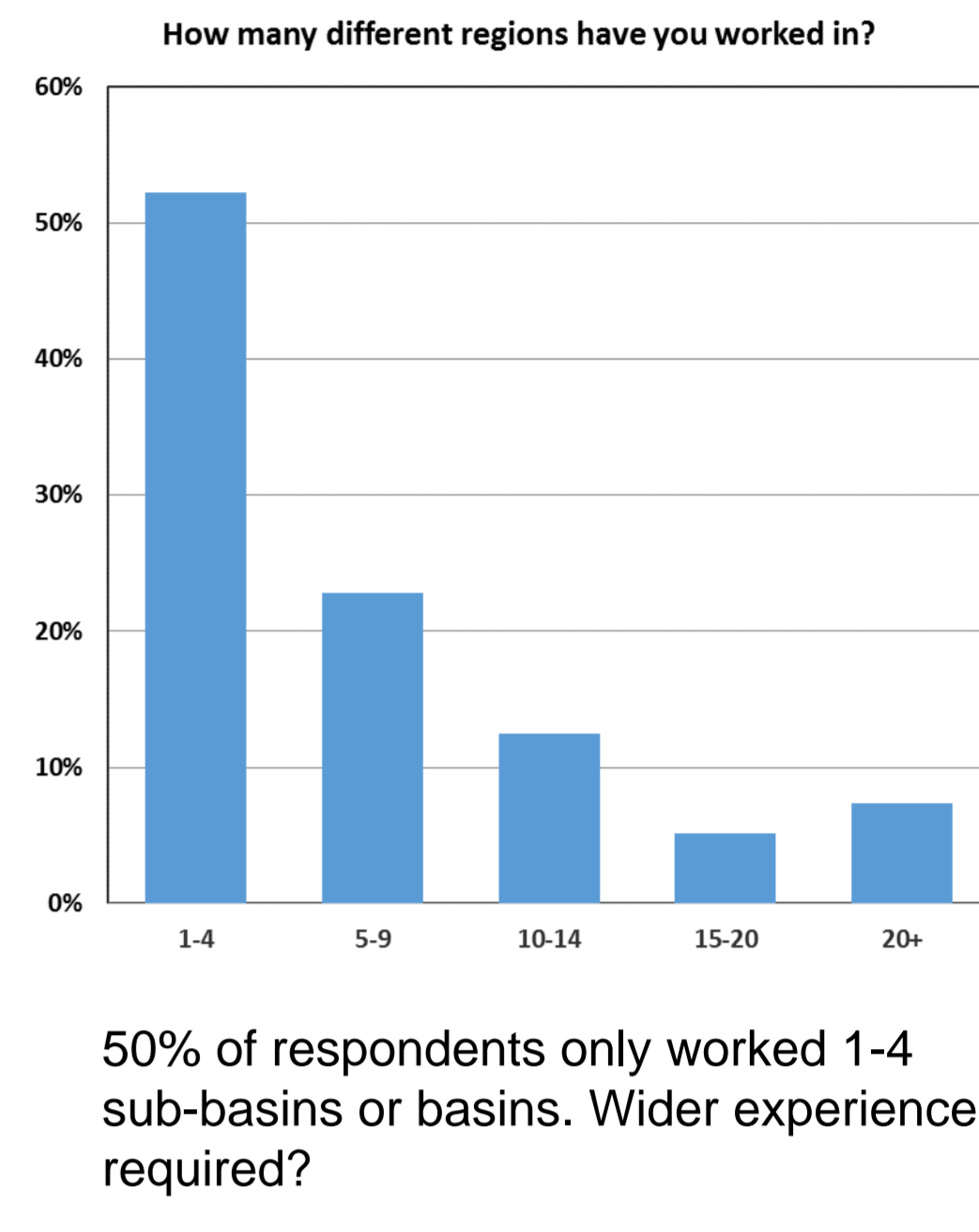


No real surprised where UK nationals work. Not enough data for other nationalities. All Norwegians work in Norway.



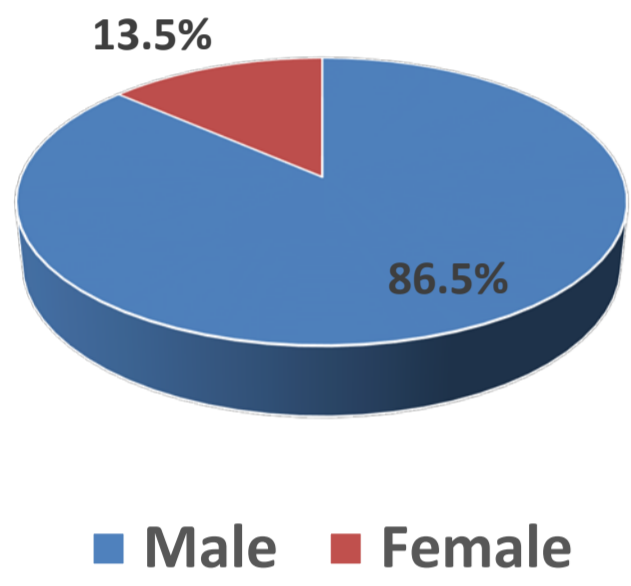
More staff than expected? Survey bias to big companies?

Basins and sub-basins worked

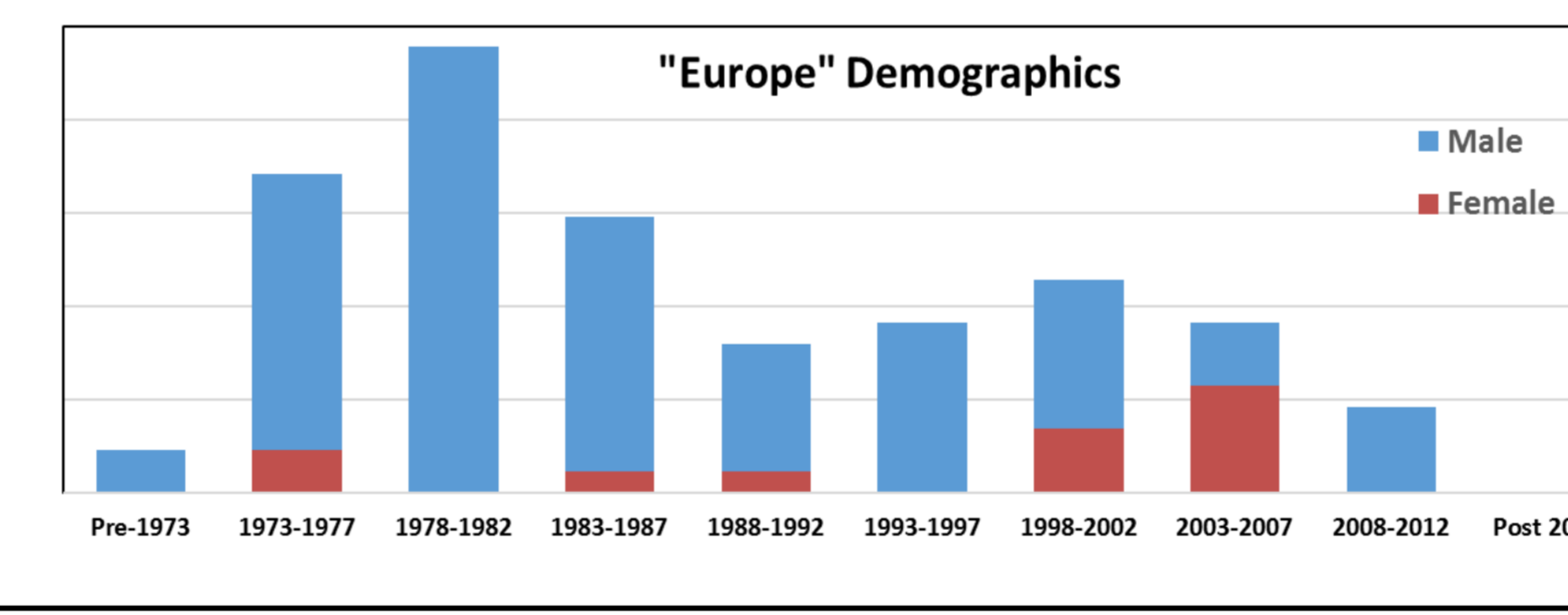
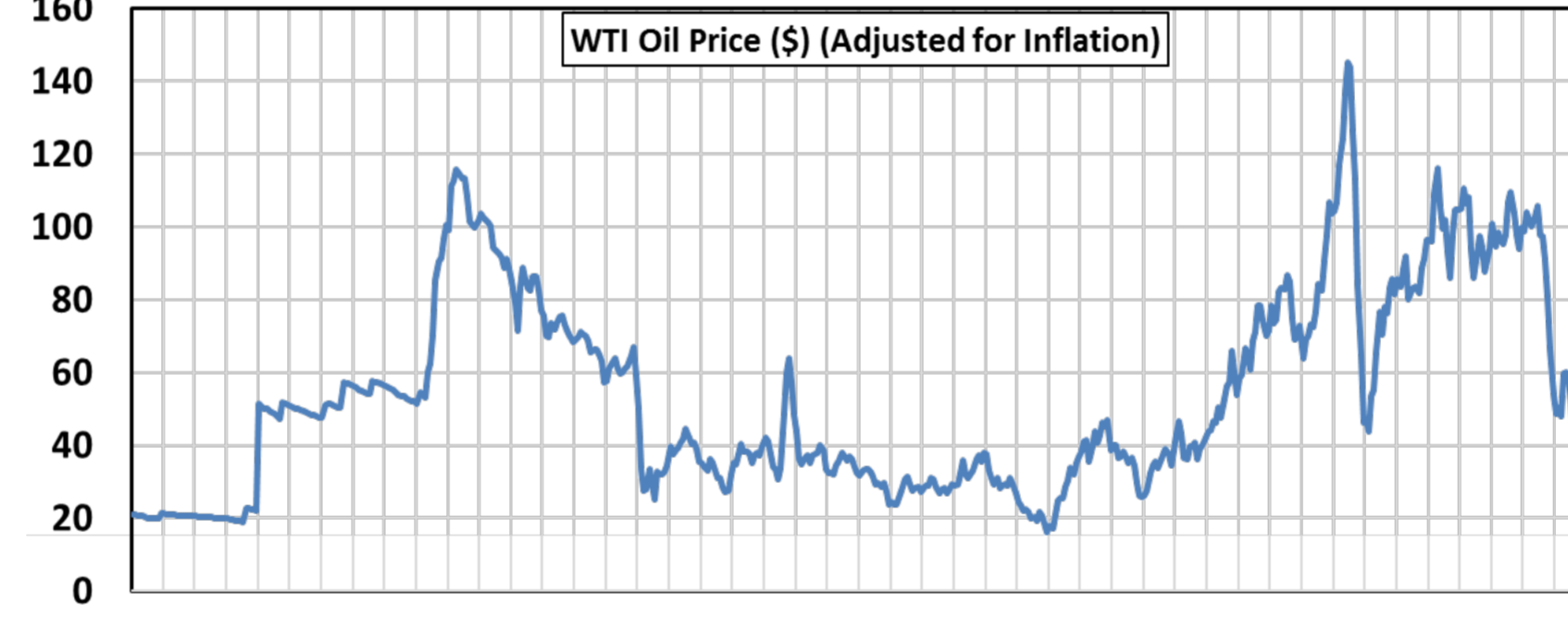
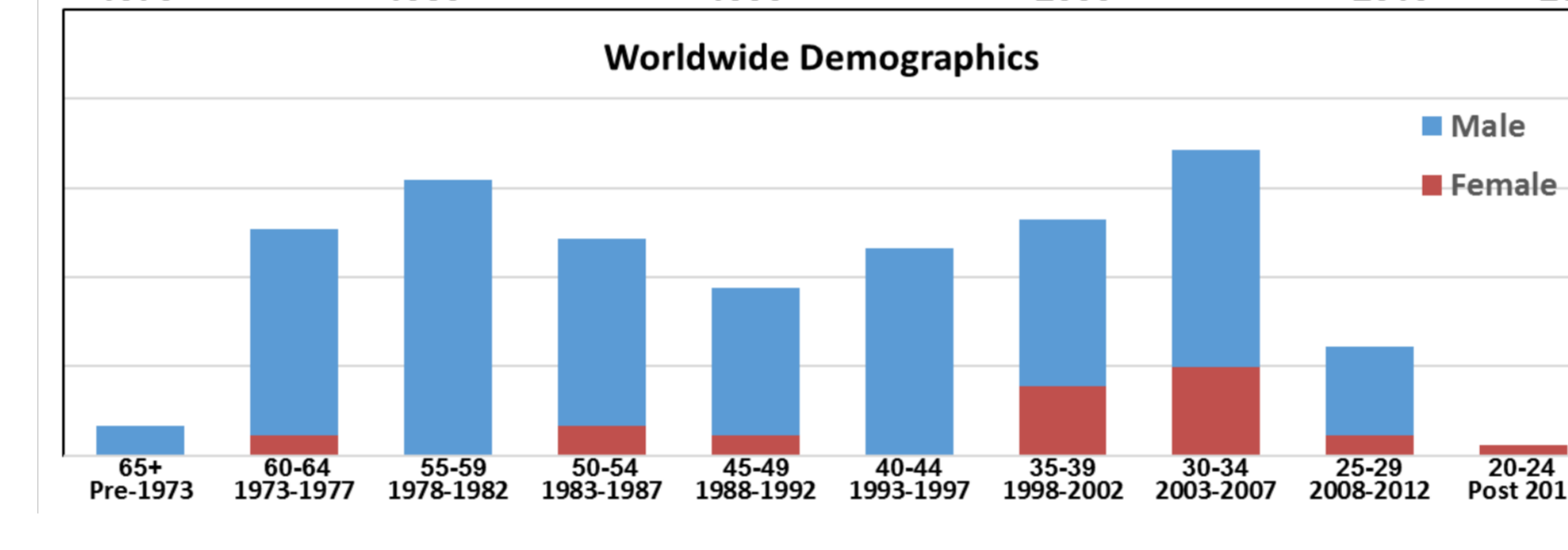
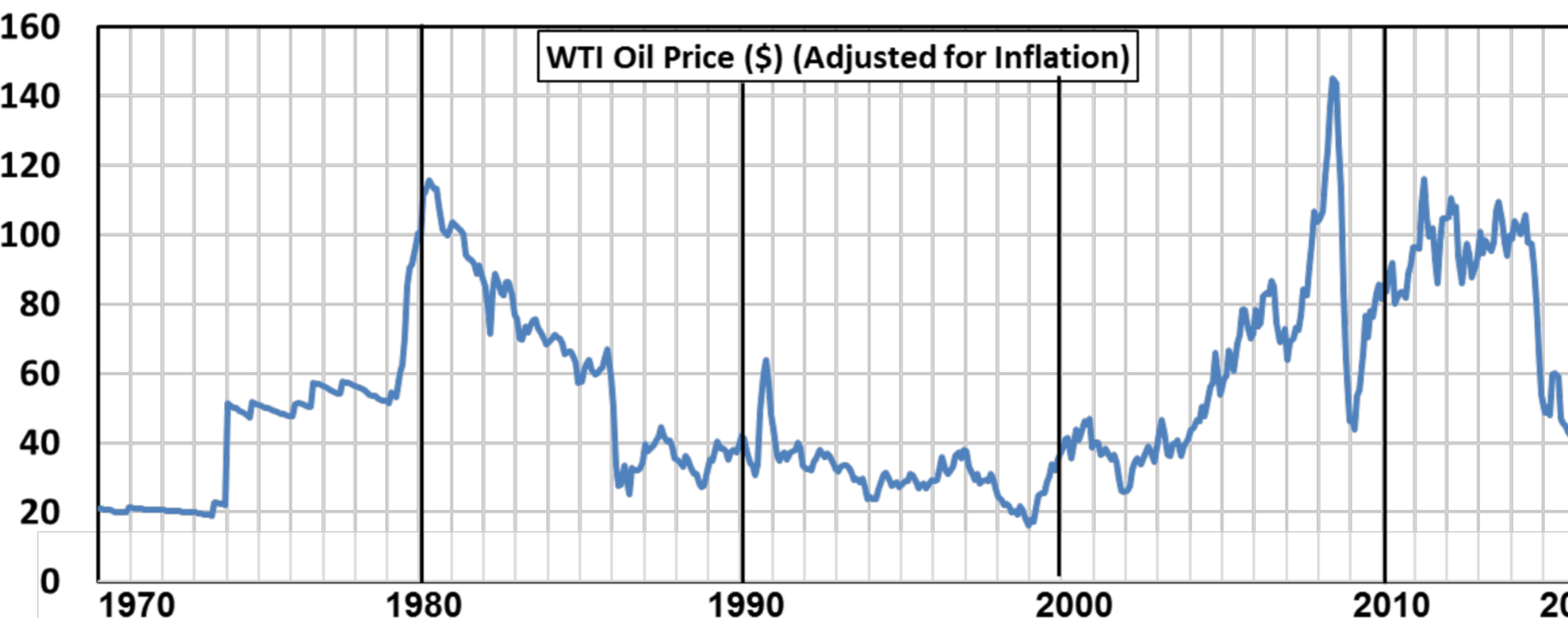
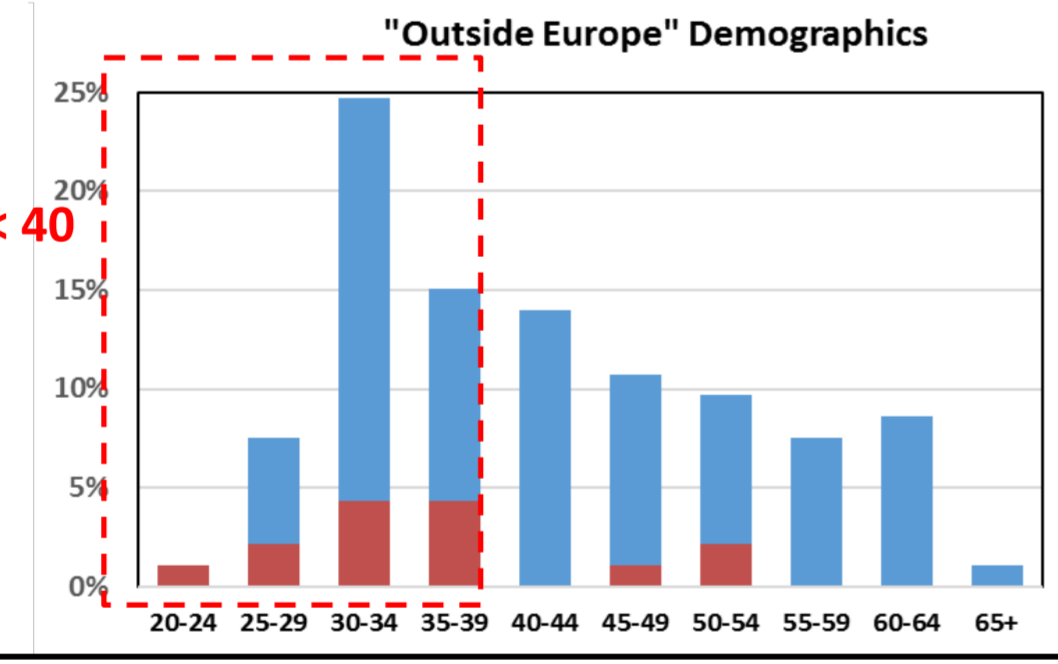
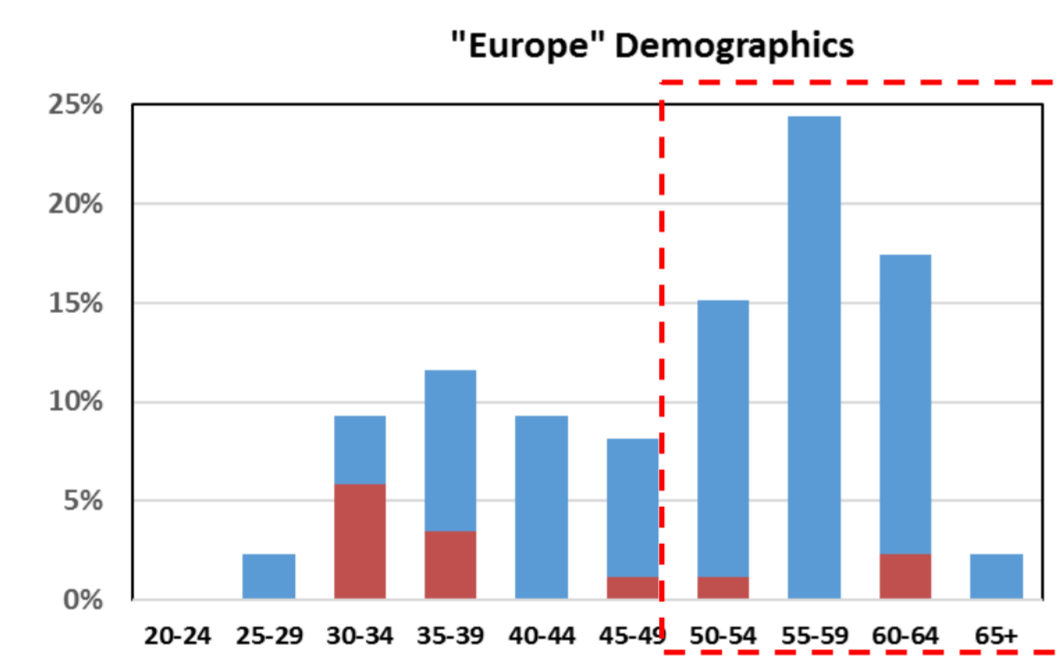
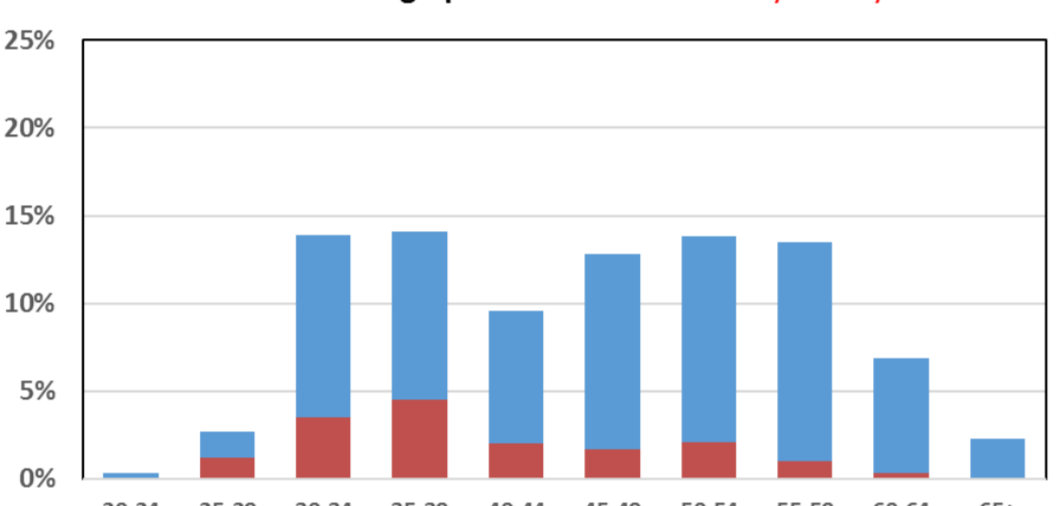
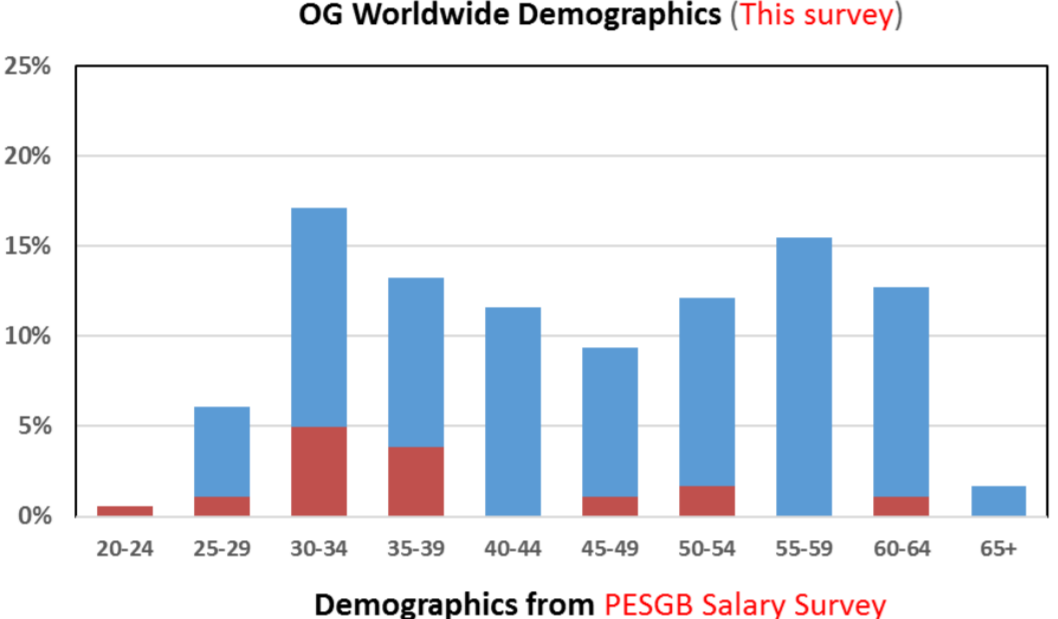


50% of respondents only worked 1-4 sub-basins or basins. Wider experience required?

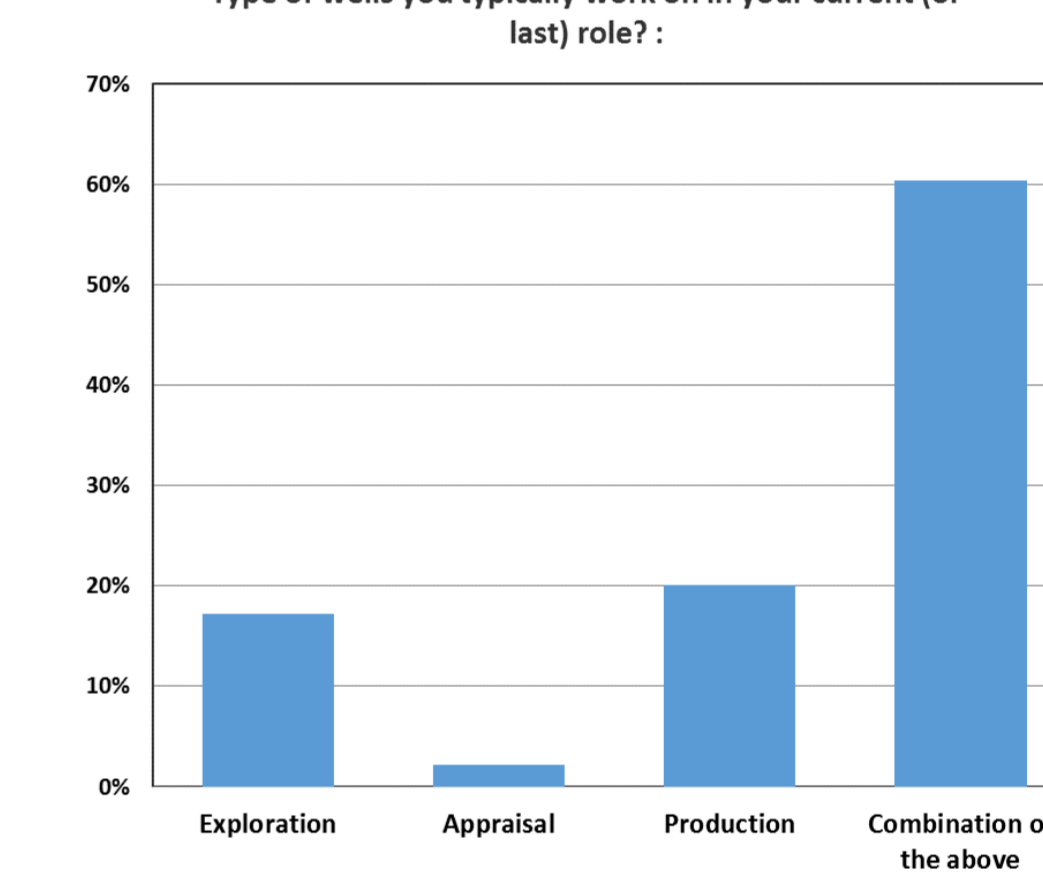
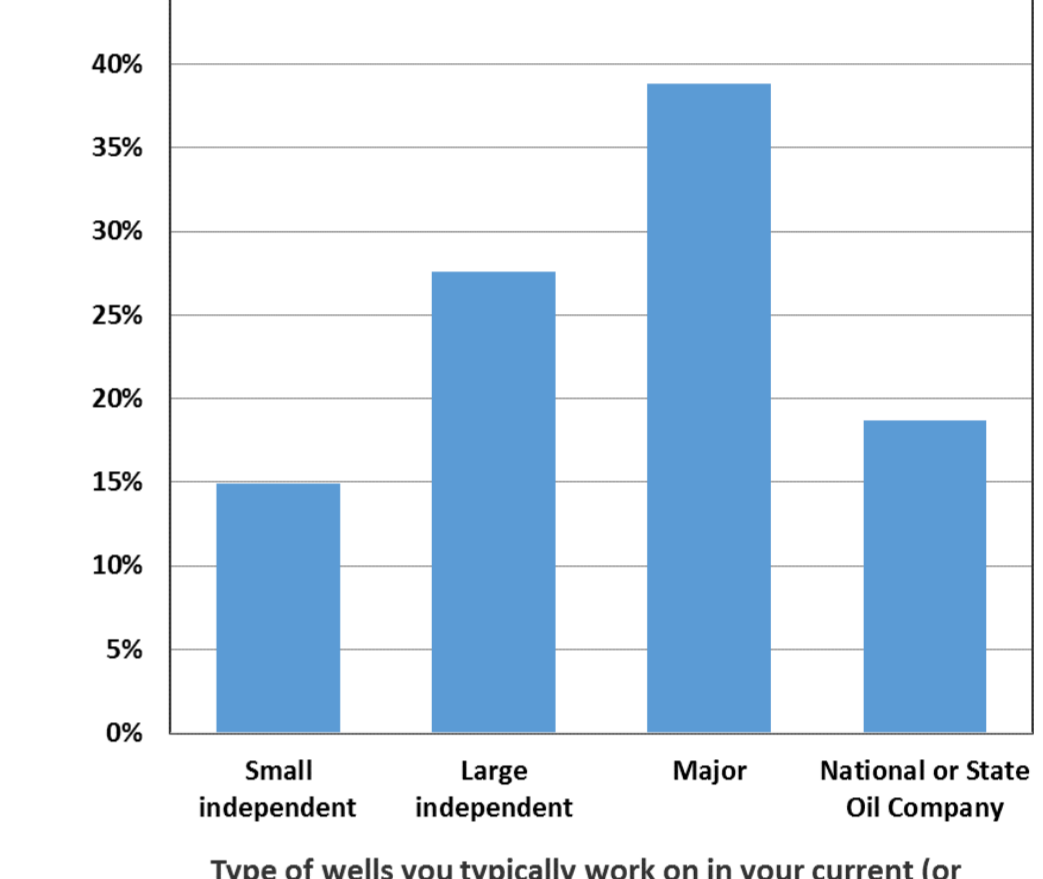
Gender & Demographics



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



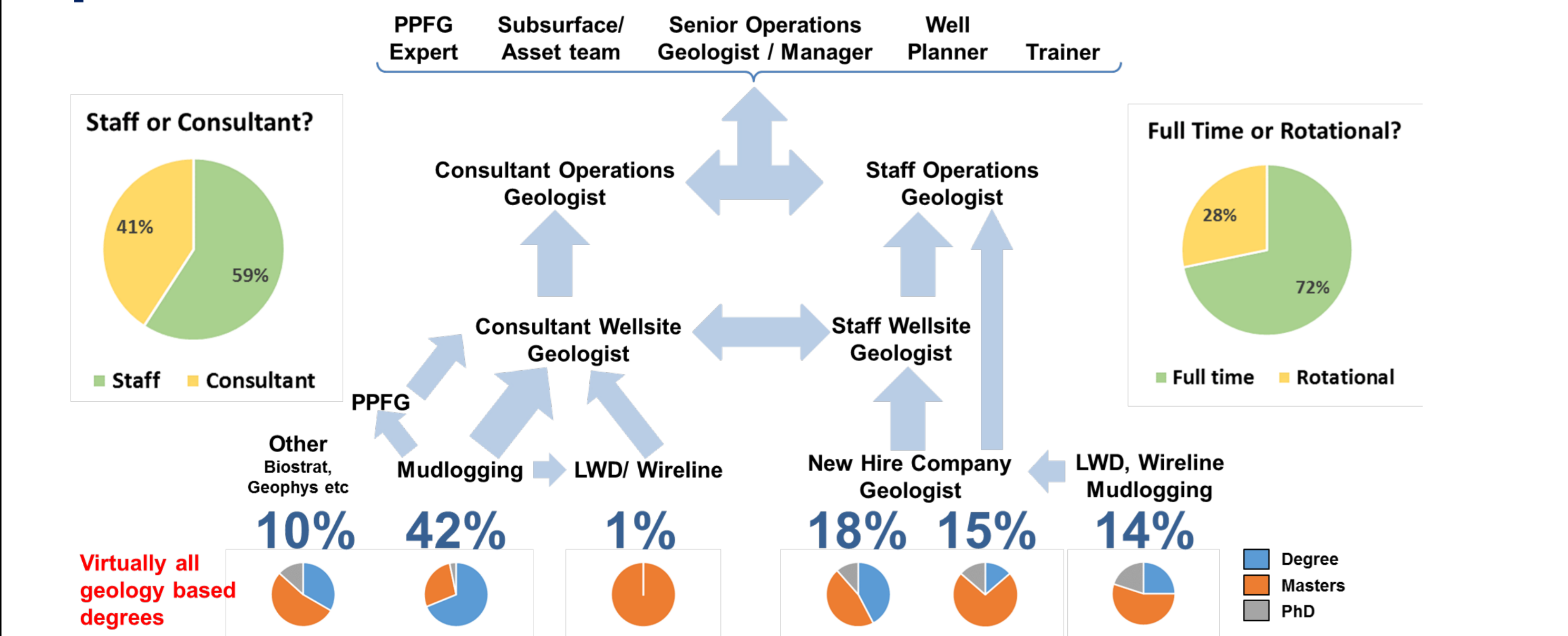
What kind of company do you currently work for/supply services to, or last did so?



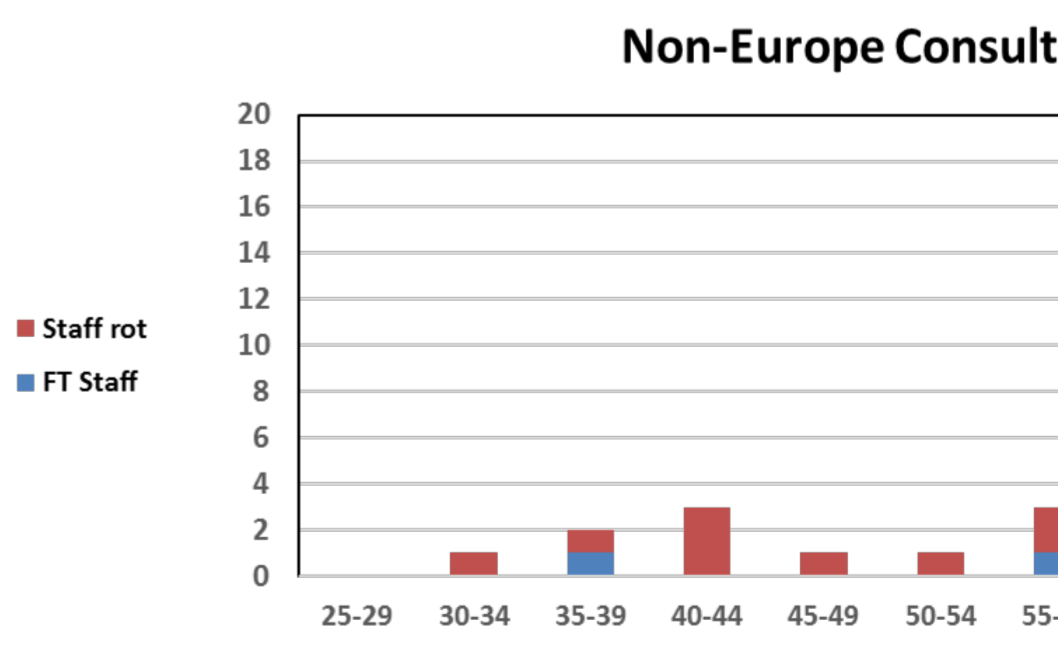
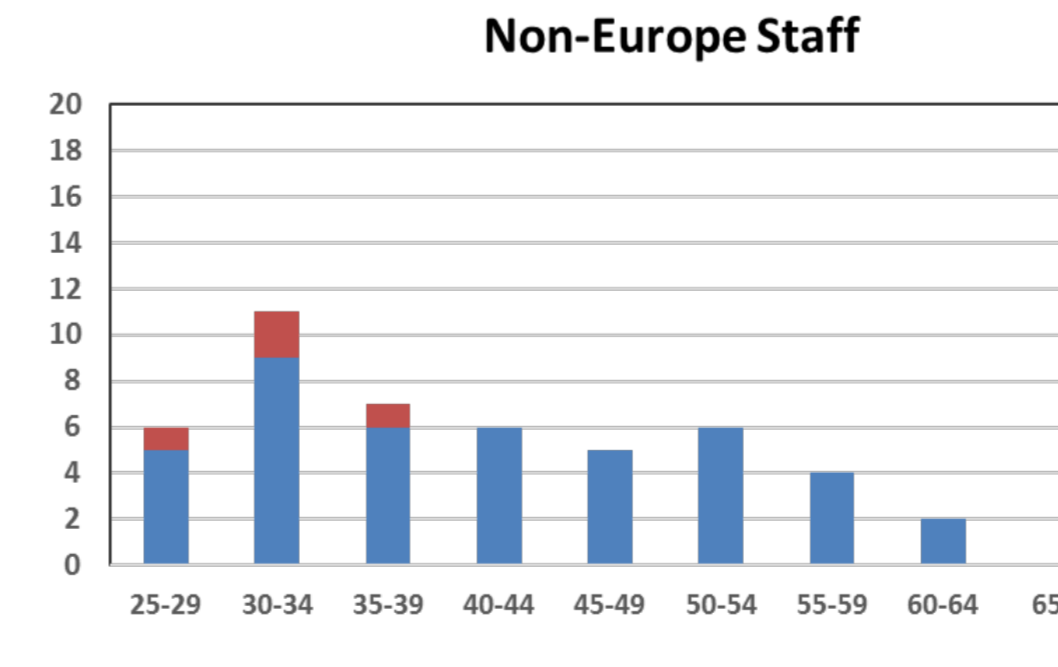
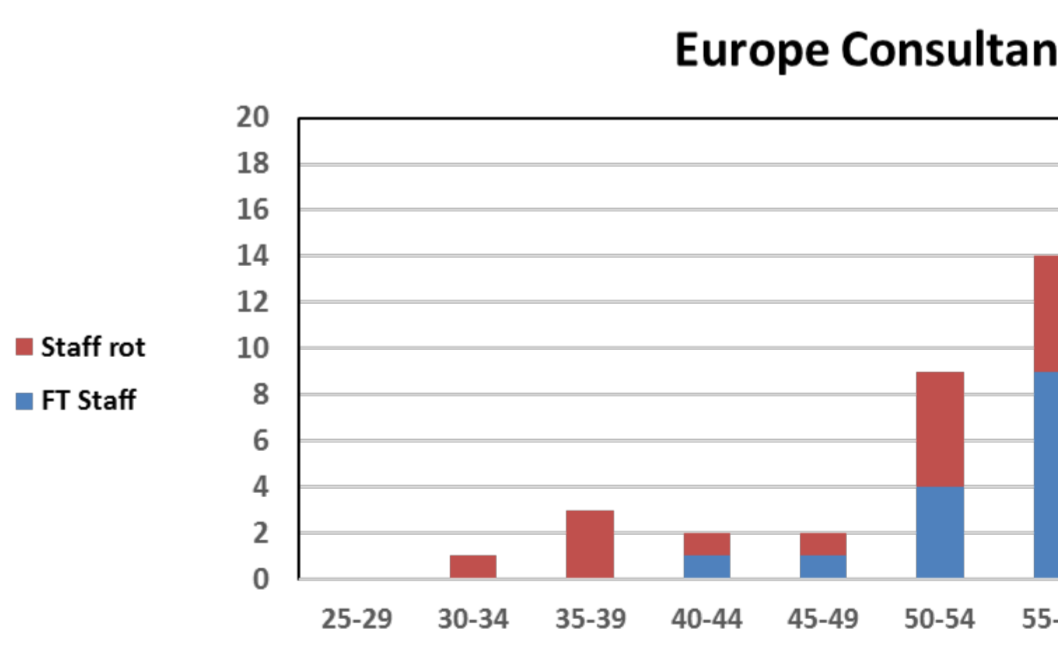
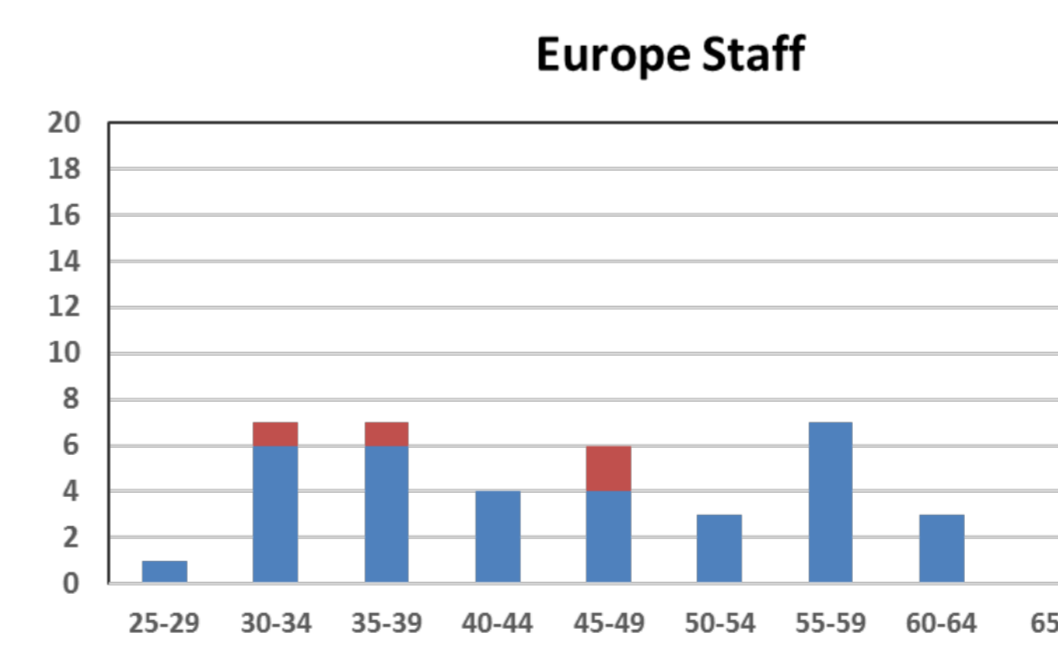
- Tempting but unverifiable relationship to historic oil price?
- Large number entered industry in Europe in late '70s early '80s boom as mudloggers.
- Became successful wellsite and operations geologists.
- Experience and expertise meant they got work at good rates.
- Partly blocking younger generation.
- Now that older generation is about to all retire!

- Company and well type results were slightly unexpected.
- 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.

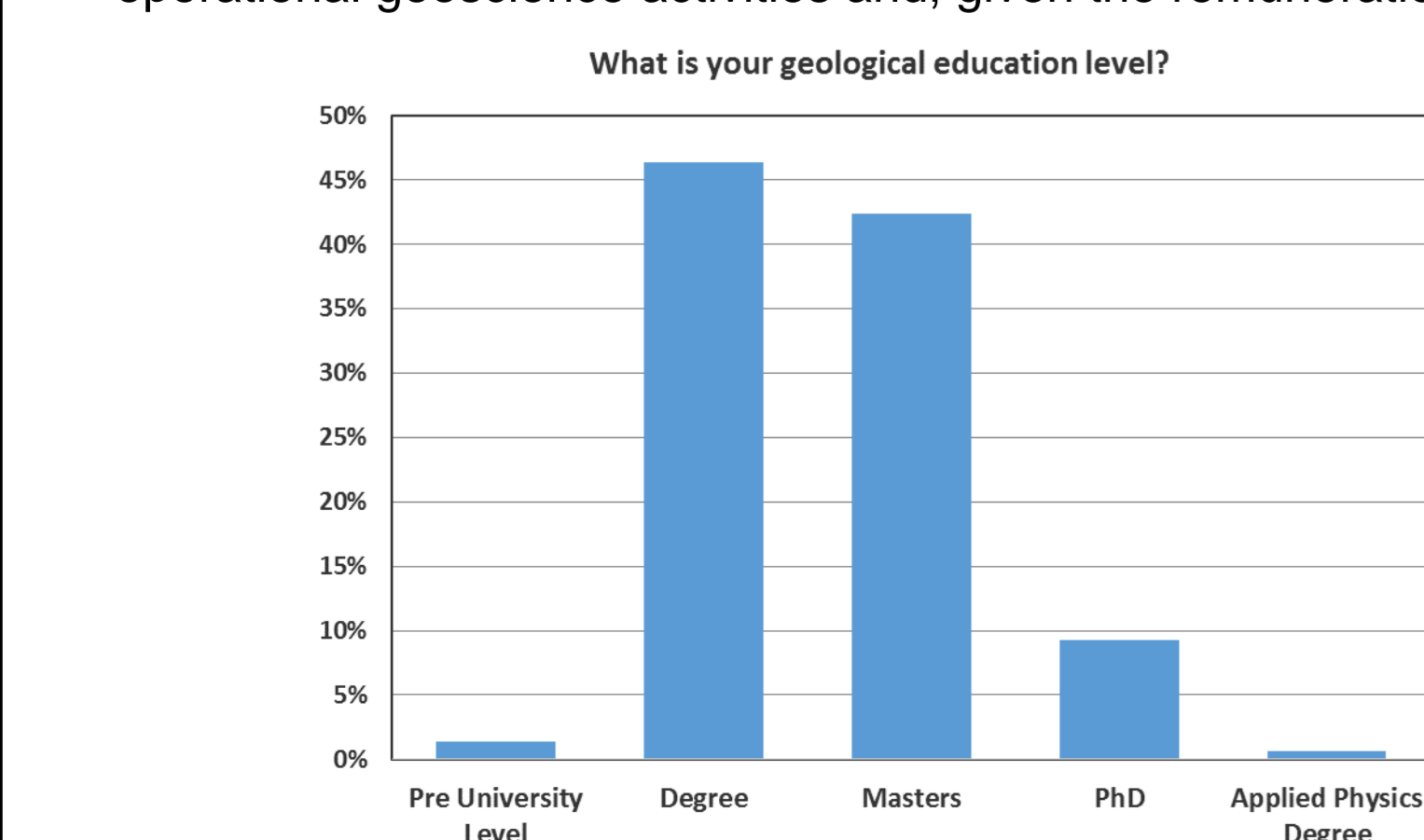
Operational Geoscience Career Paths and Roles



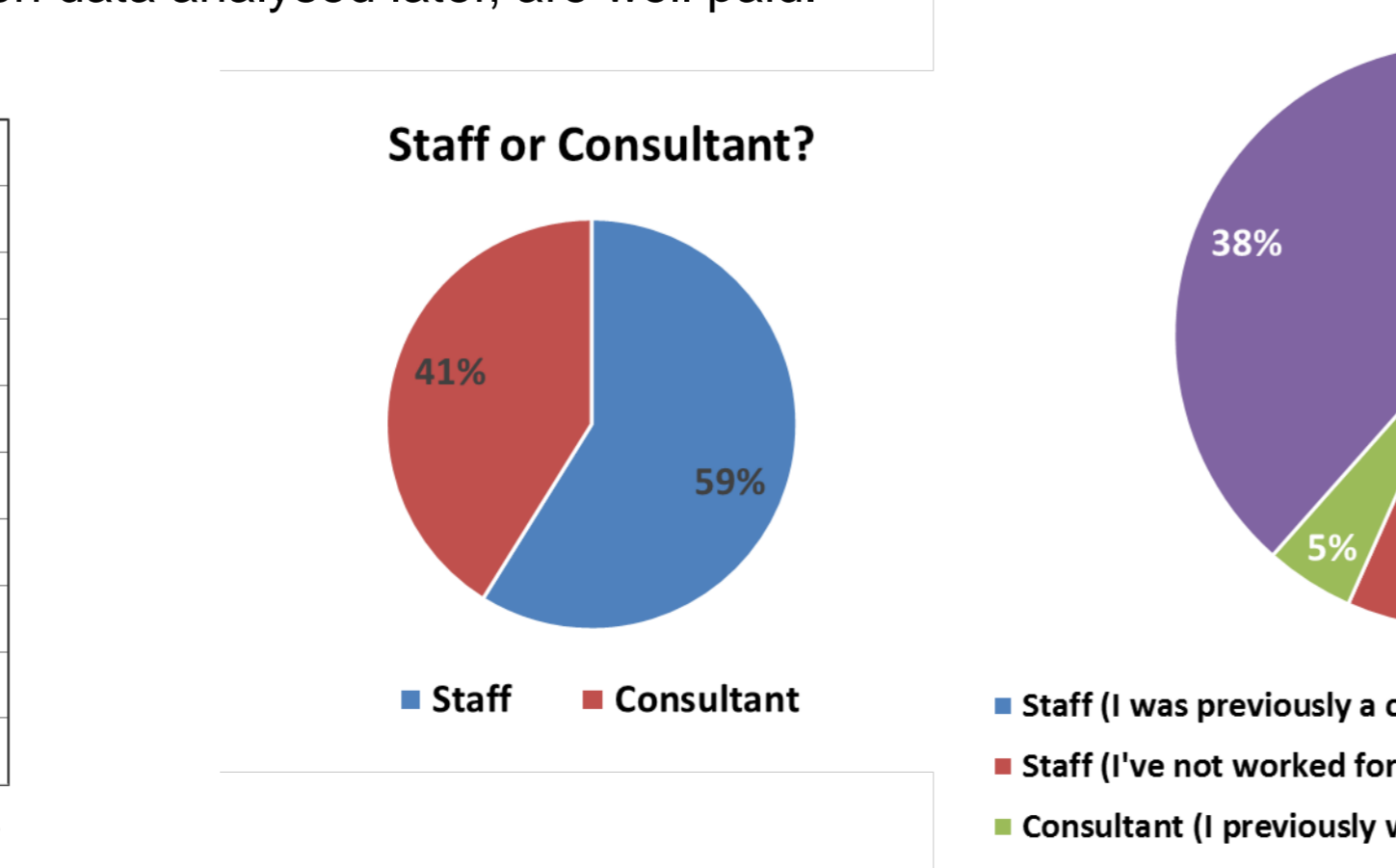
- Around 50% went via mudlogging route – WSG and then OG - pie charts along the bottom of the figure give an indication of education level achieved for each subset. Over two thirds following the mudlogging route are degree level.
- A proportion of those who follow this route also join oil companies and 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.



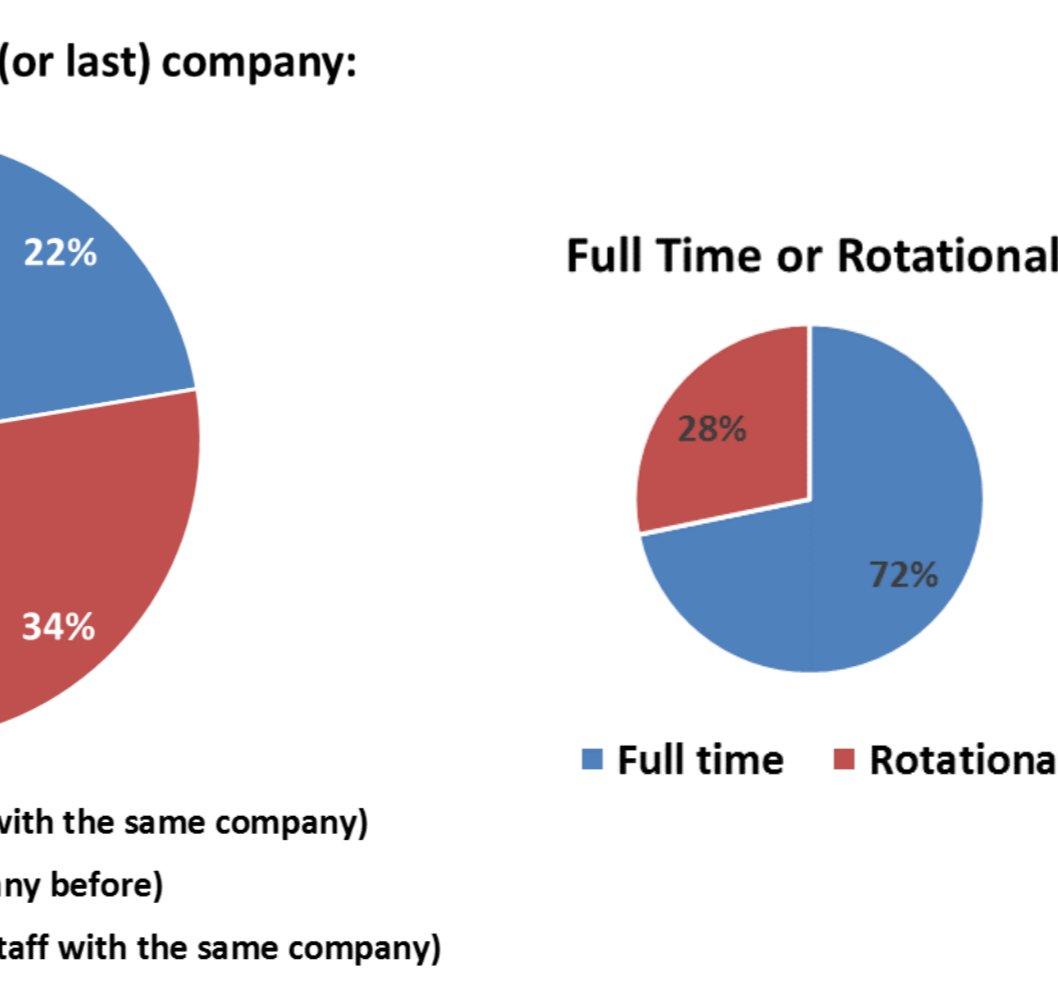
- Similar age distributions for consultants and staff:
 - Apart from a large number of aging European consultants from that '70s/'80s influx.
 - Consultants have more rotation work patterns
 - A large number of older full time consultants



- 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.

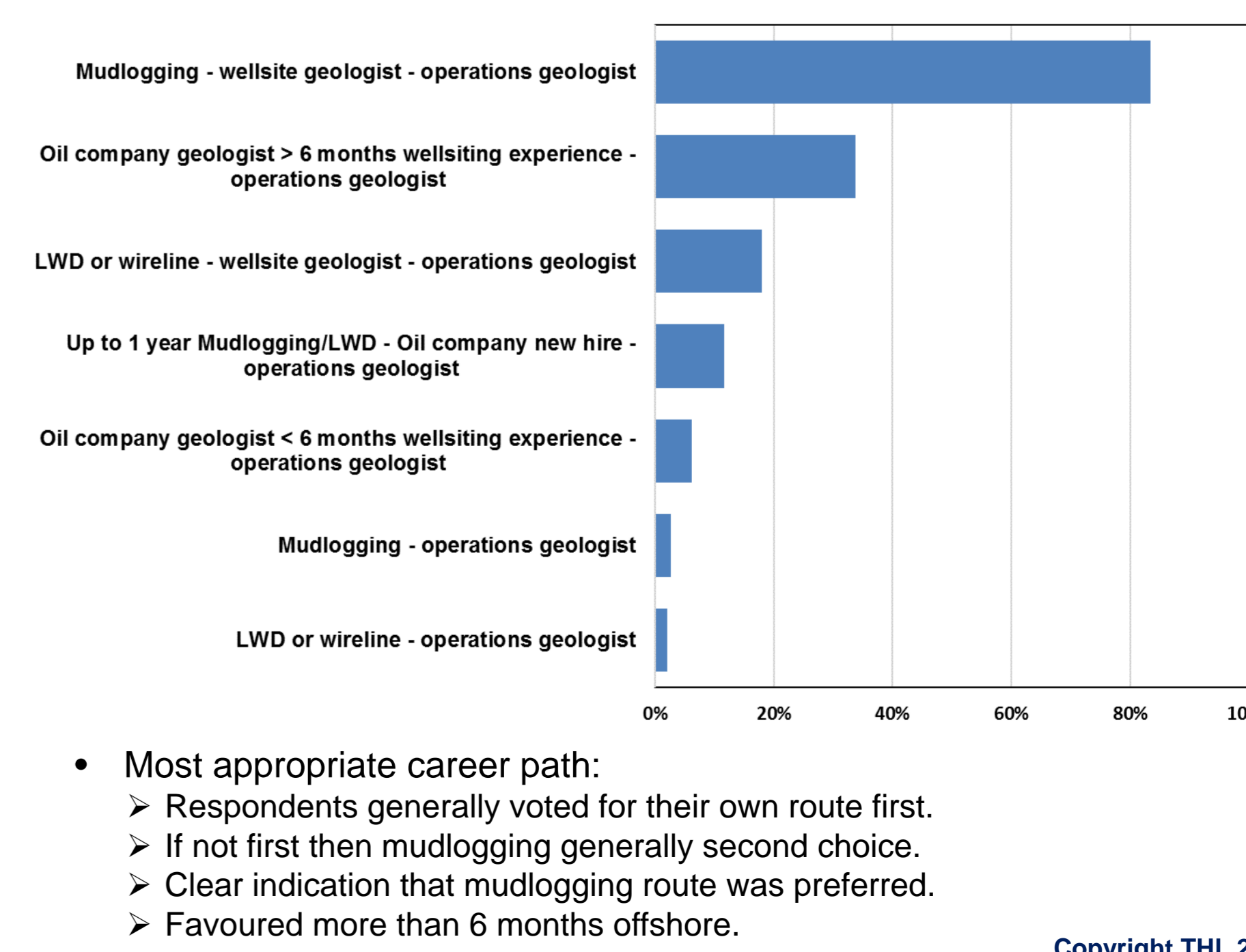


- Surprisingly, against expectation, more staff than consultants and more full time than rotational:
 - Issue of survey bias?
 - Actual trend to staff operations geologists and as a key geoscience role?



- Full Time or Rotational?
 - Full time (28%)
 - Rotational (72%)

Most Appropriate Career Paths (Multi-choice)



- 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.

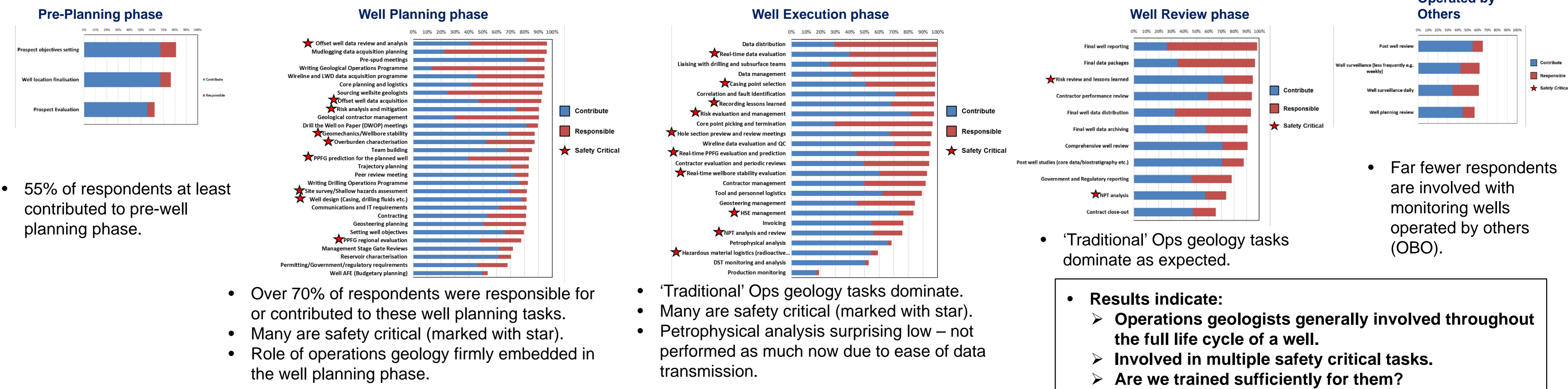
Results of the Operational Geoscience Survey 2015



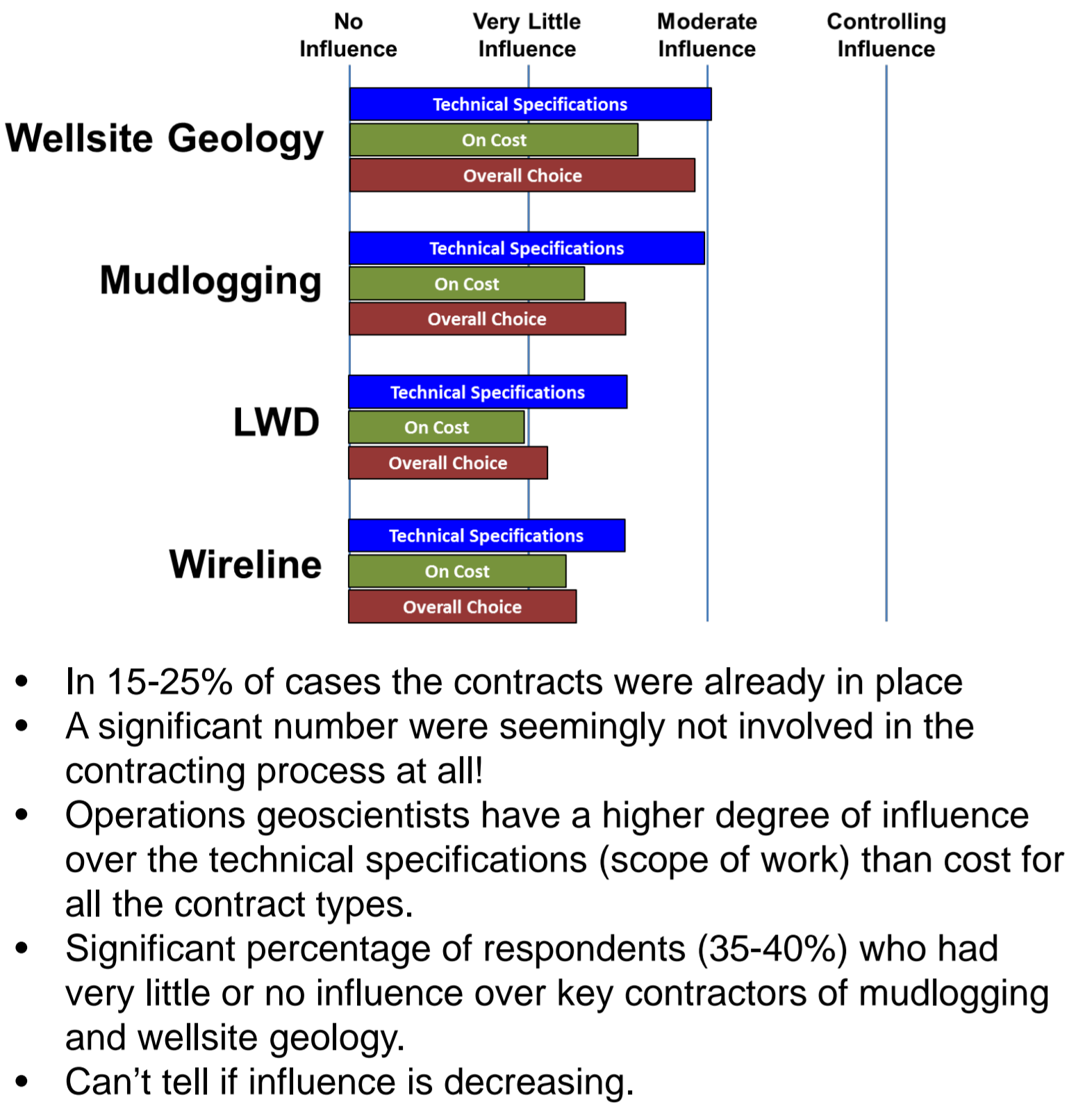
Tim Herrett Ltd

What Do Operational Geoscientists Do?

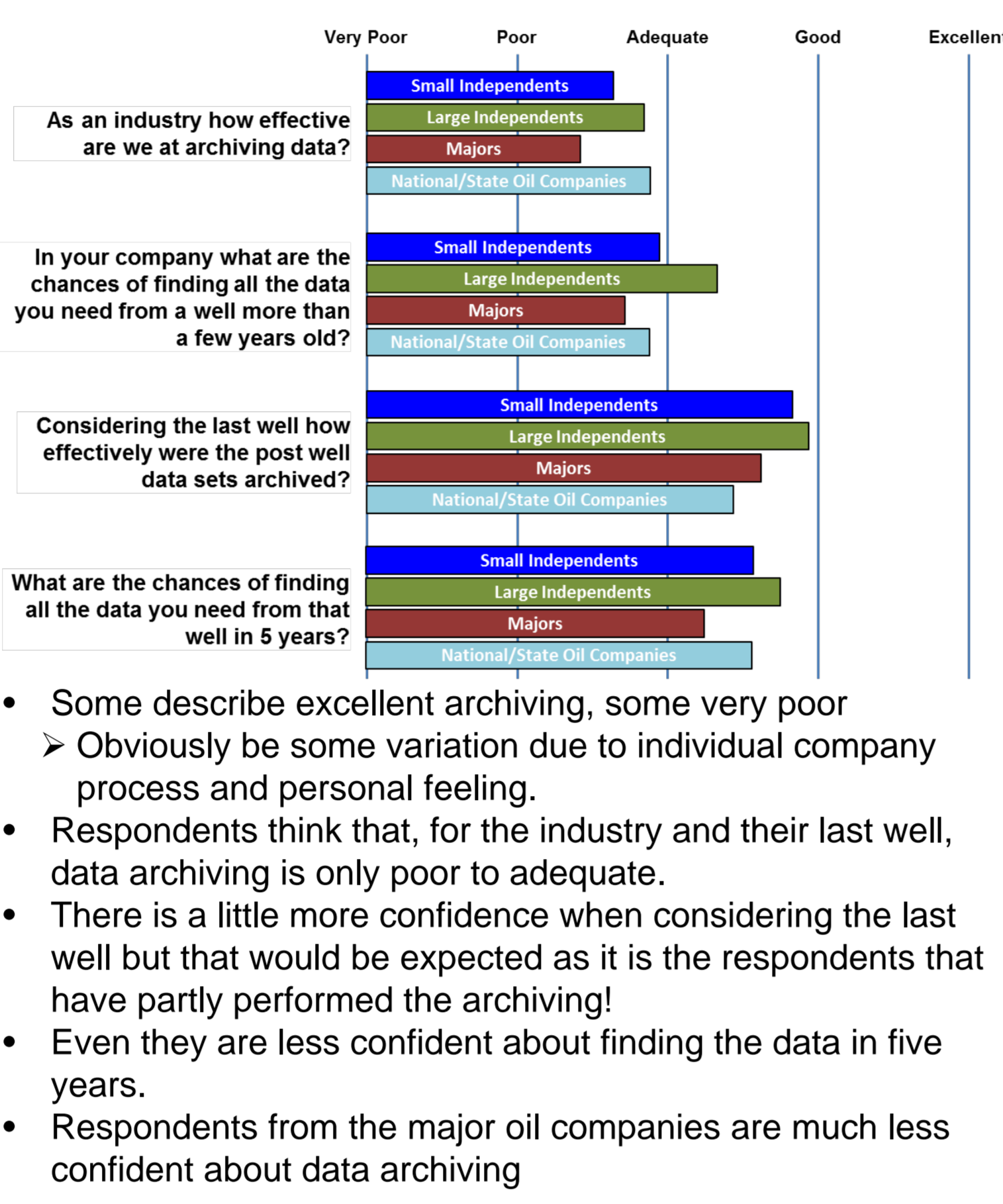
- Four well phases were surveyed.
 - Pre-Well Planning – Initial review of a prospect evaluating regional and local context.
 - Well planning – From setting well objectives, evaluating final well location up to spud.
 - Execute – Drilling and evaluation of a well, data collation, distribution and management.
 - 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



Average Influence on Contracting Process



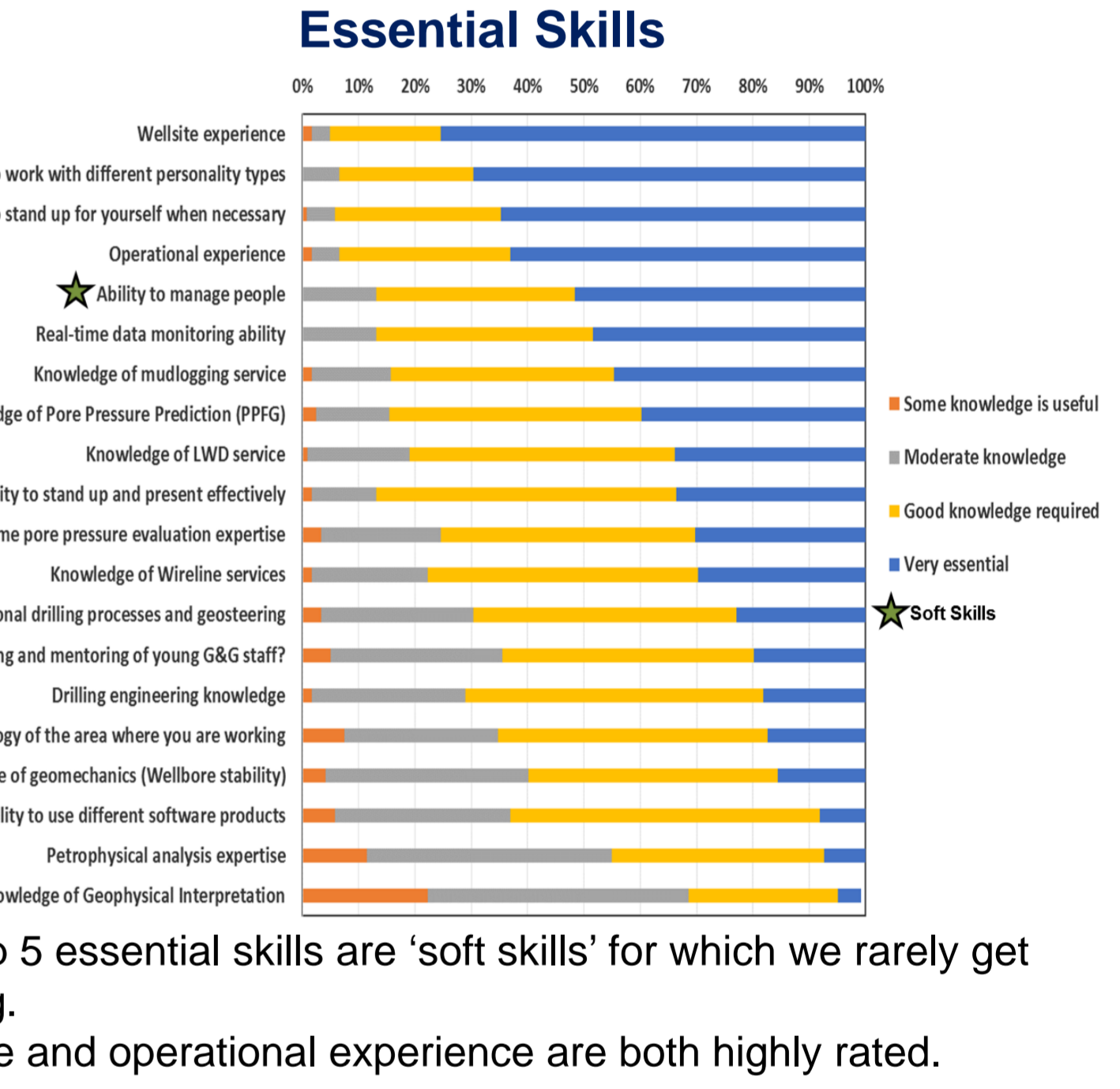
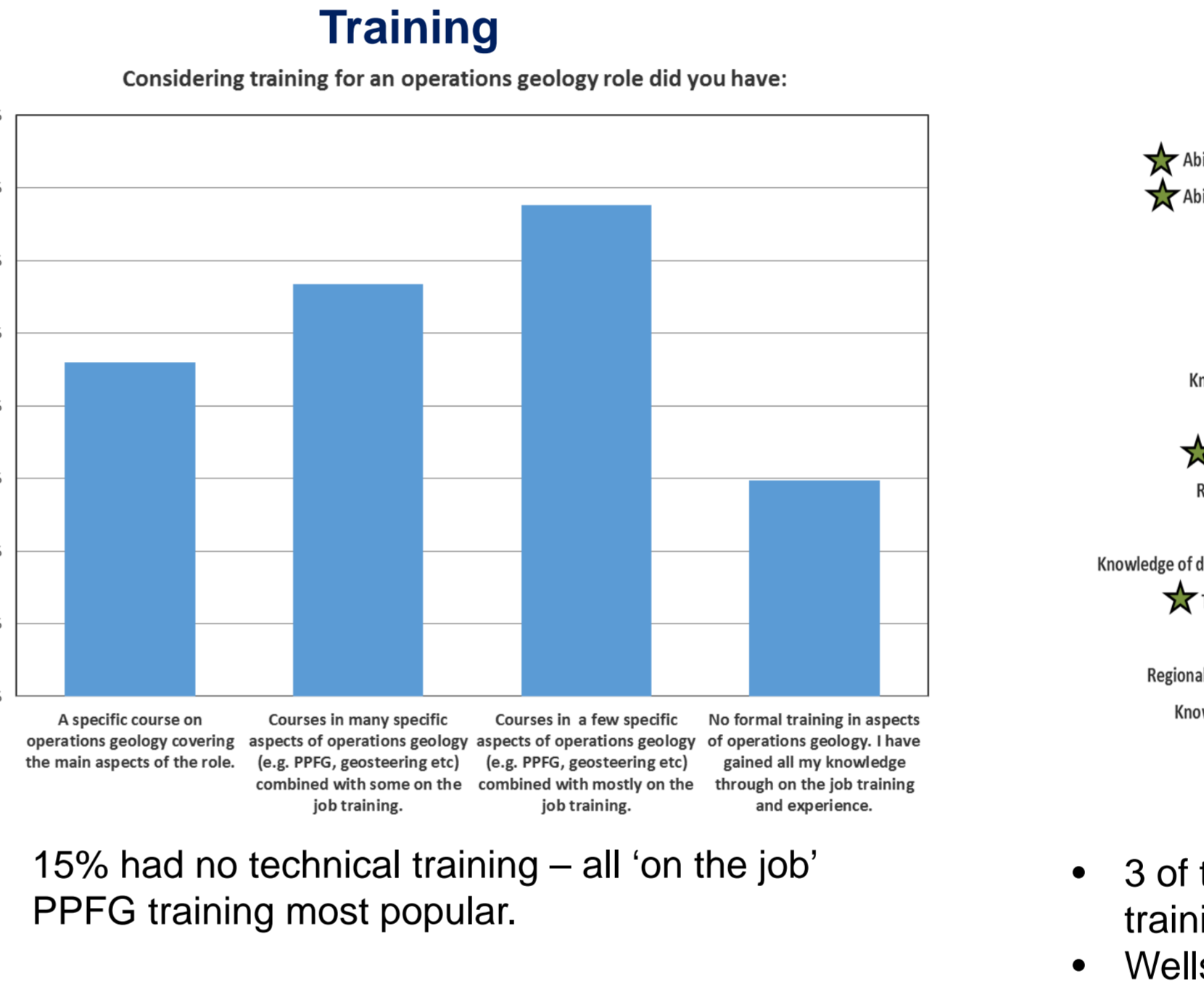
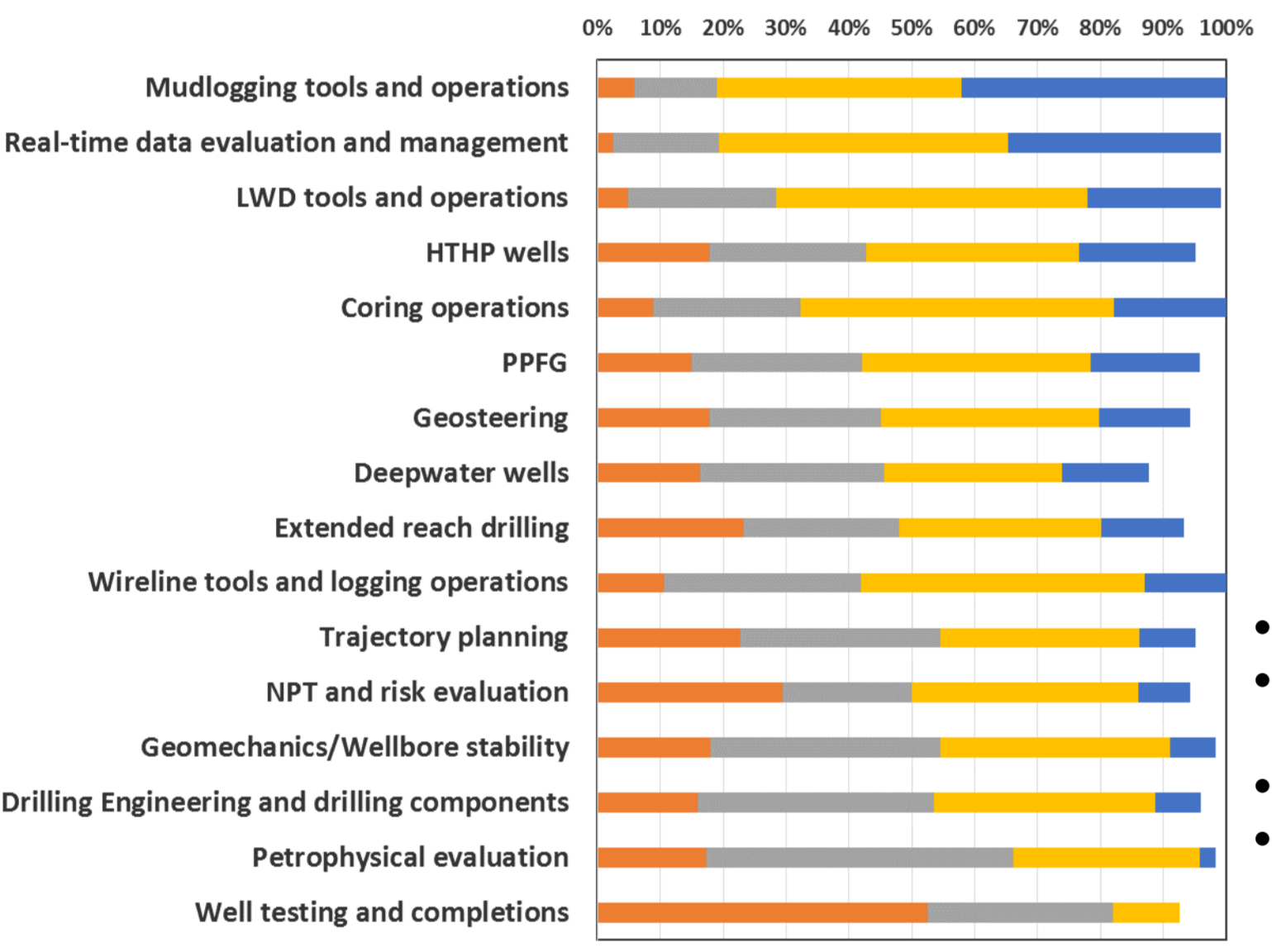
Post-well Data Archiving



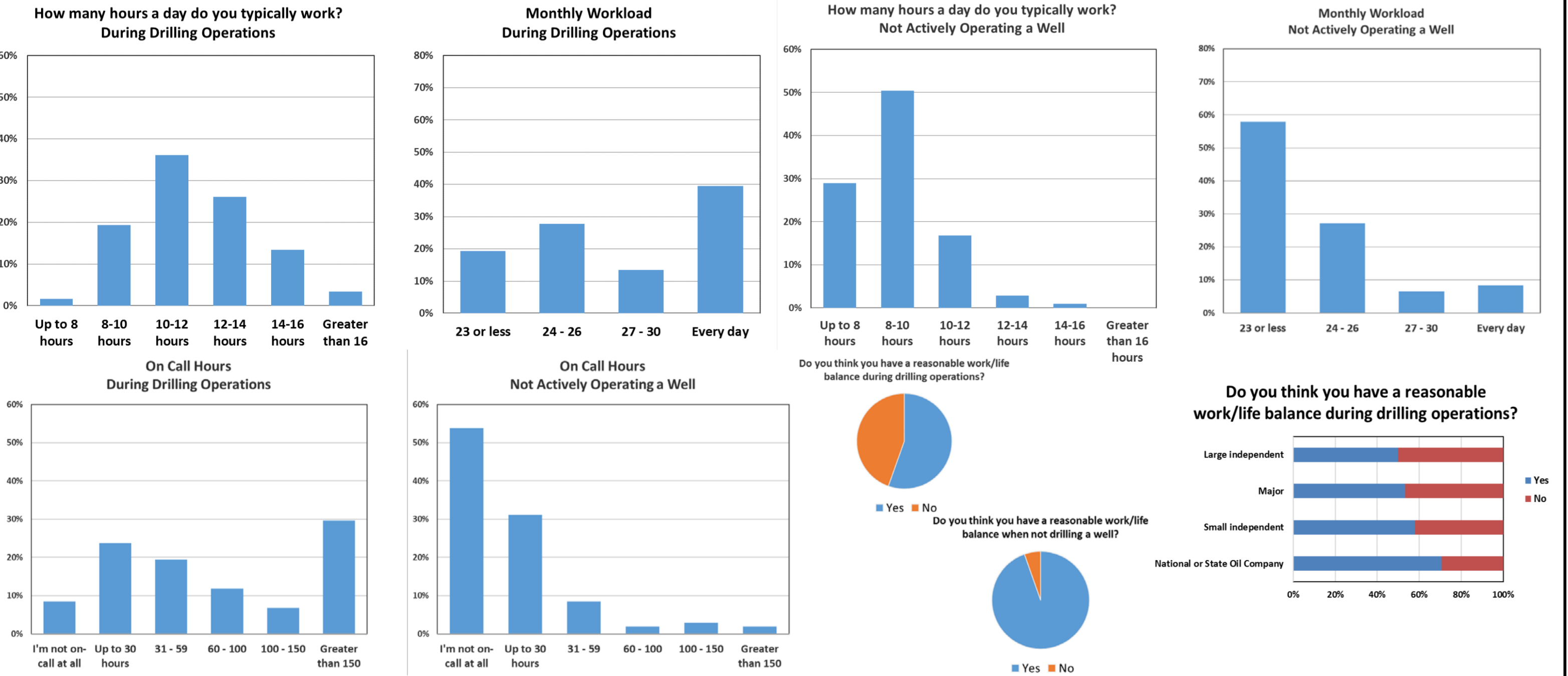
Real-Time Data Monitoring



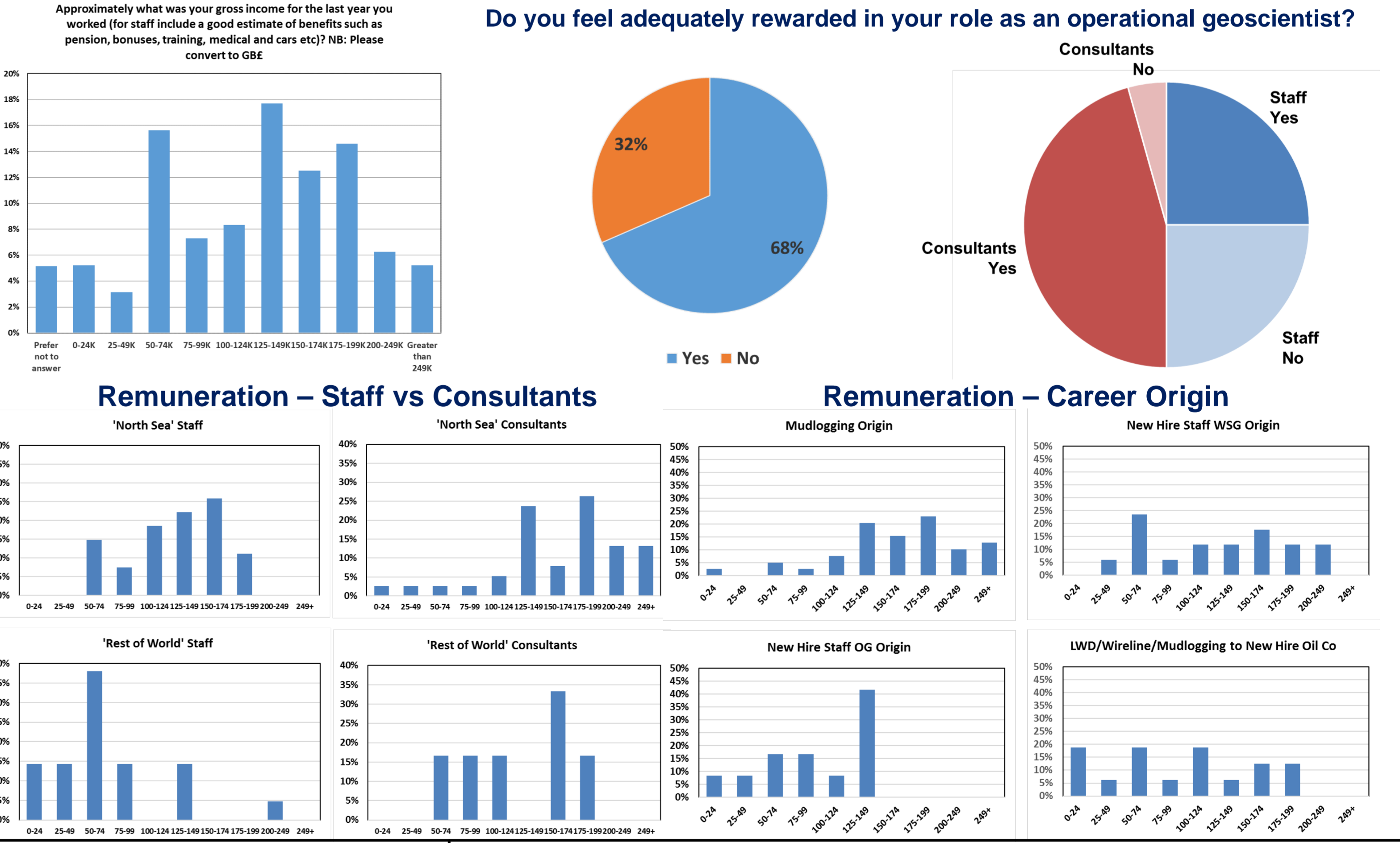
Expertise and Skillsets



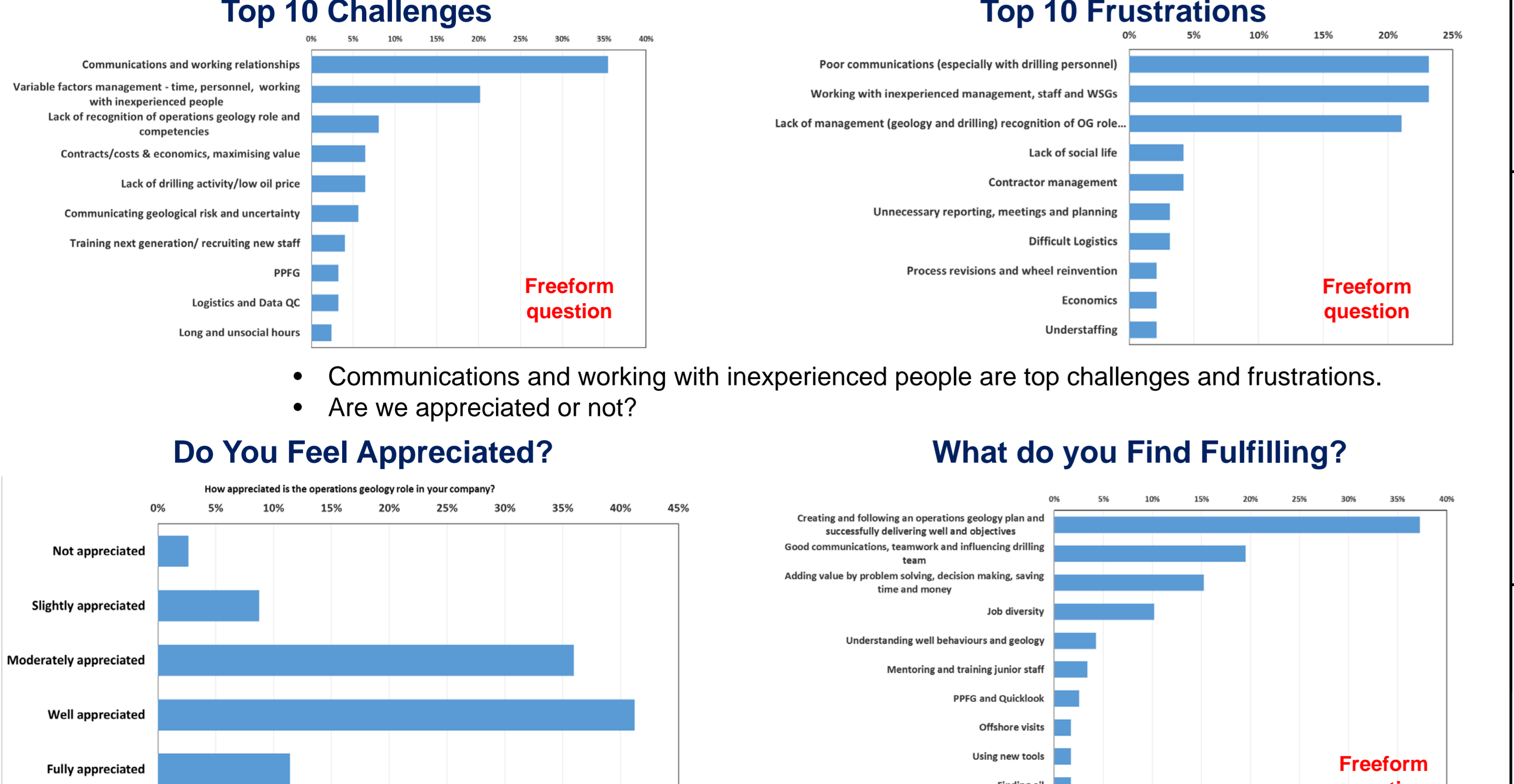
Working Hours – Too many?



Remuneration – All



Challenges, Frustrations, Appreciation & Fulfilment



Job Factors



Conclusions

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

References: Gardner, M. Fagg, R., 2016: A romp through the history of operations geology. Special publication to the Operations Geology Conferences. 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.