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Project: Potential Skills Shortages in the UKCS Decommissioning Phase

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Table of Contents

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1. Abstract

Concern surrounding potential engineering and technology skills shortages in the United Kingdom Continental Shelf (UKCS) has been a matter of much discussion for a number of years. A number of reasons have been put forward for these fears including demographic aging of the workforce and lack of young people in training. This fear is exacerbated by the need for skilled personnel to decommission platforms and infrastructure as oil fields in the UKCS are depleted.

The UK North Sea decommissioning phase has begun. Hundreds of platforms and structures and thousands of kilometres of pipeline will be decommissioned over the next few decades.

This project sought to assess the reality of the feared skills shortages with particular emphasis to the UKCS decommissioning phase.

The data regarding availability and requirements for personnel was gathered from surveys and reports carried out by the Engineering Construction Industry Training Board (ECITB), Scottish Enterprise, Oil and Gas UK (OGUK), the Offshore Petroleum Industry Training Organisation (OPITO), EngineeringUK and Hays Oil & Gas. The vast majority of this data is readily available in the public domain on the internet.

Appropriate information on estimated future requirements for and availabilities of skilled personnel was extracted from the various reports. This was then converted into tabular format and is presented graphically for ease of visual comparison.

The report concludes the following:

Firstly it was found that no new skill sets are anticipated for decommissioning. All required skills already exist.

Secondly the myth of an aging UKCS workforce is disproved.

Finally, the concern regarding shortages applicable specifically to the decommissioning phase is addressed. Noting that, an accurate schedule for decommissioning is not available as dates are dependent on the fiscal viability of each structure, calculations are based on the Scottish Enterprise 2005 estimated decommissioning schedule.

The results indicate a 32% shortage of skilled onsite personnel. Results for offsite professional personnel differ greatly indicating an initial 14% shortage rapidly tapering off over 5 years.

In summary, the findings indicate that there will be a significant shortage of skilled and professional personnel over the next 20 years if action to mitigate this eventuality is not taken immediately.

2. Introduction

2.1 Background

The United Kingdom Continental Shelf (UKCS) has recently entered the decommissioning phase. Scottish Enterprise estimates that, over the next 20 years "Around 470 installations, 10,000 kilometres of pipelines, 15 onshore terminals and around 5,000 wells constitute part of the infrastructure that will need to be decommissioned." (Scottish Enterprise, 2009) This would appear to indicate an increase in the numbers of artisan and technician personnel required. Acknowledgement of this indication coupled with a commonly held, possibly anecdotal, belief that the UKCS workforce is aging led to concerns of an impending skills shortage.

However, this concern is by no means universal. Industry surveys indicate a perception of shortages whilst a number of respected bodies foresee an era of high employment without a crisis.

The results of the recent Offshore Petroleum Industry Training Organisation (OPITO) Labour Market Intelligence Survey provided interesting reactions. Overall, the new release concluded:

"The demand for appropriately skilled or experienced staff continues to outstrip supply. Attracting appropriately skilled and experienced staff and the resulting cost of employing such staff were the principal challenges facing virtually every sector of the industry. Over 50% of respondents identified attracting appropriately skilled staff as the number one challenge .This indicates a general preference across industry to pay a premium to recruit experience rather than developing new entrant skills over the longer term and in-house." (OPITO, 2011a)

This indicates that, albeit for experienced personnel only, the industry itself perceives a skills gap in the near future.

However, speaking of the OPITO survey results, OPITO UK Managing Director, David Binnie "dispelled the idea that the Industry has an aging population across the board, emphasising that as a whole the average working age is only 40, with an older demographic only presenting a significant challenge in the managerial and senior roles such as OIMs. However, he did not underplay the significance of youth attraction, visionary thinking and Sector-wide support and leadership in continuing to build the industry into one of the UK's proudest achievements." (OPITO, 2011b)

This comment indicates that despite industry fears there is no real concern regarding skills shortages for the duration of the decommissioning phase.

The industry's concern regarding business opportunities is evidenced its strong support of Decom North Sea. One of this body's aims is to "understand capabilities and gaps relating to people, processes and technologies, and then put in place measures to addresses (sic) the issues and opportunities". (Decom North Sea, 2011)

Thereby indicating that concerns exist regarding availability of suitably trained personnel.

The Engineering Construction Industry Training Board (ECITB) which has carried out personnel requirement surveys for a number of years also has some apparently conflicting views.

The latest Strategic and Suitability Review notes "The latest projections (2010) of the manpower needs for the future suggest that around 56,000 people need to be Attracted, Developed and Qualified if the need is to be met. This is 20% HIGHER than previous estimates." (ECITB, 2010b)

and

"Simply, there are too few people readily available to meet the need. Whilst the industrial relations structures remain largely in place today, they have come under increasing pressure in the last five years as the levels of capital investment have increased at the time of skills shortages." (ECITB, 2010b)

However, the ECITB concluded in 2008 that

"Industry has indicated that there will always be an extent of undersupply of trained and competent craft and technical personnel (level 2&3) in core ECI related disciplines that are commonly deployed during the decommissioning phase, but that this extent is not currently significant and is within manageable tolerances." (ECITB, 2008)

So, on the one hand the companies making up the industry have fears of skills shortages on the other the main training bodies foresee no crisis provided sufficient investment in education is made.

This report provides results of analysis of available data with the intent of answering the question of whether a future skills shortage exists.

It should be noted that requirements for and availability of specialist vessels does not form part of this research.

2.2 Key Findings

- No new skill sets are required for the decommissioning process.
- An average deficit of 3,200 onsite personnel (approximately 29% of the current onsite workforce) is indicated for the duration of a 10 year decommissioning programme.
- Shortages and the shortage trend for offsite management, professional and engineering personnel differ significantly to those for onsite personnel. Shortages are short term and decrease rapidly peaking at around 935 in the first year.
- Demographic data indicates no concerns regarding reduction in the availability skilled personnel due to age. It is the sudden increase in requirement rather than an aging workforce which causes the skills shortage.
- Current levels of training for skilled onsite personnel are insufficient to meet probable future requirements for the decommissioning campaign.
- An accurate decommissioning schedule is required. The level of any shortage will be entirely dependent on the decommissioning schedule. Without a much more

accurate estimate of decommissioning dates it is impossible to *accurately* predict potential skills shortages.

- Existing decommissioning schedules indicate large fluctuations in personnel requirements. If a method, either by voluntary co-operation of the many companies involved or by government intervention, is found to smooth the potential peaks in decommissioning activity then skills shortages impacts may be reduced.

3. Literature Review

3.1 Introduction

A number of respected bodies regularly publish verifiable data on personnel levels in the UKCS (ECITB, Scottish Enterprise, Oil and Gas UK (OGUK)). Some estimate levels of requirement for the future. In addition in 2010 OPITO commissioned a wide-ranging survey of the subject. A summary of the results of this were published in 2011. The author was permitted access to unpublished data gathered for OPITO by Robert Gordon University (RGU).

Appropriate data from various reports is utilised to calculate the various results. It is noted that the bases of the various surveys and data collations differ leading to divergent results. The literature review carried out examines the figures available from the main reports. The Research Method section describes how the data was compared to allow for logical conclusions to be drawn.

In this age of technology all data is sourced from the internet and by e-mail correspondence with appropriate bodies.

In line with the terminology utilised in published documents the descriptions "onsite" (=offshore) and "offsite" (=onshore) are used.

3.2 Skill sets required onsite

In order to understand what skill shortages may exist it is first necessary to understand which skill sets are required during decommissioning.

The ECITB and Scottish Enterprise have both considered this matter.

The ECITB concluded that "Research to date indicates that no entirely new functions, roles or skills will be required to support a successful decommissioning phase." (ECITB, 2008)

and further advises the following requirements:

"Technical and Craft occupations
The core occupations deployed in decommissioning activities are similar to or the same as those deployed on commissioning and maintenance O&M activities:
Riggers
Platers
Pipefitters
Electrical/mechanical fitters & technicians
Erecting/dismantling steel structures

Most personnel involved in these activities have experience of disassembly/deconstruction due the nature of current re-fit, shutdown, module change activities etc and the relevant competencies are encompassed to some extent

at least, within the existing suite of occupational standards.

Additional specialist skills to support the decommissioning phase are acquired via specialist contracting service companies, and the numbers deployed in these skill areas are likely to increase, although this is likely to be met in part at least by multi-skilling or redeployment (e.g. from scaffold erector to rope access):

- Rope Access specialists
- NDT services
- Asbestos removal/handling
- Pre-decommissioning pipework flushing/pigging/purging etc" (ECITB, 2008)

Scottish Enterprise is largely in agreement with these skill set requirements listing the following:
"Operators – riggers – fitters – mechanics – welders – crane operators – electricians – foremen – supervisors – field engineers – safety officers" (Scottish Enterprise, 2009)

A representative of a large operating company, responding to an e-mail, also indicated agreement: "It would be bold to say decommissioning is the reverse of designing and constructing but the skill sets are largely the same."

Thus there is consensus that no new skill sets are required. From this it can be concluded that existing personnel can be used for decommissioning.

3.3 Skill sets required offsite

Again the ECITB and Scottish Enterprise have both considered this matter and broadly agree on requirements.

The ECITB advises the following requirements:

"Level 4&5 occupations
These roles & functions include essential activities required throughout each stage of the decommissioning cycle, from planning and consent approval, through to post removal and deconstruction environmental monitoring, survey etc:

- Planning Engineers
- Structural Engineers
- Environmental consultant engineers
- Project Management Leaders
- Logistics and Supply Chain specialists etc.

These roles are invariably onshore/offsite and may be based in international regional/head office locations outwith the UKCS." (ECITB, 2008)

Scottish Enterprise is more concise:

"Experienced Project management Multi-discipline engineering task force" (Scottish

Enterprise, 2009)

Thus, again, there is consensus that no new skill sets are required.

For the purpose of analysis graduate engineers and management are combined into one figure on the basis that, in general, for engineering projects, one evolves into the other.

3.4 Numbers of personnel required and available

Information collated by the ECITB, Scottish Enterprise, Oil and Gas UK (OGUK), OPITO and Hays Oil & Gas are analysed to provide a cohesive estimate of the numbers of personnel with various skill sets required. The skill sets are divided into onsite skilled and offsite skilled, in the main. In this section the data provided, the methodology used to calculate that data and the limitations of that data are discussed.

ECITB Data

The ECITB Strategic and Sustainability Review (Quinquennial Review) 2010 provides forecasts of the numbers of people required to be trained to fill the estimated requirements to 2020 consequentially data is provided for the anticipated numbers of personnel required to 2020. The data is based on detailed industry surveys of all engineering industries and presented for each industry and skill set based on the percentage of overall manpower required by each industry. (ECITB, 2010a) The base data used by this respected body is assumed correct.

The gathered base data is based on a formula comprising:

- 1%-2% increase in annual requirements across the board
- 4% reduction in workforce due to retirement
- 2% reduction in workforce for other reasons

No other reasons for workforce variation are taken into account. No account is taken of numbers required for decommissioning, numbers becoming available due to cessation of production on structures to be decommissioned, numbers required for new ventures or the international and inter-industry mobility of the workforce.

Scottish Enterprise Data

The Scottish Enterprise, 2009, Report on industry consultation, North Sea Decommissioning Supply Chain Steering Group, April 2009 was the only published data located which, in any way, estimated the numbers of personnel required for decommissioning of various types of structures.

The estimated numbers of the various types of personnel required for the decommissioning of each type of structure in conjunction with the numbers of each type of structure scheduled to be decommissioned in each year is used to predict the numbers required.

It should be noted that the only tabulated figures available date from 2005. No

accurate information on decommissioning dates is available. A DECC representative, contacted by e-mail, advised "The problem is there are no fixed dates for decommissioning as oil price has an influence. Operators only apply to DECC for COP authority once a field becomes revenue negative and that changes with oil price.....Also even after COP it can be several years before the removal work …...While we hold potential COP dates for all producing fields it is not an accurate guide."

Thus, during analysis certain, stated, assumptions are made for utilisation of this data.

OGUK Data

OGUK provides workforce demographics reports for 2006, 2007, 2008 and 2009 (Oil and Gas UK, 2007, 2008, 2009, 2010) based on figures gathered from the Vantage offshore personnel tracking system (Vantage, 2011). These figures are based on either 100+ days offshore or 25+ days offshore overall and by skill as recorded on the Vantage system. As this report concerns availability of full-time offshore personnel the 100+ days figures are used.

The information is used, initially, to verify general agreement of overall personnel numbers provided by the various bodies. Further, the data is useful in examining demographic trends.

OPITO Data

The OPITO Labour Market Intelligence Survey (OPITO, 2010) results provide further up-to-date information on skill requirements. This was a wide-ranging survey "More than 110 companies spanning the construction, drilling, engineering, geoscience, marine, science, inspection and operations sectors contributed." (OPITO, 2011a) OPITO confirmed, by e-mail, that actual numbers provided are taken from numbers of personnel with Minimum Industry Safety Training (MIST) training. The numbers provided by this report are slightly lower than those provided by others as not all personnel have completed MIST training. This information is used largely in verification of numbers provided by other data and in verification of demographic trends.

Hays Data

Hays is an international recruiting company which conducts an annual survey of personnel in the oil and gas industry the objective of which is "to provide both recruiters and job seekers with a better understanding of the approximate levels of pay, benefits and confidence that currently exist in the market. " (Hays, 2011) The latest survey was completed by more than 10,800 people. The information provided is used to assess the effect of international personnel movement.

EngineeringUK

EngineeringUK describes itself as follows:

"EngineeringUK is an independent, not-for-profit organisation whose purpose is to promote the vital contribution that engineers, engineering and technology make to our society, and inspire people at all levels to pursue careers in engineering and technology. We work in partnership with business and industry, government,

education and skills providers, the professional engineering institutions, the Engineering Council, the Royal Academy of Engineering and the wider science, technology, engineering and mathematics community. Together, we pursue two strategic goals:

- To improve the perception of engineers, engineering and technology
- To improve the supply of engineers" (EngineeringUK, 2011)

The body provides detailed information regarding education and training in technology and engineering subjects from school to graduate level. This information is used to indicate further research and work required to ensure a ready supply of engineers and technicians in the future.

Limitations to accounting for Variability in Personnel Numbers

In predicting numbers of personnel available in future years, the ECITB "formula" for reductions in workforce (retirement and other reasons) is utilised. An attempt is made to take account of onsite personnel made available by cessation of production on structures to be decommissioned (refer to Section 4.2.2/Appendix 1.3). Limitations to this methodology should be noted.

For onsite and, more particularly, offsite personnel there are other unknowns. Unknown factors must be recognised such as the availability of personnel formerly working on aging asset enhancement, numbers of personnel required for new ventures, the return of personnel from overseas assignments due to political instability in a number of oil states and nationalisation of formerly ex-pat positions in more stable regions.

Engineering skills are internationally saleable, in consequence, given the correct visa documentation, engineers and technicians are free to work worldwide. As many of the personnel involved are essentially self-employed or work on a contract basis collation of data on their international movements would be time-consuming and does not appear to have been attempted. The only data located forms part of the Hays Oil & Gas Global Salary Guide 2011.

Matt Underhill, Managing Director, Hays Oil & Gas advises, "The last two years have seen a huge number of overseas employees laid off as demand fell through the recession.....In line with this trend we also saw a huge amount of repatriation of high skilled labour from all parts of the globe, with many taking up positions at home or retiring from the industry altogether."

Of the 10,800 personnel responding to the survey 41.9% are not based in their country of origin in 2011 – a reduction from 45.6% in 2010. The accuracy of these figures for the entire engineering population with the prerequisite documentation to work in the UKCS remains unknown. However, this represents less than 2% of the overall number of personnel employed in UKCS. Thus, whilst recognised, this variability is not taken into account in calculations.

A further unknown is the possible personnel requirement in other engineering industries – notably nuclear and power infrastructure. The UK government national policy statements for power infrastructure are nearing the end of the timeline for ratification (DECC, 2011). Nuclear Power Limited makes the claim that "In the UK,

there are plans to build 10 or more new nuclear power stations over the next 15 years." (Nuclear Power Limited, 2011).Once final policy decisions are made requirements for personnel can be estimated. The possible effects on future UKCS personnel availability are unknown at this time.

Additionally, if reports in industry papers such as RigZone and Upstream are to be believed, recent requirements for offsite personnel in the design of FPSO and FLNG vessels have been increasing with reports of orders placed by Shell, FLEX, Talisman, Petrobras and INPEX amongst others. Construction of these vessels mostly takes place in the Far East but onsite skilled personnel could be lured by attractive contracts. Effects on design personnel availability for decommissioning projects are also possible.

In short, the timeline data for decommissioning is dubious, numbers of personnel required for new ventures are unknown, effects of construction campaigns in other industries and for oil and gas production vessels are unknown. Therefore the results of calculations from available data indicate trends specific to UKCS rather than exact numbers.

3.5 Numbers of potential personnel in training

ECITB reported in 2008 that "Industry has indicated that there will always be an extent of undersupply of trained and competent craft and technical personnel (level 2&3) in core ECI related disciplines that are commonly deployed during the decommissioning phase, but that this extent is not currently significant and is within manageable tolerances." and recommends on-going monitoring of the UK decommissioning market to ensure that future needs are met.

By 2010 the ECITB is reporting that "The latest projections (2010) of the manpower needs for the future suggest that around 56,000 people need to be Attracted, Developed and Qualified if the need is to be met."

These comments apply to the entire engineering industry – not only the oil and gas sector. As the figures used are based on the formula detailed above (Section 3.4) it is by no means certain that this figure takes account of probable decommissioning shortages.

Although the ECITB reports outstanding success in increasing the numbers of people completing apprenticeships and "upskilling" between 2003 and 2008 further work on promotion of apprenticeships is required if the decommissioning shortfall is to be avoided. As it is estimated that the time required to fully train a skilled person is 4-6 years action is required immediately.

In respect of professional personnel required the time to train is estimated at 7-10 years. The 2011 Engineering UK report indicates exceptional increases in the uptake of mathematics and physical sciences in schools and in engineering courses at universities and colleges over the past 6 years. This indicates a good supply of professional engineering personnel in the future. Due to the very short term nature of the predicted shortfall in professional engineering personnel for the UKCS decommissioning phase there is insufficient time to train new entrants to mitigate it.

4. Research Method

4.1 Data collection

Data collection was by means of internet searches based on a knowledge of the main bodies engaged in the subject matter. All data with the exception of the OPITO MIST Statistical Analysis: Job Role and Discipline Split Against Age Range Grouping and the RGU 2010 Survey Report are published and readily accessible.

It was considered that, given the amount of published data and recent extensive surveys completed, contacting companies directly was unlikely to provide and new or more accurate data.

Where necessary the authors of reports – particularly ECITB and OPITO - were contacted directly for clarification. Both concerns were extremely helpful.

4.2 Data analysis

Appropriate information was extracted from the various reports available. This was then converted into tabular format and is presented graphically for ease of visual comparison. The Linux OpenOffice suite of programmes was used throughout.

4.2.1 General data

Detailed descriptions of the data used are provided in Section 3.4, a short description is provided below:

- The ECITB Strategic and Sustainability Review (Quinquennial Review) 2010 is based on detailed industry surveys. The actual figures gathered are available from the ECITB website. (ECITB, 2010a) The data in this report covers all UK industry but helpfully splits the data down into industries and skill sets.

- Scottish Enterprise provides estimated numbers of skilled personnel required for each class of platform and estimate the numbers of each type of platform to be decommissioned each year.

- Oil and Gas UK provides figures for overall personnel numbers based on either 100+ days offshore or 25+ days offshore as recorded on the Vantage offshore personnel tracking system (Vantage, 2011) for 2006 to 2009. These figures are useful in looking at demographics and as a check regarding the actual numbers. As this report concerns availability of full-time offshore personnel the 100+ days figures are used.

- The OPITO survey provides data for 2010 based on numbers of personnel with Minimum Industry Safety Training (MIST) training.

As a baseline check of the viability of the data the overall numbers of personnel onsite in 2010 provided by, or extrapolated from, the ECTIB, Oil and Gas UK and OPITO data were compared.

Source	2010 Personnel Requirement	Base Data Source
ECTIB	21639	Industry Survey
Oil and Gas UK	20233	Vantage
OPITO	16187	MIST

Table 1 Comparison of overall numbers required

There can be no argument with figures taken from the Vantage system, however, the Oil and Gas UK figure used (100+ days) provides only an estimate. This figure is in reasonable agreement (a 7% variance) with the ECITB figure (extrapolated from 2009 data). The much lower OPITO figure may be explained as not all personnel will have completed MIST training. Hence there is a *general* level of agreement regarding current numbers of personnel working in the UKCS. This allows the data provided to be utilised with a reasonable degree of confidence.

4.2.2 Onsite Personnel requirements

Detailed tabulated data, methodology and calculations are included in Appendix 1.

The ECITB provides detailed estimates of numbers and types of personnel required for the next 20 years. Scottish Enterprise estimates numbers of personnel required for the decommissioning of various types of structure. This data is used to predict possible shortfalls. Only skilled personnel numbers are considered as these are, generally, the most difficult personnel to recruit.

The ECITB estimates to 2020 are based on a percentage increase (1 to 2%) in annual requirements (based on relative stability in existing requirements plus a few new ventures) and an assumption of an annual 4% reduction in workforce due to retirement, and a reduction of 2% of workforce due to other reasons giving an annual workforce reduction of 6%.

These estimates (Figure 1) indicate a rise in the requirements for skilled[1] onsite personnel to 2020.

1 Note: Skilled onsite = Crafts, M&P, Engineers, Technicians = 37% of total estimated manpower

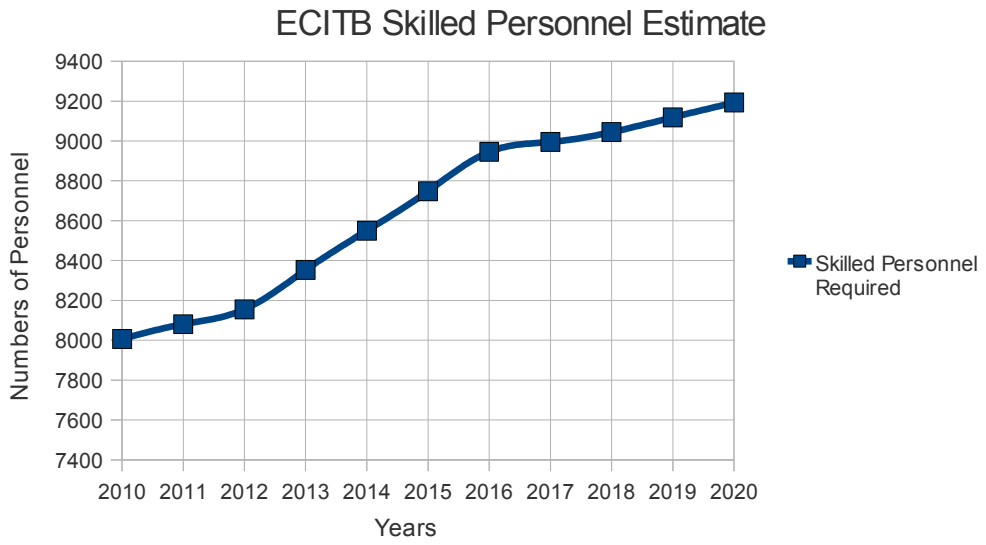

Figure 1 ECITB estimated onsite skilled personnel requirements

However, it must be noted that this estimating methodology does not appear to take account of fluctuations in personnel numbers required for decommissioning, or, for reduction in personnel numbers due to platforms cessation of production.

Scottish Enterprise provides estimated decommissioning dates for different types of structure along with typical numbers of skilled personnel required to perform the decommissioning. Utilising this data, a rather different view of the requirements for onsite personnel forms.

The figures are based on estimated decommissioning dates for structures in early 2005. Due to the increasing oil price over the past year it can safely be assumed that the Scottish Enterprise dates from 2005 have changed. For the purpose of analysis the figures are moved out 3 years. (Refer to Appendix 1.) It must be noted that no reliable data regarding the exact timing of decommissioning is available. Further research is required into accurate decommissioning dates. Also the effect of the recently introduced 12% oil production tax is unknown at this time, although Centrica's decision to operate South Morecambe intermittently dependent on fiscal viability may give an indication. (Telegraph, 2011 and Boman, 2011b).

Scottish Enterprise data is provided graphically in Figure 2.

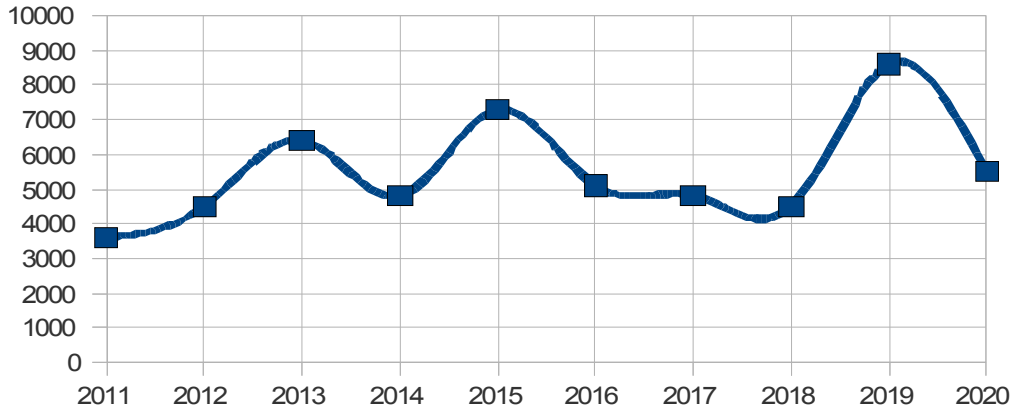

Figure 2 Time delayed Scottish Enterprise estimated onsite skilled personnel requirements

Comparing the smooth upward trend of the ECITB graph with the widely varying Scottish Enterprise graph it may be concluded that the short term effects of decommissioning are not evident in the ECITB future estimate.

The numbers of skilled personnel made available by cessation of production must be taken into account as this reduces the deficit (refer to Appendix 1 for details). Numbers required for new ventures remain an unknown (Boman, 2011a).

In interpreting the final shortfall the inaccuracy account of the decommissioning data available. The shortfall, is in graphical form:

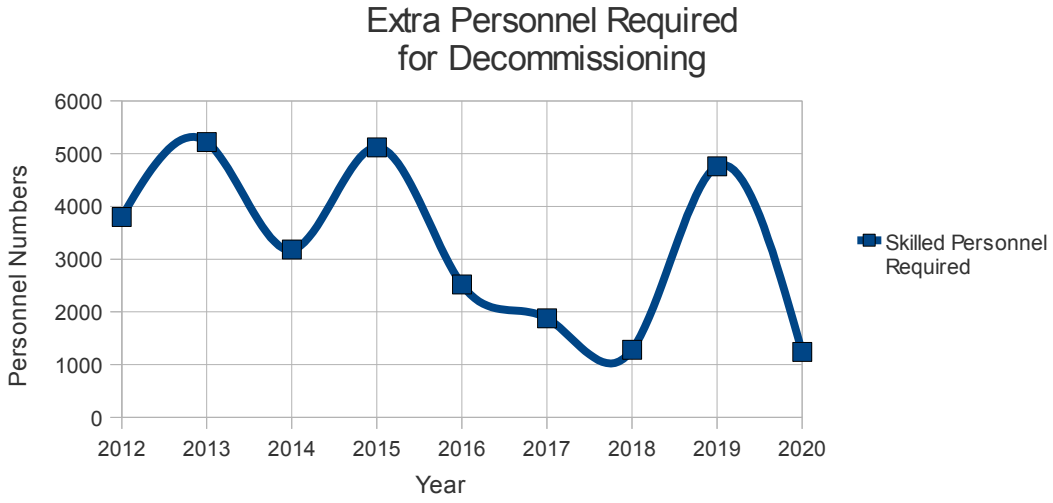

Figure 3 Estimate of extra onsite skilled personnel required

The extra numbers required vary between 1240 and 5180 dependent on year. This indicates an additional requirement of 12.5% and 52.3% of existing onsite workforce.

Even if this can be smoothed (refer to Section 5) an average 3200 (32%) increase in personnel numbers per anum over 10 years is needed.

Data analysis indicates a significant concern.

4.2.3 Offsite Personnel requirements

Detailed tabulated data, methodology and calculations are included in Appendix 2.

As for onsite personnel the ECITB estimates to 2020 are based on a percentage increase (1 to 2%) in annual requirements and an assumption of an annual 4% reduction in workforce due to retirement, and a reduction of 2% of workforce due to other reasons giving an annual workforce reduction of 6%.

These estimates (Figure 4) indicate a rise in the requirements for skilled[2] offsite personnel to 2020.

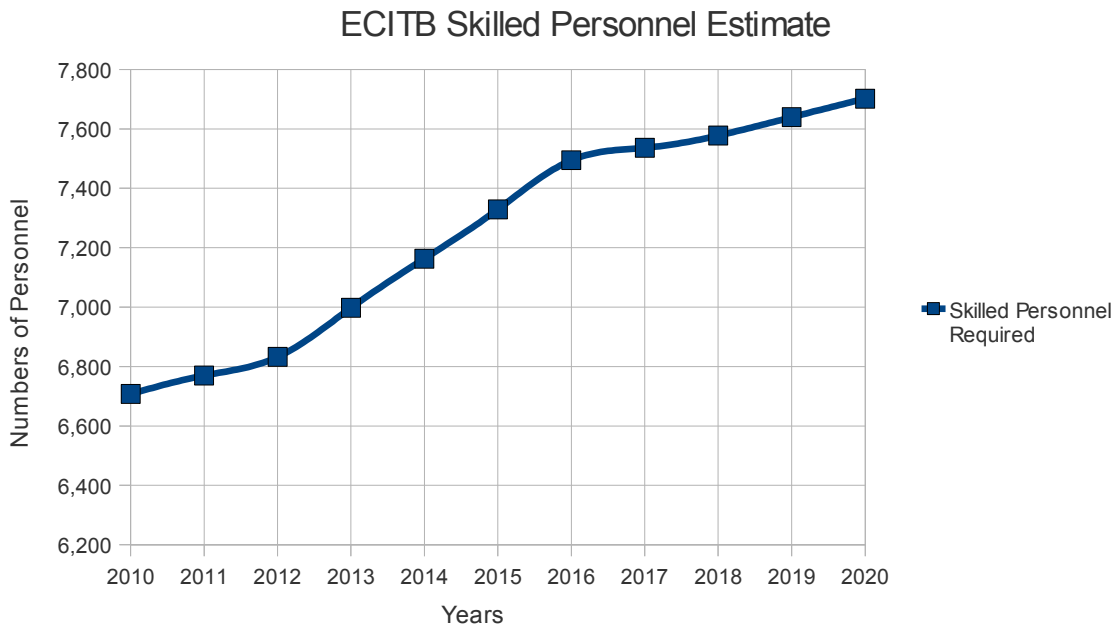

Figure 4 ECITB Estimate of skilled offsite personnel requirements

Again a continuous increase in requirements are indicated. As for onsite personnel, it must be noted that this estimating methodology does not appear to take account of increases in personnel numbers required for decommissioning design.

Scottish Enterprise provides estimated decommissioning dates for different types of structure along with typical numbers of skilled design personnel required to perform

2Note: Skilled offsite = Engineers, Management & Professional = 34% of manpower

the decommissioning. This data does not indicate as much deviance in trend as is encountered for onsite personnel. This makes logical sense as offsite personnel are largely involved in project design. As for onsite personnel, the figures for offsite personnel are delayed by three years.

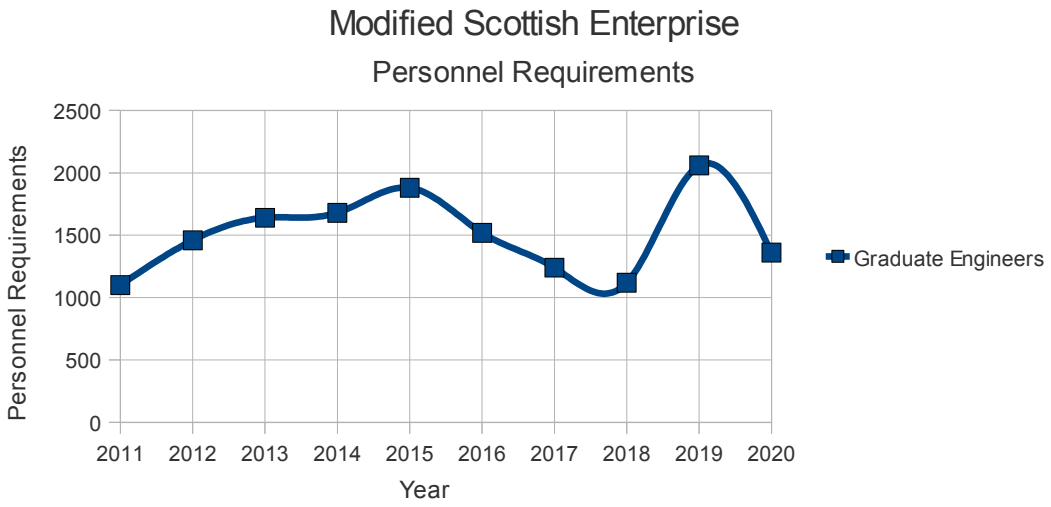

Figure 5 Time delayed Scottish Enterprise estimated onsite skilled personnel requirements

Comparison of the ECITB and Scottish Enterprise figures for offsite personnel is a rather more complex issue given the peripatetic nature of much of the workforce. It is common in engineering design for teams to be created for a specific design and members of those teams to move to different projects on completion of that design.

In order to estimate any shortage many factors must be taken into account such as the availability of personnel formerly working on aging asset enhancement, the return of personnel from overseas assignments due to political instability in a number of oil states and nationalisation of positions in more stable countries, and, the possible requirements in other industries – notably nuclear and power infrastructure. Further detailed research into these variables is required.

However, applying the same logic regarding personnel made available by cessation of production as used for onsite personnel (Refer to Appendix 2 for details) a very different scenario appears:

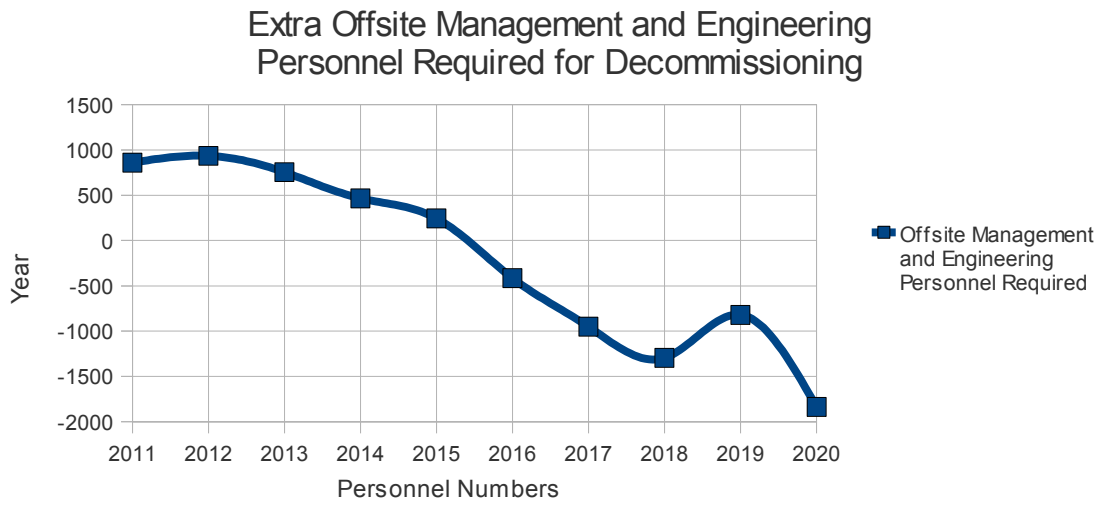

Figure 6 Estimate of extra onsite skilled personnel required

A very short term (4.5 year) deficit peaking after one year at 935 (13.7% of existing workforce) is indicated. Although locating over 900 professional personnel is unlikely to be an easy task the shortfall is not believed to indicate a crisis.

4.2.4 Personnel demographics

Detailed tabulated data, methodology and calculations are included in Appendix 3.

Data applicable to demographic trends is available from the Oil & Gas UK annual UKCS workforce demographics reports.

For the purpose of analysis the data available from these reports is grouped as follows:

Onsite crafts = riggers and scaffolders
Onsite Technicians = electrical, maintenance, mechanical, production and wellsite services technicians
Onsite semi-skilled = crane drivers

Not all skills are included in the data available so actual numbers do not match previous figures. However, in this particular analysis it is the trend rather than the numbers which is important.

Occupation		۱۸-۲۳	۲۴-۲۹	۳۰-۳۴	۳۵-۳۹	۴۰-۴۴	۴۵-۴۹	۵۰-۵۴	۵۵-۵۹	۶۰-۶۴
Onsite Craftsperson	۲۰۰۶	۲۱	۷۳	۹۶	۱۱۹	۱۳۸	۱۲۳	۸۷	۷۷	۴۳
	۲۰۰۷	۲۰	۸۵	۶۶	۱۰۶	۱۴۳	۱۲۵	۹۴	۶۷	۵۲
	۲۰۰۸	۲۱	۹۲	۸۰	۱۰۱	۱۳۴	۱۲۶	۹۱	۶۵	۴۸
	۲۰۰۹	۳۳	۱۱۷	۱۰۱	۱۲۹	۱۵۶	۱۴۴	۱۰۹	۷۳	۵۴

Occupation		۱۸-۲۳	۲۴-۲۹	۳۰-۳۴	۳۵-۳۹	۴۰-۴۴	۴۵-۴۹	۵۰-۵۴	۵۵-۵۹	۶۰-۶۴
Onsite Technicians	۲۰۰۶	۵۰	۱۷۰	۱۵۴	۱۵۳	۱۶۴	۱۵۴	۱۴۲	۹۷	۴۰
	۲۰۰۷	۴۵	۱۸۹	۱۵۰	۱۵۲	۱۵۴	۱۵۲	۱۳۶	۹۹	۴۶
	۲۰۰۸	۴۷	۱۹۶	۱۴۸	۱۵۱	۱۵۰	۱۵۱	۱۳۴	۹۹	۴۷
	۲۰۰۹	۶۹	۲۳۵	۱۷۰	۱۷۷	۱۷۴	۱۷۱	۱۵۳	۱۱۰	۵۲

Occupation		۱۸-۲۳	۲۴-۲۹	۳۰-۳۴	۳۵-۳۹	۴۰-۴۴	۴۵-۴۹	۵۰-۵۴	۵۵-۵۹	۶۰-۶۴
Onsite Semi Skilled	۲۰۰۶	۰	۷	۲۷	۵۹	۷۰	۸۷	۵۲	۳۹	۳۰
	۲۰۰۷	۰	۸	۲۸	۵۱	۶۹	۸۳	۶۱	۳۶	۳۷
	۲۰۰۸	۳	۱۱	۲۶	۴۷	۷۲	۷۶	۵۹	۴۵	۳۳
	۲۰۰۹	۱	۱۱	۲۲	۴۱	۶۷	۷۰	۵۰	۴۴	۲۶

Table 2 OGUK age range data

In graphical format the results are:

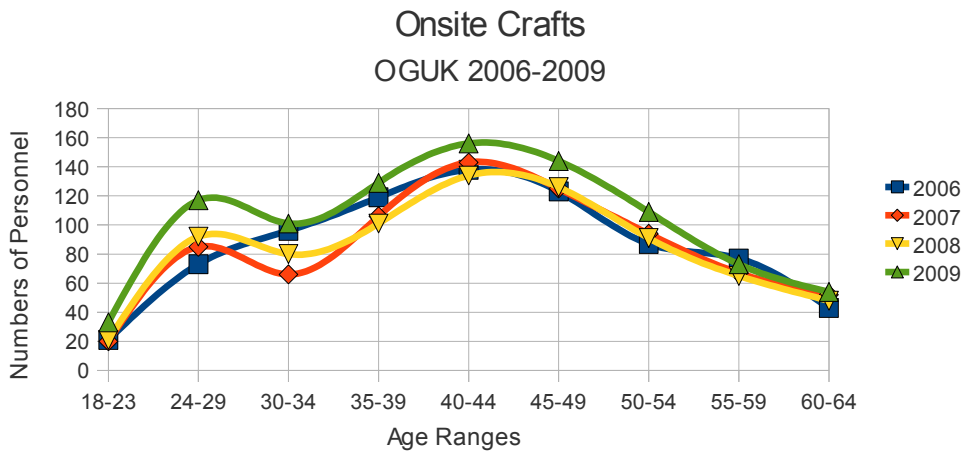

Figure 6 Onsite crafts personnel demographics for 2006 to 2009

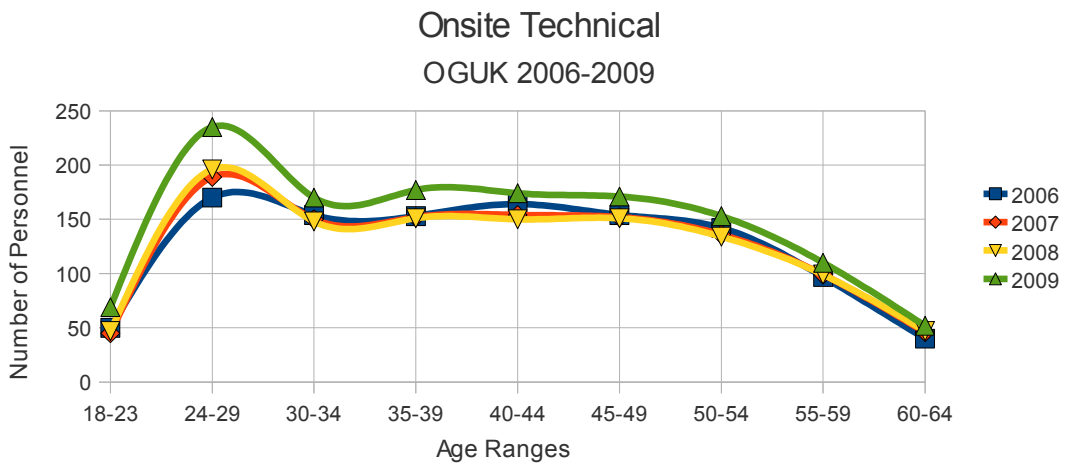

Figure 7 Onsite technical personnel demographics for 2006 to 2009

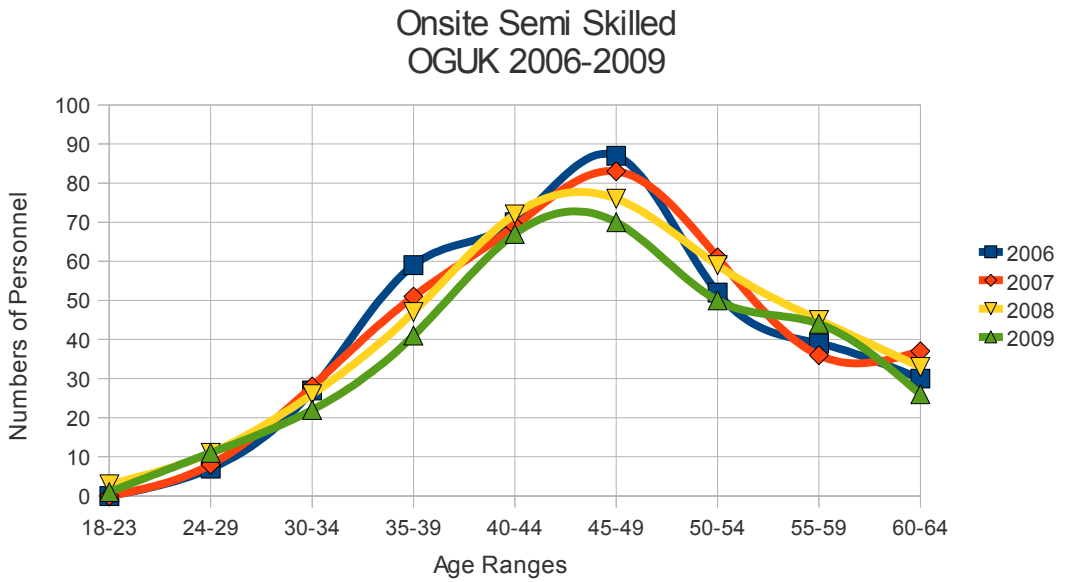

Figure 8 Onsite semi-skilled personnel demographics for 2006 to 2009

This indicates that from 2006 to 2009 the peak age of onsite craftspeople was fairly stable at approximately 41, technical personnel at 31 and semi-skilled personnel falling from 48 to 46.

Data available from the OPITO survey provides a slightly different landscape. OPITO data categories differ to those used by OGUK. Only the technical skills are indicated

here.

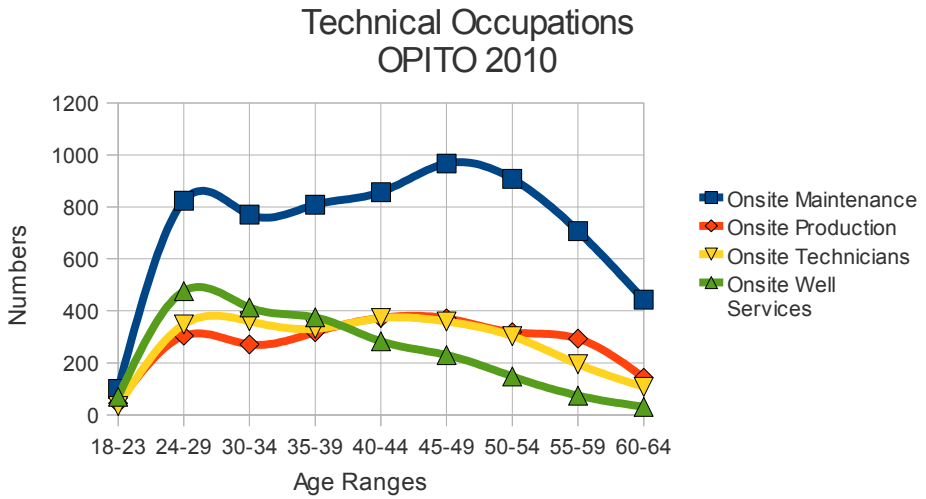

Figure 9 OPITO onsite personnel 2010 demographic

For technical personnel this indicates a general peak age of around 26 with a maintenance personnel peak at 46. It may be that semi-skilled personnel are included in the OPITO definition of maintenance personnel.

Despite the slight differences between information gathered by different sources there is little movement from 2006 to 2010 in personnel demographics.

Less detailed information is available for offsite personnel. However, respondents to the OPITO survey (RGU, 2010) advised that 74.4% of professional engineers and 58.6% of engineers are younger than 45 years of age. Only in the field of management is a demographic concern indicated, with 45.1% under 45 years of age, however, as personnel tend to move into management later in their careers the demographic figures are perhaps not truly indicative of a future skill gap.

These statistics indicate that the concerns regarding skills gaps due an aging workforce can be dismissed for the 20 year period of decommissioning considered. However, to maintain this scenario, attracting young people and training of new personnel must be continued.

4.2.5 Potential personnel in training

Assessing accurately the exact numbers of personnel in training against those required for the decommissioning phase in the North Sea and taking into account other industry requirements opens up the opportunity for further in depth research.

Both the ECITB and EngineeringUK indicate that good progress has been made in attracting young people to technology and in “upskilling” of existing personnel over recent years. Both bodies indicate sufficient supply to meet this base needs of the engineering industries with, perhaps, a minimal undersupply. However, it appears that the requirements of UKCS decommissioning were not included in these calculations. It is suggested that further work in training technician level personnel is critical to a successful decommissioning phase.

5. Conclusions

The objectives of the research, by means of analysis of collated data, were:

1. To determine the main artisan and engineering skill sets required to meet the needs of the planned decommissioning over the next 20 years.

2. To assess and estimate numbers of personnel with those skills required per anum over the next 20 years.

3. To determine the current demographic trends affecting skilled personnel.

4. To determine the numbers of potential personnel in training to attain the necessary skills.

Taking each of these objectives in turn:

1. There is general agreement from training bodies and the industry in general that the skill sets for both onsite and offsite personnel for the decommissioning phase do not differ significantly from those required for the ongoing production phase. No new skill set requirements are envisaged.

2. The estimated skills shortages for onsite and offsite personnel differ greatly both in numbers and in variance over the 10 year period considered.

   For onsite – largely skilled - personnel the extra number required varies between 1240 and 5180 dependent on year. This indicates an additional requirement of 12.5% and 52.3% of existing onsite workforce - an average 3200 (32%) increase in personnel for the initial 10 year period of decommissioning is indicated. It should be noted that these figures indicate the numbers of skilled personnel required over and above the numbers required for continuation of base operations. The figures take account, in as far as possible, the numbers of personnel made available by cessation of production on structures undergoing decommissioning. However, no accurate data is available for personnel required for new ventures.

   For offsite – largely professional – the outlook is very different. Following an initial peak shortfall of 935 (13.7%) the extra numbers required falls off sharply until, in the 5th year the shortfall is non-existent. It has been noted that for the offsite personnel the actual effect of any gap is difficult to assess accurately from data available. The majority of offsite personnel are involved in designing the project and are largely engineers and designers. It is common in engineering design for teams to be created for a specific design and members of those teams to move to different projects on completion of that design.

Given the peripatetic nature of much of the workforce and taking into account the availability of personnel formerly working on aging asset enhancement, the probable return of personnel from overseas assignments due to political instability in a number of oil states and nationalisation of positions in more stable countries, further research into this specific area is required to provide any meaningful figures.

In addition it must be noted that the size of any shortage is largely dependent on the scheduling of decommissioning. No accurate data regarding the planned dates of decommissioning exist. The desire of operators to decommission is highly dependent on oil price and may be affected by the recent introduction of a 12% "windfall" tax by the UK Government.

A method suggested to prevent sudden short term skills gaps is for cooperation between the many parties involved in decommissioning to be encouraged to control the dates of decommissioning thereby allowing only the number of structures for which personnel are available to be decommissioned in any year. Failing cooperation government intervention may be required.

Finally, the possible requirements in other industries – notably nuclear and power infrastructure – may affect the numbers of experienced, skilled personnel available. To take the concept of reducing peaks further, co-operation between the oil & gas, nuclear and power infrastructure industries could be considered.

3. The myth of the aging UKCS workforce is disproved

ECITB demographic data for 2006 to 2009 indicates the peak age of onsite craftspeople was fairly stable at approximately 41, technical personnel at 31 and semi-skilled personnel falling from 48 to 46. OPTIO data for 2010 for onsite technical personnel indicates a general peak age of around 26 with a maintenance personnel peak at 46. It is assumed that semi-skilled personnel are included in the OPITO definition of maintenance personnel.

For offsite personnel the OPITO survey (RGU, 2010) advised that 74.4% of professional engineers and 58.6% of engineers are younger than 45 years of age. Only in the field of management is a demographic concern indicated, with 45.1% under 45 years of age, however, as personnel tend to move into management later in their careers the demographic figures are perhaps not truly indicative of a future skill gap.

Thus there are no demographically based concerns regarding skills gaps in the foreseeable future.

4. From the data available from the ECITB and EngineeringUK the numbers of

personnel in training appear at this time would appear to be sufficient to fulfill general requirements. This is largely due to the great efforts made to attract young people to technical and engineering disciplines over the last decade. However, the estimates used do not appear to take account of the large numbers of onsite personnel required for the decommissioning phase in the North Sea. Further effort will be required to provide the necessary places and apprenticeships to train the extra personnel needed.

6. Recommendations

1. The primary and most important recommendation is for research resulting in a more accurate estimate of the schedule for UKCS decommissioning. Without an accurate estimate of dates it remains impossible to accurately asses the numbers of personnel required.

2. A more accurate estimate of the numbers of personnel required for the decommissioning of each type of structure is required taking account of relatively recently introduced environmental considerations.

3. Further research into the availability of the largely peripatetic offsite engineering and design workforce would assist in estimating future, possible skills gaps.

4. Data on existing training programmes indicate that they are successful. However, in order to provide skilled personnel for the decommissioning phase in the North Sea further work in this area is required. Continued investment in attracting young people into careers in engineering is recommended.

5. The peaks in numbers of personnel required caused by decommissioning of multiple structures simultaneously may be mitigated. With cooperation of the many parties involved it may be possible to limit the numbers of structures decommissioned in any year thereby smoothing the peaks.

6. The final concern is that other industries, notably nuclear and power infrastructure, are likely to see increased requirements for skilled engineering personnel within the same timeframe. In addition to continuation of the sterling work of the ECITB and others in attracting personnel to engineering and upskilling those within the industry methods must be investigated to retain existing skilled and professional personnel. Whilst detailed recommendations regarding personnel recommendations are outwith the scope of this report it may be of use to the UK companies to look at the remuneration packages offered by their mainland Europe counterparts and other governments attitudes to taxation of skilled and professional engineering personnel. In addition, given the rapidly increasing costs of further education, it may benefit the industry to consider sponsorship of students and apprentices.

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Appendices

Appendix 1
Onsite Personnel Requirements

1.1 ECITB Data

This data was taken from the ECITB, Strategic and Suitability Review (Quinquennial Review) 2010 and the ECTIB Manpower Forecasts.

The first data provided is the percentage share of the entire workforce employed in the different engineering sectors.

This indicates that the Upstream Offshore requirement remains fairly static at around 30% for the foreseeable future. However, it must be noted that this figure may be affected if the UK government continues with plans to decommission existing and build new nuclear power plants and overhaul the entire UK electrical power system.

Sector	% Share at 2008	% Share at 2009	% Share at 2010	% Share at 2011	% Share at 2012	% Share at 2013	% Share at 2014	% Share at 2015	% Share at 2016	% Share at 2017	% Share at 2018	% Share at 2019	% Share at 2020
Power Generation	١٢%	١٢%	١٢%	١٢%	١٢%	١٢%	١٢%	١٣%	١٢%	١٢%	١٢%	١٢%	١٢%
Upstream Offshore (Oil & Gas)	٢٩%	٢٩%	٢٩%	٢٩%	٢٩%	٣٠%	٣٠%	٣٠%	٣١%	٣٠%	٢٩%	٢٨%	٢٧%
Downstream (Oil & Gas)	١٧%	١٧%	١٩%	١٩%	١٩%	١٩%	١٩%	١٩%	١٥%	١٥%	١٥%	١٣%	١٣%
Chemical & Pharmaceuticals	١٢%	١٢%	١١%	١١%	١١%	١١%	١١%	١١%	١١%	١١%	١١%	١٠%	١٠%
Steel & Metal Smelting	٣%	٣%	٣%	٣%	٣%	٣%	٣%	٣%	٣%	٣%	٣%	٣%	٣%
Nuclear	٧%	٧%	٨%	٨%	٨%	٨%	٨%	٩%	١٠%	١٢%	١٣%	١٩%	١٨%
Renewables	١%	١%	١%	١%	١%	١%	١%	١%	١%	٢%	٢%	٣%	٣%
Other	١٩%	١٩%	١٧%	١٧%	١٧%	١٩%	١٩%	١٩%	١٩%	١٣%	١٣%	١٣%	١٣%
Total Workforce	١٠٠%	١٠٠%	١٠٠%	١٠٠%	١٠٠%	١٠٠%	١٠٠%	١٠٠%	١٠٠%	١٠٠%	١٠٠%	١٠٠%	١٠٠%

Table A1:1

The ECITB then provides a breakdown of types of personnel:

Occupation	% Share at 2008
Onsite Craftsperson	١٨%
Onsite Management & Professional	٨%
Onsite Engineers	٢%
Onsite Technicians	٩%
Onsite Semi Skilled	□%
Onsite Other	□%
Offsite Craftsperson	□%
Offsite Management & Professional	٩%
Offsite Engineers	٢٥%
Offsite Other	١٨%

Table A1:2

The manpower forecast to 2020 is provided. Assuming the percentage of skilled onsite personnel does not change from those calculated for 2008, the number of skilled onsite personnel required per anum to 2020 is calculated.

Year	Sector	%Share at 2008	Manpower at 2008	No Recruitment Since 2008	Required Manpower Forecast	Onsite Skilled
٢٠٠٩	Upstream Offshore (Oil & Gas)	٢٩%	٢١,٣٧٢	٢٠,٠٩٠	٢١,٥٠٥	٧,٩٥٧
٢٠١٠				١٨,٨٨٤	٢١,٦٣٩	٨,٠٠٦
٢٠١١				١٧,٧٥١	٢١,٨٣٩	٨,٠٨٠
٢٠١٢				١٦,٦٨٦	٢٢,٠٤٠	٨,١٥٥
٢٠١٣				١٥,٦٨٥	٢٢,٥٧٤	٨,٣٥٢
٢٠١٤				١٤,٧٤٤	٢٣,١٠٨	٨,٥٥٠
٢٠١٥				١٣,٨٥٩	٢٣,٦٤٣	٨,٧٤٨
٢٠١٦				١٣,٠٢٨	٢٤,١٧٧	٨,٩٤٥
٢٠١٧				١٢,٢٤٦	٢٤,٣١١	٨,٩٩٥
٢٠١٨				١١,٥١١	٢٤,٤٤٤	٩,٠٤٤
٢٠١٩				١٠,٨٢١	٢٤,٦٤٤	٩,١١٨
٢٠٢٠				١٠,١٧١	٢٤,٨٤٥	٩,١٩٣

* % share at ٢٠٠٨ is based on onsite workforce as at spot date

* Annual - ٤% of workforce is lost due to retirement, ٢% of workforce is lost due to other reasons – annual manpower rate falls at ٦%

* It is assumed that personnel recruited after ٢٠٠٨ do not retire by ٢٠٢٠ - an annual loss of ٢% is calculated on each group recruited

Note: Skilled onsite = Crafts, M&P, Engineers, Technicians = ٣٧% of manpower

Table A1:3

This data, presented in a more user-friendly graphical format, indicates a gradual increase in numbers required.

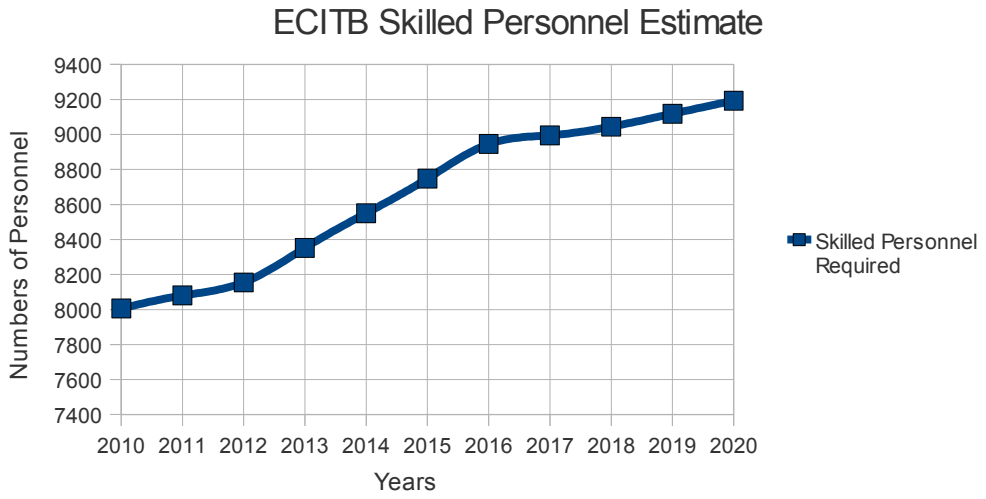

Figure A1:1

The gradual increase in numbers of personnel required is based on the following theoretical assumptions:

1. Status quo prevails in the existing UKCS infrastructure. No account is taken of major decommissioning, demanning or upgrade campaigns.
2. New ventures require a 1-2% increase in personnel per anum.

1.2 Scottish Enterprise Data

This data was taken from the Scottish Enterprise, 2009, Report on industry consultation, North Sea Decommissioning Supply Chain Steering Group, April 2009.

The estimated number of structures to be decommissioned, as per the 2005 plan, are provided:

Structure Type	٢٠٠٨	٢٠٠٩	٢٠١٠	٢٠١١	٢٠١٢	٢٠١٣	٢٠١٤	٢٠١٥	٢٠١٦	٢٠١٧	٢٠١٨	٢٠١٩	٢٠٢٠
Large Steel and Concrete	٠	٢	١	٠	١	٣	٣	٤	٣	٠	٤	٣	٠
Small Steel	٤	٣	١٤	٤	١٥	٥	٨	٧	١٨	١٣	١٢	١٢	٨
Subsea	٧	١٢	٨	١٨	٨	١٠	٥	٣	٤	٥	٤	١	٣
Other	٥	٢	١	٠	٤	٢	١	١	٦	٣	٤	١	٠
Total	١٦	١٩	٢٤	٢٢	٢٨	٢٠	١٧	١٥	٣١	٢١	٢٤	١٧	١١

Table A1:4

An average of the numbers of personnel estimated for each structure type is calculated, from data provided "required offshore resources 100-300 multi-skilled operators on each rotation" (Scottish Enterprise, 2009 : Decommissioning break down structure page 8).

Structure Type	Skilled Personnel
Large Steel and Concrete	٤٠٠
Small Steel	٣٠٠
Subsea	٢٠٠
Other	٢٠٠

Table A1:5

Using these two sets of data the number of personnel required is calculated (arithmetic multiplication of structure number and personnel number):

Personnel Required for Decommissioning	٢٠٠٨	٢٠٠٩	٢٠١٠	٢٠١١	٢٠١٢	٢٠١٣	٢٠١٤	٢٠١٥	٢٠١٦	٢٠١٧	٢٠١٨	٢٠١٩	٢٠٢٠
Skilled Personnel (Majority Onsite)	٠٠	٠٠	٦٤٠٠	٤٨٠٠	٧٣٠٠	٥١٠٠	٤٨٠٠	٤٥٠٠	٨٦٠٠	٥٥٠٠	٦٨٠٠	٥٢٠٠	٣٠٠٠

Table A1:6

These figures are then delayed by three years (no verifiable reason exists for the choice of three years other than much of the decommissioning planned in 2005 has not yet occurred) – accurate dates for decommissioning remain unknown).

Modified Personnel Required for Decommissioning	٢٠١١	٢٠١٢	٢٠١٣	٢٠١٤	٢٠١٥	٢٠١٦	٢٠١٧	٢٠١٨	٢٠١٩	٢٠٢٠
Skilled Personnel Required	٣٦٠٠	٤٥٠٠	٦٤٠٠	٤٨٠٠	٧٣٠٠	٥١٠٠	٤٨٠٠	٤٥٠٠	٨٦٠٠	٥٥٠٠

Table A1:7

Presented graphically:

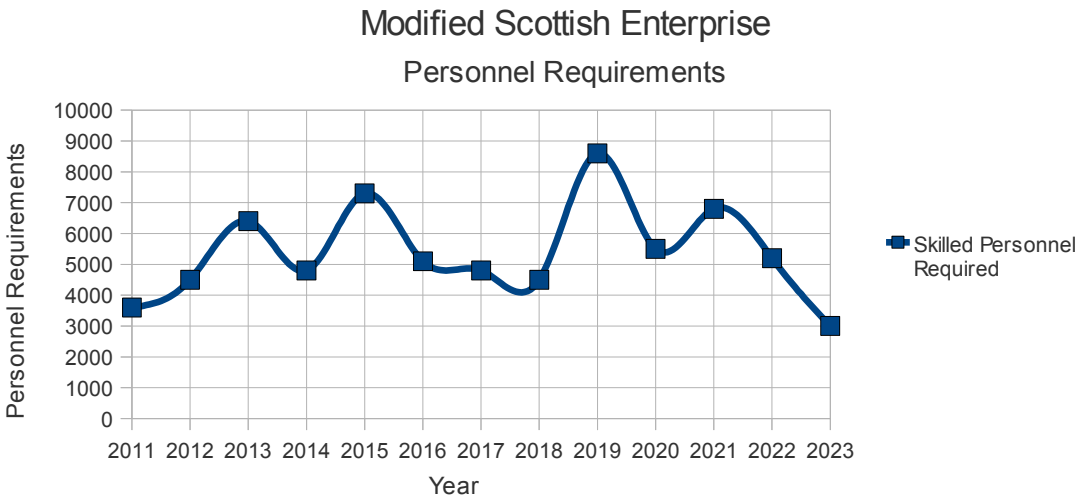

Figure A1:2

1.3 Comparison

The ECITB and Scottish Enterprise data provide very different pictures of future demand.

Utilising both sets of data and accounting for effects of "demanning" a proposed future landscape is proposed.

As production ceases the personnel employed to operate the "structure" will become available for redeployment. In order to take this into account it was assumed that approximately 22000 personnel were employed over 500 manned structures (and maintenance of unmanned structures). From ECTIB data 45% of these personnel are based onsite. Therefore an average of 20 onsite personnel are made available by the closure of one structure. The effect is cumulative and reduces excess personnel required.

Personnel made available by closure of structures	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of structures	16	19	24	22	28	20	17	15	31	21
Onsite skilled personnel numbers	320	380	480	440	560	400	340	300	620	420
Cumulative Effect	320	700	1180	1620	2180	2580	2920	3220	3840	4260

Excess Personnel Required for Decommissioning	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Skilled Personnel Required	3280	3800	5220	3180	5120	2520	1880	1280	4760	1240

Table A1:8

In graphical format:

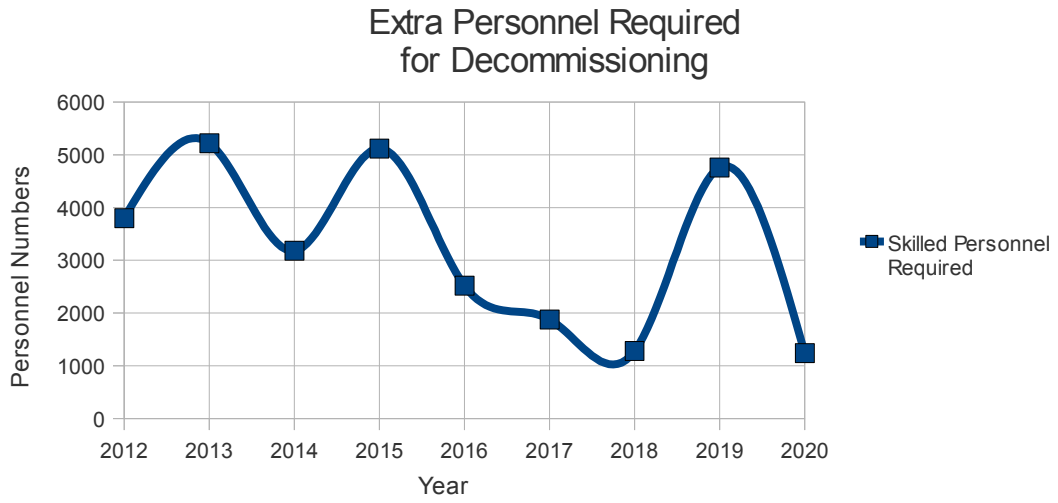

Figure A1:3

A significant variation in extra personnel requirements is indicated over the 10 year

period. However, the more important result is an average 3,200 person shortage per anum over a 10 year period. This approximates to a required increase of one third of the existing workforce.

Appendix 2
Offsite Personnel Requirements

2.1 ECITB Data

This data was taken from the ECITB, Strategic and Suitability Review (Quinquennial Review) 2010 and the ECTIB Manpower Forecasts.

The first data provided is the percentage share of the entire workforce employed in the different engineering sectors.

This indicates that the Upstream Offshore requirement remains fairly static at around 30% for the foreseeable future. However, it must be noted that this figure may be affected if the UK government continues with plans to decommission nuclear power plants and overhaul the entire UK electrical power system.

Sector	% Share at 2008	% Share at 2009	% Share at 2010	% Share at 2011	% Share at 2012	% Share at 2013	% Share at 2014	% Share at 2015	% Share at 2016	% Share at 2017	% Share at 2018	% Share at 2019	% Share at 2020
Power Generation	14%	14%	14%	14%	14%	14%	14%	13%	12%	12%	12%	12%	12%
Upstream Offshore (Oil & Gas)	29%	29%	29%	29%	29%	30%	30%	30%	31%	30%	29%	28%	27%
Downstream (Oil & Gas)	17%	17%	16%	16%	16%	16%	16%	16%	15%	15%	15%	14%	13%
Chemical & Pharmaceuticals	12%	12%	11%	11%	11%	11%	11%	11%	11%	11%	11%	10%	10%
Steel & Metal Smelting	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Nuclear	7%	7%	8%	8%	8%	8%	8%	9%	10%	12%	13%	16%	18%
Renewables	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	3%	3%
Other	16%	16%	17%	17%	17%	16%	16%	16%	16%	14%	14%	13%	13%
Total Workforce	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table A2:1

The ECITB then provides a breakdown of types of personnel:

Occupation	% Share at 2008
Onsite Craftsperson	18%
Onsite Management & Professional	8%
Onsite Engineers	2%
Onsite Technicians	9%
Onsite Semi Skilled	7%
Onsite Other	1%
Offsite Craftsperson	2%
Offsite Management & Professional	9%
Offsite Engineers	25%
Offsite Other	18%

Table A2:2

The manpower forecast to 2010 is provided. From these figures the number of skilled offsite personnel is calculated assuming the percentage breakdown to be the same as that in 2008.

Year	Sector	% Share at 2008	Manpower at 2008	No Recruitment Since 2008	Required Manpower Forecast	Offsite Skilled
2009	Upstream Offshore (Oil & Gas)	29%	21,372	20,090	21,505	7,312
2010				18,884	21,639	7,357
2011				17,751	21,839	7,425
2012				16,686	22,040	7,494
2013				15,685	22,574	7,675
2014				14,744	23,108	7,857
2015				13,859	23,643	8,039
2016				13,028	24,177	8,220
2017				12,246	24,311	8,266
2018				11,511	24,444	8,311
2019				10,821	24,644	8,379
2020				10,171	24,845	8,447

Table A2:3

The data is then presented in a more user-friendly graphical format:

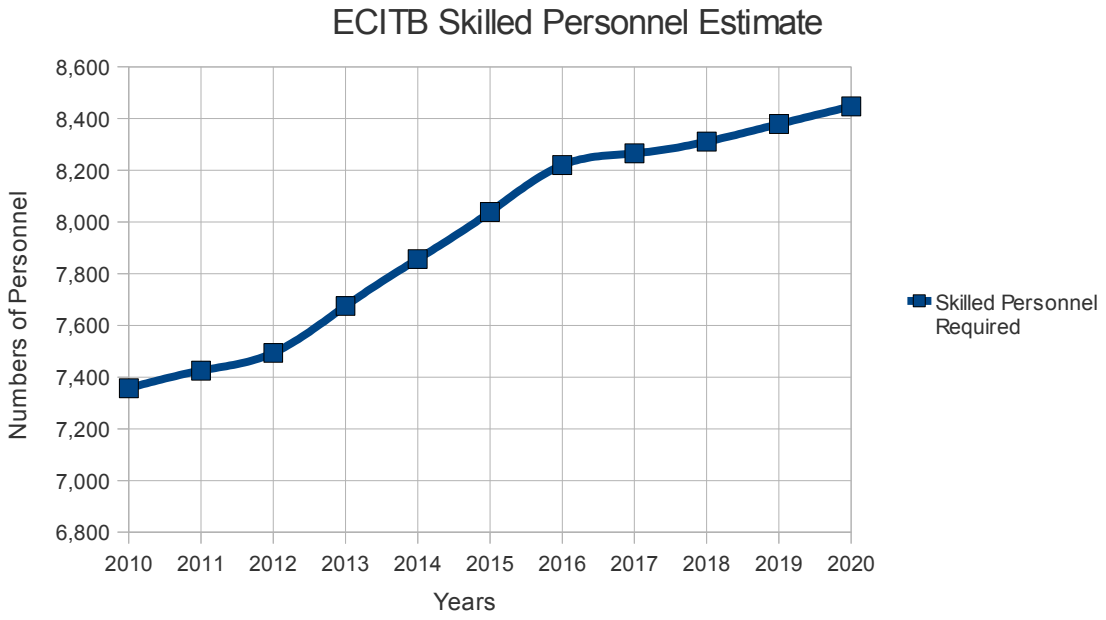

Figure A2:1

2.2 Scottish Enterprise Data

This data was taken from the Scottish Enterprise, 2009, Report on industry consultation, North Sea Decommissioning Supply Chain Steering Group, April 2009.

The estimated number of structures to be decommissioned, as per the 2005 plan, are provided:

Structure Type	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Large Steel and Concrete	0	2	1	0	1	3	3	4	3	0	4	3	0
Small Steel	4	3	14	4	15	5	8	7	18	13	12	12	8
Subsea	7	12	8	18	8	10	5	3	4	5	4	1	3
Other	5	2	1	0	4	2	1	1	6	3	4	1	0
Total	16	19	24	22	28	20	17	15	31	21	24	17	11

Table A2:4

An average of the numbers of personnel estimated for each structure type is calculated:

Structure Type	Graduate Engineers
Large Steel and Concrete	100
Small Steel	60
Subsea	80
Other	60

Table A2:5

Using these two sets of data the number of personnel required is calculated (arithmetic multiplication of structure number and personnel number):

Personnel Required for Decommissioning	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Graduate Engineers (Majority Offsite)	1600	1460	1640	1680	1880	1520	1240	1120	2060	1360	1680	1160	720

Table A2:6

An assumption is made, for ease of calculation, that each structure requires the personnel for one calendar year.

These figures are then delayed by three years (no verifiable reason exists for the choice of three years – accurate dates for decommissioning remain unknown).

Modified Personnel Required for Decommissioning	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Graduate Engineers	1100	1460	1640	1680	1880	1520	1240	1120	2060	1360

Table A2:7

Presented graphically:

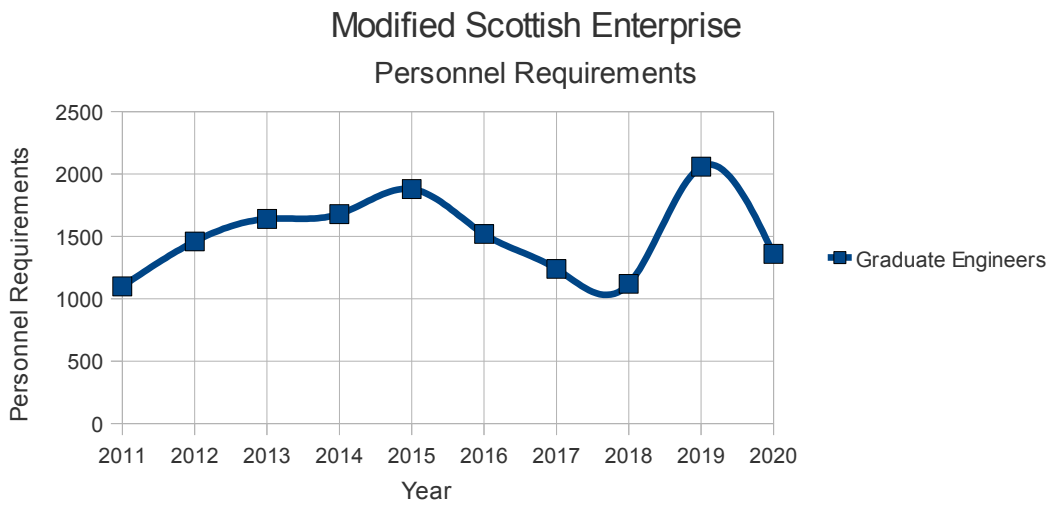

Figure A2:2

By the same argument used to take account of personnel made available due to cessation of production it was assumed that approximately 22000 personnel were employed over 500 manned structures (and maintenance of unmanned structures). From ECTIB data 34% of these personnel are management, professional and engineering personnel based offsite. Therefore an average of 15 offsite personnel are made available by the closure of one structure. The effect is cumulative and reduces excess personnel required.

Personnel made available by closure of structures	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of structures	16	19	24	22	28	20	17	15	31	21
Offsite skilled personnel numbers	240	285	360	330	420	300	255	225	465	315
Cumulative Effect	240	525	885	1215	1635	1935	2190	2415	2880	3195

Excess Personnel Required for Decommissioning	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Offsite Management and Engineering Personnel Required	860	935	755	465	245	-415	-950	-1295	-820	-1835

Table A2:8

In graphical format:

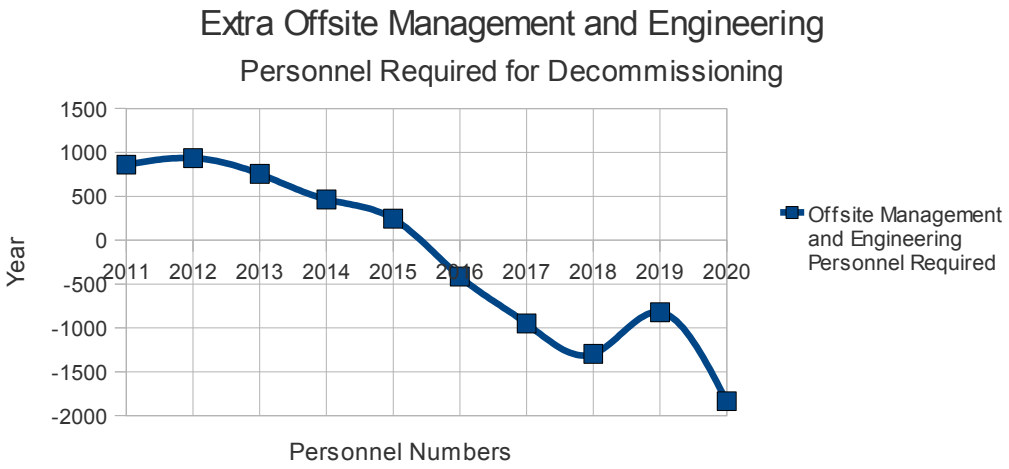

Figure A2:3

This indicates a very different scenario than for onsite personnel requirements. A very short term (5 year) excess requirement peaking at 935 (13.7% of existing workforce) is indicated.

Appendix 3
Personnel Demographics

Onsite Personnel

In order to investigate the effects of demographics on the onsite workforce data has been collated from Oil & Gas UK UKCS Workforce Demographics Reports for 2006, 2007, 2008 and 2009. These are then compared with the data provided for 2010 from the OPITO, 2010, MIST Statistical Analysis.

The percentage of personnel for each group of personnel for each of the four years was extracted from the reports. In order to provide more easily read graphs these percentages were converted into personnel numbers using the overall number of each type of personnel onsite for 100+ days.

In view of the availability of information regarding the personnel requirements for decommissioning only the craftspeople, technicians and semi-skilled personnel are considered.

Due to the skills considered in the available reports the actual numbers indicated are somewhat irrelevant in comparison to total numbers required, however, the age trends are indicative for overall numbers.

The extraction and manipulation of the data results in the following:

Occupation		18-23	24-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Onsite Craftsperson	2006	21	73	96	119	138	123	87	77	43
	2007	20	85	66	106	143	125	94	67	52
	2008	21	92	80	101	134	126	91	65	48
	2009	33	117	101	129	156	144	109	73	54

Occupation		18-23	24-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Onsite Technicians	2006	50	170	154	153	164	154	142	97	40
	2007	45	189	150	152	154	152	136	99	46
	2008	47	196	148	151	150	151	134	99	47
	2009	69	235	170	177	174	171	153	110	52

Occupation		18-23	24-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Onsite Semi Skilled	2006	0	7	27	59	70	87	52	39	30
	2007	0	8	28	51	69	83	61	36	37
	2008	3	11	26	47	72	76	59	45	33
	2009	1	11	22	41	67	70	50	44	26

Table A3:1

These tables are provided graphically within the body of the report.

For the purpose of completeness the full tables of data extracted are included at the end of this appendix.

The OPITO data is for 2010 only and based on personnel who have completed MIST training. OPITO data for similar skill sets is:

OPITO 2010 %

Occupation	18-23	24-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Onsite Maintenance	99	824	770	808	857	967	908	707	443
Onsite Production	45	304	271	318	373	371	318	293	143
Onsite Technicians	34	348	360	331	372	359	303	195	108
Onsite Well Services	69	476	413	375	283	230	148	74	31

Table A3:2

Again, graphical representation is provided in the body of the report.

ETICB figures for 2006.

2006	18-23	24-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Onsite Crafts									
Riggers	2.14	6.87	7.76	13.84	13.75	17.32	13.30	14.28	9.02
	13	42	47	85	84	106	81	87	55
Scaffolders	3.03	11.12	15.54	16.36	20.56	15.08	10.00	7.12	3.28
	28	104	145	153	192	141	93	67	31
Average	**2.6**	**9.0**	**11.7**	**15.1**	**17.2**	**16.2**	**11.7**	**10.7**	**6.2**
	21	**73**	**96**	**119**	**138**	**123**	**87**	**77**	**43**
Onsite Management & Professional									
Management	0.27	0.81	6.35	10.81	19.18	24.46	23.51	12.16	3.24
OIM	0.00	0.00	0.93	7.91	16.43	23.87	21.08	17.05	6.05
Average	**0.1**	**0.4**	**3.6**	**9.4**	**17.8**	**24.2**	**22.3**	**14.6**	**4.6**
Onsite Technical									
Electrical	3.45	11.59	11.06	12.30	13.81	15.75	15.00	11.50	4.51
	47	157	150	167	187	214	204	156	61
Maintenance	3.52	18.79	14.62	14.62	14.72	12.31	10.66	7.36	2.86
	50	267	208	208	209	175	151	105	41
Mechanical	3.57	11.34	10.71	11.43	13.30	16.16	15.26	11.52	5.71
	30	95	90	96	112	136	128	97	48
Production	4.68	13.15	13.87	13.60	16.57	13.78	13.37	7.29	3.15
	75	210	222	217	265	220	214	117	50
Wellsite Services	10.54	27.44	23.10	17.21	10.54	6.20	2.79	2.17	0.00
	46	121	102	76	46	27	12	10	0
Average	**5.2**	**16.5**	**14.7**	**13.8**	**13.8**	**12.8**	**11.4**	**8.0**	**3.2**
	50	**170**	**154**	**153**	**164**	**154**	**142**	**97**	**40**
Onsite Semi Skilled									
Crane Driver	0.00	1.78	7.22	15.56	18.44	22.89	13.77	10.33	8.00
	0	7	27	59	70	87	52	39	30
Average	**0.0**	**1.8**	**7.2**	**15.6**	**18.4**	**22.9**	**13.8**	**10.3**	**8.0**
	0	**7**	**27**	**59**	**70**	**87**	**52**	**39**	**30**
Offshore Other									
Deck Crew	1.56	6.89	10.00	15.33	19.56	19.77	14.22	7.33	4.56
Catering	5.53	12.67	10.54	13.75	18.21	16.88	11.69	7.86	3.21
Medical	0.36	4.64	12.95	14.64	18.39	17.67	14.19	11.16	4.91
Average	**2.5**	**8.1**	**11.2**	**14.6**	**18.7**	**18.1**	**13.4**	**8.8**	**4.2**

Table A3:3

ECITB figures for 2007.

2007	18-23	24-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Onsite Crafts									
Riggers	1.69	7.86	6.87	12.50	15.45	16.96	13.48	12.23	10.62
	10	48	42	77	95	104	82	75	65
Scaffolders	3.26	12.97	9.66	14.49	20.56	15.62	11.35	6.40	4.16
	30	121	90	135	192	146	106	60	39
Average	**2.5**	**10.4**	**8.3**	**13.5**	**18.0**	**16.3**	**12.4**	**9.3**	**7.4**
	20	**85**	**66**	**106**	**143**	**125**	**94**	**67**	**52**
Onsite Management & Professional									
Management	0.27	1.22	8.37	9.73	16.48	25.13	24.59	12.56	3.78
OIM	0.00	0.00	0.93	6.51	16.43	21.86	29.76	17.36	6.35
Average	**0.1**	**0.6**	**4.7**	**8.1**	**16.5**	**23.5**	**27.2**	**15.0**	**5.1**
Onsite Technical									
Electrical	2.56	13.72	11.06	11.95	12.83	14.69	14.60	11.50	5.39
	35	186	150	162	174	199	198	156	73
Maintenance	3.57	19.56	15.16	14.39	13.41	12.96	9.78	7.25	2.96
	51	278	215	204	191	184	139	103	42
Mechanical	3.66	13.30	10.89	11.07	12.14	15.53	14.64	12.32	6.34
	31	112	92	93	102	131	123	104	53
Production	4.41	14.86	12.43	13.60	16.31	13.60	12.97	7.84	3.69
	71	238	199	217	261	217	207	125	59
Wellsite Services	9.22	29.76	21.24	18.45	9.61	6.20	3.10	1.55	0.31
	41	131	93	81	42	27	14	7	1
Average	**4.7**	**18.2**	**14.2**	**13.9**	**12.9**	**12.6**	**11.0**	**8.1**	**3.7**
	45	**189**	**150**	**152**	**154**	**152**	**136**	**99**	**46**
Onsite Semi Skilled									
Crane Driver	0.00	2.22	7.33	13.44	18.22	21.78	16.22	9.55	9.78
	0	8	28	51	69	83	61	36	37
Average	**0.0**	**2.2**	**7.3**	**13.4**	**18.2**	**21.8**	**16.2**	**9.6**	**9.8**
	0	**8**	**28**	**51**	**69**	**83**	**61**	**36**	**37**
Offshore Other									
Deck Crew	2.00	10.33	8.55	14.00	16.67	20.67	15.44	8.77	5.44
Catering	5.62	12.86	9.82	13.75	17.86	16.96	12.32	6.96	3.66
Medical	0.54	6.52	12.41	15.71	19.82	16.51	13.21	8.39	5.80
Average	**2.7**	**9.9**	**10.3**	**14.5**	**18.1**	**18.0**	**13.7**	**8.0**	**5.0**

Table A3:4

ECITB figures for 2008.

2008	18-23	24-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Onsite Crafts									
Riggers	1.61	8.66	8.93	11.69	14.91	16.16	14.02	11.25	10.17
	10	53	55	72	91	99	86	69	62
Scaffolders	3.48	14.04	11.23	13.93	18.98	16.40	10.34	6.52	3.65
	33	131	105	130	177	153	97	61	34
Average	**2.5**	**11.4**	**10.1**	**12.8**	**16.9**	**16.3**	**12.2**	**8.9**	**6.9**
	21	**92**	**80**	**101**	**134**	**126**	**91**	**65**	**48**
Onsite Management & Professional									
Management	2.70	2.70	4.46	9.59	17.43	24.86	20.81	14.32	4.32
OIM	0.00	0.00	0.93	7.75	13.33	18.76	31.16	18.76	7.59
Average	**1.4**	**1.4**	**2.7**	**8.7**	**15.4**	**21.8**	**26.0**	**16.5**	**6.0**
Onsite Technical									
Electrical	2.47	15.04	11.68	11.42	12.38	14.25	14.60	11.59	5.31
	34	205	159	156	169	194	199	158	72
Maintenance	3.84	20.44	14.84	13.85	13.07	13.18	9.23	7.03	3.29
	55	290	211	197	186	187	131	100	47
Mechanical	4.02	14.02	10.98	11.43	11.87	15.00	13.84	11.34	5.89
	34	118	92	96	100	126	117	95	50
Production	4.23	14.41	11.80	14.32	15.67	13.78	12.97	8.37	4.14
	68	230	189	229	251	220	207	134	66
Wellsite Services	10.08	30.38	19.84	17.67	10.23	5.89	3.56	1.71	0.15
	44	134	87	78	45	26	16	8	1
Average	**3.8**	**15.7**	**12.2**	**13.1**	**13.7**	**14.0**	**12.7**	**9.3**	**4.6**
	47	**196**	**148**	**151**	**150**	**151**	**134**	**99**	**47**
Onsite Semi Skilled									
Crane Driver	0.67	2.78	6.89	12.44	19.11	20.11	15.44	11.78	8.67
	3	11	26	47	72	76	59	45	33
Average	**0.7**	**2.8**	**6.9**	**12.4**	**19.1**	**20.1**	**15.4**	**11.8**	**8.7**
	3	**11**	**26**	**47**	**72**	**76**	**59**	**45**	**33**
Offshore Other									
Deck Crew	2.88	7.55	8.11	13.55	19.11	17.33	16.67	8.33	5.11
Catering	5.00	13.57	9.91	13.21	16.61	17.14	12.95	7.05	4.19
Medical	0.00	7.23	10.45	16.25	18.57	18.30	13.04	8.04	7.05
Average	**2.6**	**9.5**	**9.5**	**14.3**	**18.1**	**17.6**	**14.2**	**7.8**	**5.5**

Table A3:5

ECTIB Figures for 2009.

2009	18-23	24-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Onsite Crafts									
Riggers	1.69	9.11	9.11	12.86	14.73	15.36	14.38	10.80	9.55
	12	63	63	89	102	106	99	75	66
Scaffolders	4.61	14.61	11.91	14.49	17.97	15.45	10.11	6.07	3.59
	54	171	140	170	211	181	119	71	42
Average	**3.2**	**11.9**	**10.5**	**13.7**	**16.4**	**15.4**	**12.2**	**8.4**	**6.6**
	33	**117**	**101**	**129**	**156**	**144**	**109**	**73**	**54**
Onsite Management & Professional									
Management	0.27	2.97	5.13	12.29	20.13	22.43	19.32	12.97	3.78
OIM	0.00	0.31	2.33	5.89	15.50	18.60	30.85	19.22	6.20
Average	**0.1**	**1.6**	**3.7**	**9.1**	**17.8**	**20.5**	**25.1**	**16.1**	**5.0**
Onsite Technical									
Electrical	3.72	15.66	12.30	11.68	12.47	13.54	14.07	10.62	4.77
	57	241	189	180	192	208	217	163	73
Maintenance	5.49	21.65	14.06	14.28	12.74	12.53	9.01	6.59	2.86
	94	372	241	245	219	215	155	113	49
Mechanical	4.91	14.82	10.71	11.25	11.43	15.26	13.66	11.43	5.45
	49	147	106	112	113	152	136	113	54
Production	5.04	14.77	11.62	14.14	16.22	13.24	12.97	8.02	4.41
	95	278	218	266	305	249	244	151	83
Wellsite Services	11.16	29.76	20.31	18.06	9.30	6.20	2.94	1.71	0.39
	52	138	94	84	43	29	14	8	2
Average	**6.1**	**19.3**	**13.8**	**13.9**	**12.4**	**12.2**	**10.5**	**7.7**	**3.6**
	69	**235**	**170**	**177**	**174**	**171**	**153**	**110**	**52**
Onsite Semi Skilled									
Crane Driver	0.33	3.22	6.55	12.11	19.78	20.78	14.89	13.11	7.78
	1	11	22	41	67	70	50	44	26
Average	**0.3**	**3.2**	**6.6**	**12.1**	**19.8**	**20.8**	**14.9**	**13.1**	**7.8**
	1	**11**	**22**	**41**	**67**	**70**	**50**	**44**	**26**
Offshore Other									
Deck Crew	4.00	8.33	9.33	11.55	18.11	18.00	15.78	8.33	5.33
Catering	4.82	13.39	10.17	13.93	16.34	16.96	13.04	6.78	3.93
Medical	0.00	7.86	10.71	16.61	18.03	16.61	13.57	9.19	6.87
Average	**2.9**	**9.9**	**10.1**	**14.0**	**17.5**	**17.2**	**14.1**	**8.1**	**5.4**

Table A3:6