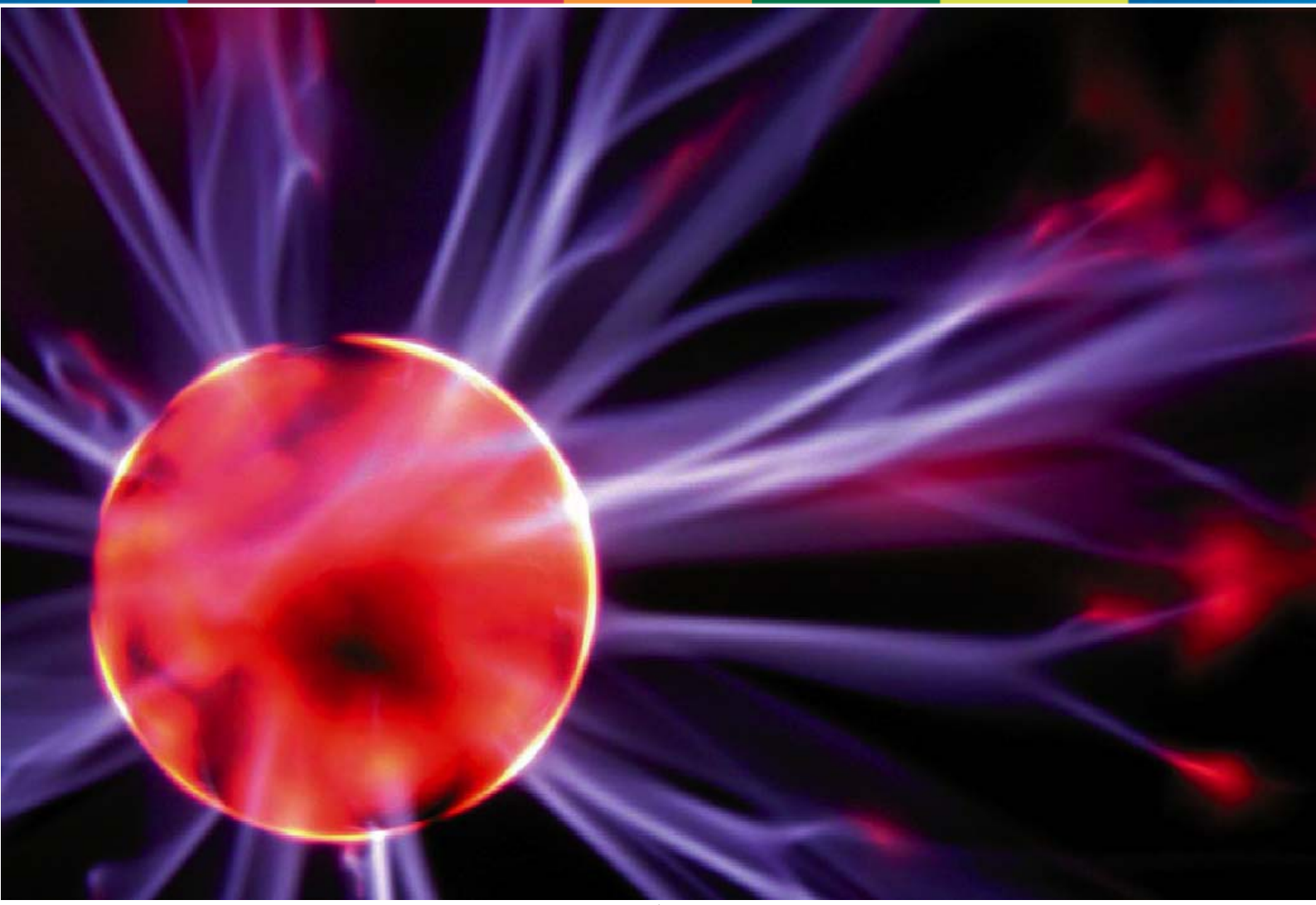
The Sector Skills Council for
Chemicals, Nuclear, Oil and Gas,
Petroleum and Polymers

An Assessment of Current Provision for the **Nuclear Industry**

Reporting on the quantity of training and qualifications and the quality and relevance to employers.

Innovation — Competence — Productivity — Sustainability



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Contents

Executive Summary

The industries covered by the Cogent footprint have access to a wealth of education and training provision, from National and Scottish Vocational Qualifications, through to Honours and Masters Degrees.

What the industries do not have, however, is a clearly defined pathway through the range of sector-specific and generic qualifications, to enable them to plan progression as both employers and employees. The sheer number of opportunities in some areas, such as higher education provision in Chemistry is not reflected in the potential articulation routes, such as N/SVQs, HNC, HND or foundation degrees. This has led to a lack of engagement between employers and providers, with the employer view of need not being clearly articulated (or uniformly expressed) to the providers. In turn, providers have addressed course content by expanding choices to reflect the perceived need of learners, with little input from industry.

There are, in contrast, a number of examples of successful co-operative developments between industry and provider, which has benefited all parties, not least the learners, who have entered or enhanced their role within industry by having the most appropriate range of skills and knowledge.

The key issues emerging from the assessment of provision fall into four broad categories: attracting people with the right skills, meeting the needs of current employees (upskilling and progression), sources of information on access and quality of provision, and issues related to decline in student numbers.

1. Attracting people with the right skills

The numbers of students entering further and higher education has increased substantially over the past 10 years. However this has not benefited the Cogent industries, as, despite the number of HE students rising by 19%, the number of students entering and completing HE courses specific to Cogent has been in decline.

The gender imbalance is also quite marked, with Higher Education Statistics from the HE Statistics Agency showing that, in 2003-4, 58% of HE students were female, but within the subject classifications related to Cogent, this fell to only 22%. When entering the sector, this gender split remains at the same proportion; therefore an increase in actual numbers studying may increase numbers of females entering the sector.

Career choices of graduates with the most relevant qualifications do not indicate a high level of interest in the sector. Indeed, only 6.5% of suitably qualified graduates actually take up employment in the Cogent Sector (as identified by Standard Industrial Classification (SIC) codes.

Employers report a lack of practical skills with regards to those entering the industry. Although employers value the level of academic knowledge gained at degree/postgraduate level, there is a perceived lack of ability to put that knowledge into practice when entering the industry.

2. Meeting the needs of current employees

Of the training and qualifications currently available to current employees Foundation degrees have not been widely embraced within the Cogent footprint, with only three specific Fds currently developed and one in development for the Nuclear industry. The numbers of employees embarking on this as a means of upskilling or career progression is very low, and the numbers completing is even lower. This is potentially a major missed opportunity for employers, to access a qualification designed to their specification and delivered locally to meet their expressed needs to upskill the current workforce and to influence graduate intake.

The same picture emerges from other vocationally specific routes, where N/SVQs have been developed in conjunction with employers, but have then failed to attract sufficient students to maintain associated training provision or awarding body support. There are exceptions to this, where candidate numbers (certificates issued) at level 2 have steadily increased. This does not, however manifest into a corresponding increase at level 3. Nor does it reflect the identified gaps in skills at levels 2 or 3, with qualified numbers being miniscule when compared to those employees requiring upskilling.

The needs of this same group could also be addressed by the availability of a mid-career apprenticeship model. As highlighted in the Skills Needs Assessment and reiterated in the workshops carried out as part of the Assessment of Current Provision, there is a move to raise the skills levels of operators from level 2 to level 3. There is therefore a need to create or adapt a framework to suit those who are already in employment. The current apprenticeship frameworks could provide good basis for this, but would require some adaptations. As they stand, apprenticeships do not account for prior experience and therefore an abbreviated version may be required, nor does the current model e.g. two years study and two years in employment, meet the needs of mid career entrants. If skills requirements for process operators do rise as predicted, demand for this type of qualification would be large.

3. Sources of information on access and quality of provision

A recurring theme from employers across the sector is the lack of specialist industry specific knowledge and skills available through qualification routes. Employers instead buy in private training to address these skills needs. They favour this type of provision because of the flexibility in delivery methods and their ability to influence the content and tailor it to suit their exact needs. The issue surrounding private provision however, is the sheer bulk available, and the lack of guidance regarding the quality of it. There is also no system currently in place that standardises achievement of a private training course across the sector, in terms of the ability of the employee following completion. The development of such a system would allow employers to readily access the provision they need, at the right quality, and in the right location. Benchmarking or kitemarking of provision would allow employers to select provision based on accurate evidence rather than historical reasons.

Employers also reported difficulties in understanding the types of qualifications that attract funding and felt that there was a need for a guide through these systems. A signposting system was requested, to allow easier engagement with providers and stakeholders.

4. Issues related to decline in student numbers

At HE level, the decrease in the numbers of students taking courses related to the Cogent industries has led to the closure of courses and entire departments. Since 1997 there have been 18 Physics departments and 28 Chemistry departments closed, with potentially more at risk. As a result the system only produces 2,000 Chemistry graduates a year as opposed to 5,000 in 1995. This is also a concern in relation to HNC and HND courses, which are now only available at a steadily declining number of establishments throughout the UK.

Provision – issues affecting the Cogent industries

Entering the sector

From schools

The Cogent sector depends on entry level qualifications related to Science, Engineering and Technology, as well as English, Maths etc. In general, the number of students choosing to study these subjects beyond compulsory levels is in decline. This is affecting the recruitment pool available to enter employment at operator level, and into apprenticeships.

The numbers moving into apprenticeships specific to Cogent are relatively small when compared to other sectors. The anticipated employer demand for current and future process and maintenance employees to be skilled to levels 2 and 3 provides a potential audience for these qualifications.

Although achievement of a level 2 qualification e.g. 5 GCSEs at grades A to C, is broadly acknowledged as an entry requirement to the sector, employers have reported that attainment of this still leaves applicants lacking for some of the skills expected of those who enter the industry. There has been a particular decline in the number of applicants with practical or 'hands on' skills, which are highly valued by employers – this may have been due to health and safety regulations. There is a need for some form of vocational element to be built into school level qualifications.

From Further and Higher Education

The range of opportunities available within some areas of education is narrow, with the decline in sector specific HNC and HND offerings (England and Wales at 10 HNCs and 14 HNDs, Scotland at 14 HNCs and 16 HNDs, and Northern Ireland having one HNC and one HND) being most noted by employers. The provision in Scotland reflects the relative strength of HNCs and HNDs as a route to both employment and further education. Only a limited number of foundation degrees have been developed to which could fill this emerging gap in England and Wales, leading to an overall need to develop or redevelop qualifications reflecting industry needs.

Undergraduate opportunities with content specific to Nuclear are limited. In fact there is no provision other than one offering specifying decommissioning studies within it. This reflects the needs of the industry, which recruits via more general degrees (such as Chemistry, Physics), utilising Masters and CPD to add the necessary knowledge and understanding of nuclear technology.

There is need to establish a common understanding on employer expectations, and to reflect this in vocational elements of further and higher education provision.

Progressing in the sector

At a sector wide level, vocational qualifications have been designed in conjunction with industry, based on National Occupational Standards. Uptake of these in some cases has been extremely low (less than 10 candidates per year), raising questions concerning employer buy-in. In the longer term, this will affect Cogent's ability to update and refresh the related standards, and to ensure that the qualifications remain in the national frameworks.

The alternative accessible qualifications (such as HNCs) are reported to be valued by industry, however this is not reflected in uptake. Foundation degrees, which can be a factor in decline of HNC and HND numbers, have not been accessed as a method of up-skilling employees – with only one being recently developed for the Nuclear industry.

Employer engagement in the design and delivery of foundation degrees presents an opportunity to have in place qualifications reflecting the reported need to up-skill employees to meet advances in technology. This is equally true of vocational qualifications, and the standards on which they are based.

Development and progression within the sector is also achieved through employers accessing private training provision. Employers value this type of provision because of the flexibility in delivery methods and their ability to tailor courses to suit their exact needs. However, there are large number of providers and courses on offer for each of the industries. This can make the selection of appropriate training difficult as there are currently no quality standards attached to this type of provision. There is also no system currently in place that standardises achievement of a private training course across the sector, in terms of the ability and competence of the employee following completion.

Background information

Phase 2 of the Sector Skills Agreement is concerned with reviewing the breadth of training and qualifications provision and the quality and relevance to employers across all levels. This document provides a snapshot of the qualifications and training available to the Nuclear industry and is a summary of the main "Assessment of Current Provision for the Cogent Sector" report.

The assessment of provision was approached in three distinct phases, each aiming to gather information on a different aspect of the qualifications and training picture:

1. Identifying provision to capture the range of learning opportunities available within the Cogent footprint, through desktop research
2. Quantifying provision to understand the volume and composition of learners making use of the variety of learning opportunities available
3. Assessing provision to review the extent to which the current provision is capable of meeting employers' current and future skills needs

Identifying provision

Two distinct types of provision emerged: those opportunities that led to a formally recognised national qualification; and those that did not.

Quantifying provision

It became apparent that there was too much relevant provision to consider gathering uptake information in respect of every learning opportunity. This was seen as an important but ongoing exercise for Cogent to undertake as part of a longer term strategy to be a central source of information, advice and brokerage in relation to skills and training. A prioritised list of provision was therefore created, which highlighted 'key provision' in terms of specific relevance to and progression opportunities for the Cogent industries.

Several sources have been used to gather information about the number of learners achieving key qualifications, or completing key training. These sources included relevant Awarding Bodies, FE/HE providers, Learning and Skills Councils (LSC), SQA, Higher Education Statistics Agency (HESA), Scottish Funding Council and training providers.

Assessing provision

This phase of activity was concerned with clarifying employers' views of the provision that is currently available to meet the skills needs of their workforces. For the Nuclear Industry, a workshop was held with to seek the views of Employers on the training and qualifications available to the industry.

Nuclear Industry Coverage

Nuclear is one of the smaller industries covered by the Cogent footprint, by number of employers. National available statistics, such as the ABI estimate that the total number of employees within the Nuclear industry is 13,413 (ABI 2004). However the number estimated by Industry is 56,000, for the purpose of this report both sets of figures have been included to highlight the differences between the workforce totals. Nuclear industry estimates include direct and indirect employment

The industry can be looked at as a grouping a number of distinct areas of activity, Nuclear heat generation (power and submarine), Nuclear Material Processing (Fuel cycle and weapon), Nuclear Decommissioning and Nuclear Waste Management.

A more detailed representation of these profiles for the Nuclear industry is shown in the table below. The seemingly low figure for proportion of workforce in management occupations within nuclear may be explained by an element of those in management positions still being classified as professionals who are involved in the technical aspects and operation of the industry whilst also being in management positions.

Occupational profile of the workforce for the Nuclear industry

	%
Managers and Senior Officials e.g. Managers: Production, Maintenance, Site, R&D	4
Professionals e.g. Scientists: Chemists, Physicists, Geologists; Engineers: Mechanical, Electrical, Electronic, Chemical, Design, Production, Process	38
Associate Professional and Technical e.g. Technicians: Laboratory, Electrical/Electronic, Maintenance, QA	13
Administration & Secretarial e.g. general administration and business support	11
Skilled Trades e.g. Electricians, Electrical Fitters, Machine Setters,/Setter Operators, Riggers	24
Sales and Customer Services e.g. Forecourt retail staff, Technical sales staff	0
Process and Machine Operatives e.g. Operators: Process, Plant, Field, Control Room, Panel Laboratory Assistant, Forklift and Crane Drivers	5
Elementary Occupations e.g. Packers, Roustabouts, Security	5

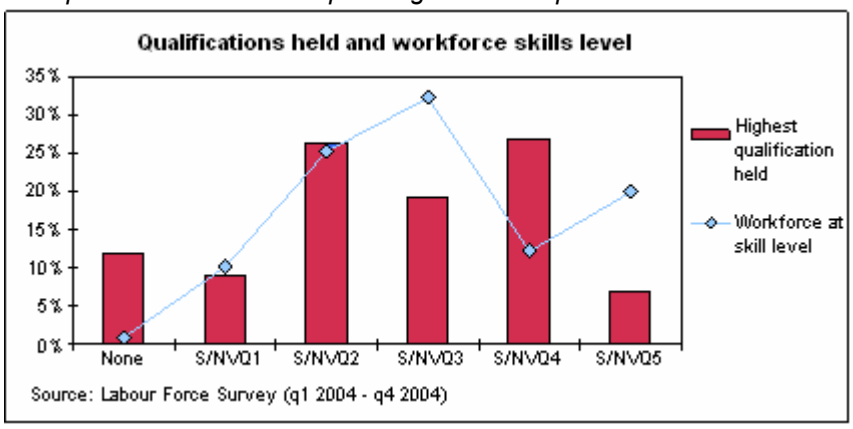
Nuclear & Radiological Skills Study (2002)

Current qualifications profile of the sector

The chart below illustrates the profile of the workforce within the Cogent sector (excluding petroleum forecourts as this group cannot be isolated in Labour Force Survey data). It is striking that there is a higher proportion of the workforce qualified to level 2 than level 3 within the sector.

The comparison is made between the qualification profile (as a proxy for skills) and the occupational skill level profile of the workforce. There is a mismatch in some areas between the level of qualifications held by the workforce and the skills level at which they are employed to operate, most notably at the elementary workforce level one, skilled workforce at level 3 and in managerial and senior official workforce at level 5.

Comparison of workforce operating level and qualification held



The gap between the concentration of employment in senior positions within the sector and the qualifications held may be cause for concern. However it is considered that a proportion of those qualified to the level 4 may be operating in the level 5 skills area. Similarly, the gap between the volume of workers with no or level 1 qualifications and the number working at these occupational levels may hide some underlying trends. These topics were the subject of further investigation by Cogent through interviews with employers.

Employer spend on training

Given the variety of different training methods used across the sector it is difficult to quantify the overall sectoral spend on training, particularly when on the job training plays such a large part of the provision for the largest group of employees (process and machine operators). The National Employer Skills Survey (NESS) for England quantifies Cogent sector employers average spend per person as £230 per annum only slightly higher than the national average at £225. However these figures seem relatively low in comparison to Chartered Institute of Personnel and Development's Training and Development Survey figure of £739 in SMEs and £339 in large companies (economies of scale). The survey of Nuclear employers in 2005 found an average training spend of £623 per person per annum which is closer in line with the CIPD findings. It is considered that figures only take account of the direct costs of training and do not incorporate costs relating to time away from the workplace.

Entry to the industry

There are many routes into the Polymer industry - including direct from the schools system. This can be via an apprenticeship, or directly into operational roles in the workforce.

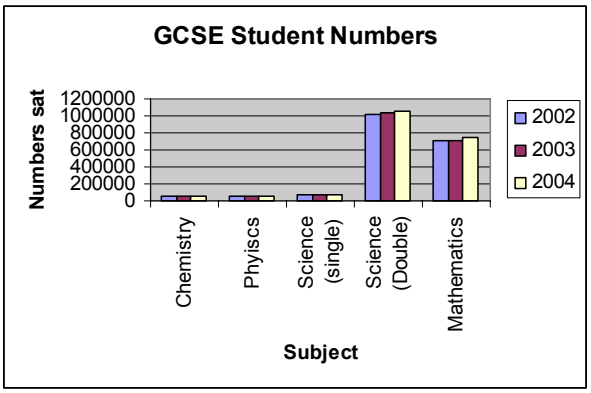
The drive towards increased productivity, and the actual processes used, leads to a dependence on more than just literacy and numeracy skills. The subjects from the school curriculum of particular relevance to employment include: Science and Mathematics, including Chemistry, Physics, Applied Science, Mathematics, as well as English and Technological subjects. In addition, the industry looks for general employability skills.

Throughput trends and achievement

England

The throughput of students in each of these subject areas has relevance to the numbers suitably qualified for entry level positions in the industry. In England, the numbers have increased slightly over the three years between 2002-2004, which in percentage terms shows a year-on-year rises of between 0.5% (Mathematics) and 5% (Physics).

GCSE student numbers by subject



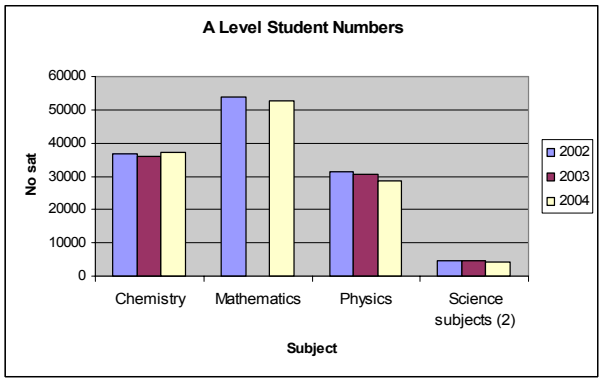
At the same time, the pass rates for A* to C have remained relatively static, with the exception of the Science Double Award, which has increased slightly.

The numbers of students studying Chemistry, Mathematics, Physics and Science Subjects at A Level are shown below. Figures for the number of students sitting each subject have seen relatively small changes. Mathematics and Physics have both seen a decrease.

According to research carried out and reported by the BBC News website, the number taking A Level Physics dropped by 34% between 1991 and 2004. The BBC also reported a decline of 16% in those taking Chemistry for the same period and the numbers studying mathematics dropped by 22%.

Pass rates for grades A to C, have also remained relatively static, with each subject achieving on average around a three per cent increase between 2002 and 2004.

A Level student numbers by subject

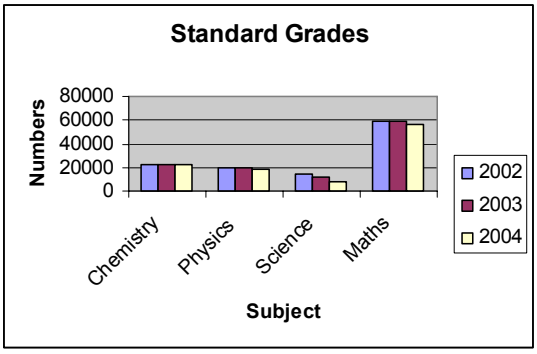


Note: the data for the number of student sitting Mathematics in 2003 has not been included due to discrepancies in the numbers reported.
Source: Joint Council for General Qualifications – National Provisional A Level (Curriculum 200) GCE Results (All UK Candidates)

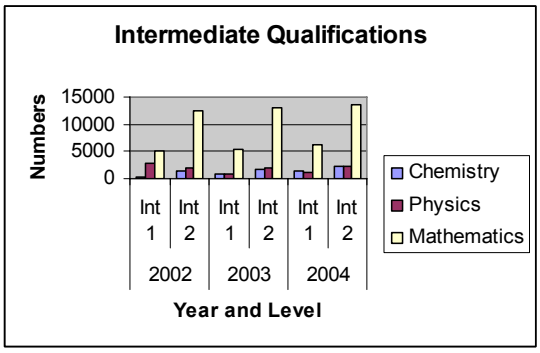
Scotland

The picture in Scotland shows a differing trend for Standard Grade entries (the data from 2001 onwards diverges to include the introduction of the new Scottish framework. For completeness, both Standard Grades and national Qualifications at Intermediate have been used to generate the data tables).

Standard grade student numbers by subject



Intermediate Qualifications students numbers by subject



The change in the Scottish education system, with the introduction of the National Qualifications Framework in 2001 has presented employers with a new range of qualifications which are levelled as equivalent to Standard Grades – Access 3 Intermediate 1 and Intermediate 2 relating to Standard Grades at Foundation, General and Credit. In 2005, the entries for Mathematics Standard Grade (53,835) may be augmented by those entries at Intermediate 2 (15,163), however this number may include students already holding a Standard Grade.

The downward trend in entries in the preferred Standard Grade subject areas has continued, but there has been a rise in Intermediate 2 entries albeit from a low starting point.

The total numbers studying these subjects has in most cases shown an overall increase, however the entry qualifications have not necessarily been updated to reflect the potential spread of qualifications matching entry requirements.

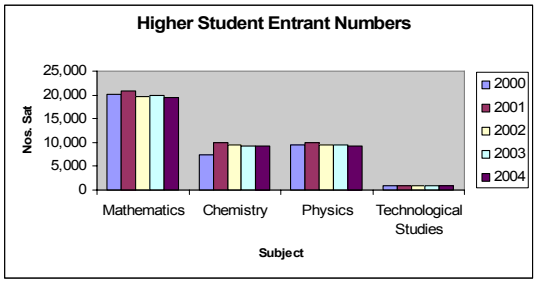
Due to the sector-wide dependence on the numbers studying and achieving good grades in the SET subjects, Cogent seeks to influence student participation in these subjects and has already taken steps to engage with Information, Advice and Guidance (IAG) work with mentoring provided by SEMTA, one of the Pathfinder SSCs of the Sector Skills Agreement process.

In Scotland students in years S5 and S6 can undertake Higher or Advanced Higher certification. The Advanced Higher was introduced to the Scottish education system in 2001. SCQF indicate that the Higher is levelled at 6 and the Advanced Higher is levelled at 7 based on pass rates at grades A to C for both levels.

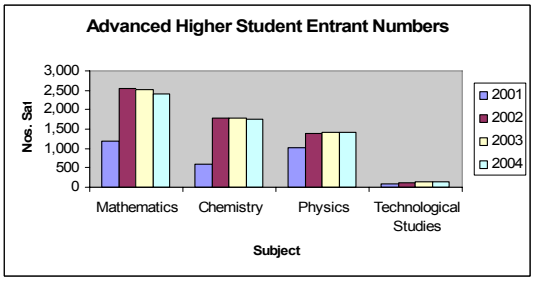
The graphs below show the number of students studying Mathematics, Chemistry, Physics and Technological Studies at Higher and Advanced Higher level. In 2002 there was a slight decrease in the students undertaking Higher Mathematics. In 2000; 7,479 students undertook Chemistry, the following years have seen an increase in the numbers studying this subject. For Physics and Technological Studies subjects, students have remained relatively static.

At Advanced Higher level Technological Studies has been a slight year on year increase in student numbers. Comparing 2003 student numbers with 2004; Mathematics has decreased by 4%, Chemistry decreased by 1%, Physics has remained the same and Technological Studies has increased by 5%.

Higher student numbers by subject



Advanced Higher student numbers by subject



Source: SQA

The per cent of students achieving a pass in Mathematics, Chemistry, Physics and Technological Studies at Higher and Advanced Higher level have not seen significant change since over the past 5 years. Higher level Mathematics and Technological Studies have both seen a slight decrease (three and four per cent respectively), and Chemistry and Physics have both seen slight increases (one and three per cent). At Advanced Higher level, The numbers achieving a pass in Chemistry saw a slight decrease – seven per cent – and the other subjects all saw slight increases (Mathematics two per cent, Physics four per cent, Technological Studies 3 per cent).

Wales

The Welsh Baccalaureate - or the Welsh Bac - is a new qualification, which recognises almost everything that young people do at school or college. It includes current, approved qualifications like A Levels, GCSEs and NVQs and adds breadth and balance through a Core programme of activities. The pilot launched in September 2003; now involves 31 schools and colleges and will run until August 2007.

Vocational Qualifications

National Vocational Qualifications (NVQs) and Scottish Vocational Qualifications (SVQs), and Vocationally Related Qualifications (VRQs)

Cogent has a key role in designing the qualifications structure for N/SVQs by determining the demand for them from both employers and employees alike. N/SVQs are organised into five levels. Briefly these are:

- Level 1 - Foundation skills and occupations
- Level 2 - Operative or semi-skilled occupations
- Level 3 - Technician, craft skilled and supervisory occupations
- Level 4 - Technical and middle management occupations
- Level 5 - Chartered, professional and senior management occupations.

Vocational Qualifications are accessed through approved centres of Awarding Bodies who must comply with quality standards laid down by the relevant Accrediting Body (SQA in Scotland, QCA in England and Northern Ireland and ACCAC in Wales).

Each of the N/SVQs listed has been based on National Occupational Standards (NOS) designed and developed in full co-operation with industry partners, to ensure that the content is valid and reflects the jobs being carried out by the target population. The qualifications have, over the last five years, been rationalised to reflect the common skills base of employees.

The NOS are now subject to incremental review, to ensure that their currency is maintained, reflecting the needs of the changing shape of the industry. This is done by consulting with industry via a range of groups.

New standards have recently been developed to serve the needs of the nuclear industry, which, prior to the establishment of Cogent SSC, had no specific route into NOS development. These standards may progress into development of N/SVQs. The request from employers for new developments such as this reflects employer need and support for the NOS and N/SVQ system.

Cogent will continue to work with industry partners to develop new standards where required, and to rationalise standards where common ground in performance criteria is identified.

There are currently only two N/SVQ that are directly applicable to the Nuclear industry. These are Nuclear Technology Decommissioning at Level 2 and Radiation Protection at Level 4. There is also a Level 2 VRQ developed by Society of Radiological Protection which expired in 2005 but was revalidated to cover the period until a new qualification is developed.

Feedback from employers reflects a mixed view – those who are involved in NOS development and N/SVQ delivery are supportive of the system and value the qualifications, whereas others, who are not involved in design or delivery, do not appear to value them. Ongoing work with employers and employer groups is required, to ensure that the widest possible consultation is carried out for new developments or updates, to gain a sense of ownership from employers. Some of the N/SVQs have shown a steady throughput of employees, reflecting long-term buy-in and belief in the quality of the product.

The Nuclear Decommissioning NVQ has been relatively popular and is taught and assessed from two main centres in Cumbria and the North Highlands. The VRQ in Radiation Protection has had limited uptake but its replacement is awaited keenly by the industry. There has been very little uptake of the Level 4 NVQ in Radiation Protection: this can be used to qualify as Radiation Protection Adviser but the preferred route is through registration.

Apprenticeships

The nuclear industry is known to use some 24 Further Education Colleges in the UK for apprenticeships and technician/craft/process worker training. There are many apprenticeships, based on a variety of SET qualifications, mainly non nuclear in content. The industry is known to have taken on around 330 apprentices in 2005. The Nuclear Decommissioning NVQ Level 2 (and planned Level 3) has been incorporated in apprenticeships in two centres so far, one of them the North Highland FE College at Thurso.

Decommissioning is a relatively new task which can be taught as part of apprenticeships to develop a new younger workforce.

Recent findings on industry skill needs across the Cogent sector, as detailed in the Skills Need Assessment prepared as the first phase of the Sector Skills Agreement, indicate a possible increase in numbers. If, as reflected in these findings, the sector seeks to raise the skills levels of process operators from Level 2 to Level 3, the apprenticeship route may provide a ready made solution for new employees entering the industry. At present, the apprenticeship framework and funding regime does not encourage participation by adult entrants or those seeking to raise their skills level from within current employment – this area may require intervention, given that approximately 75% of the 2020 workforce is already in employment, but a number require enhanced skills and knowledge to reflect the operating level of their jobs. The full content of the framework may be inappropriate, given due regard to prior learning and experience, therefore an abbreviated version may suffice.

The delivery mechanisms for the apprenticeships also do not reflect the needs of mid-career entrants currently in employment. Therefore a more flexible model would have to be considered.

The potential numbers associated with such a programme would be large – the estimated number of process operators in the Cogent footprint is 120,000, with Stage 1 research findings showing that there is already a 13% difference between those skilled at Level 3 versus those required at that level. If the future requirements are as predicted, with a step change from Level 2 to 3, most of the 120,000 would require access to some sort of additional training and development.

Further and Higher Education

FE and HE Provision in England and Wales

There are a total of 346 universities and colleges within England and Wales listed on the UCAS website, 21 of which are situated in Wales.

HNC and HNDs in England and Wales

There are currently no HNC/HND courses on offer in England and Wales with Nuclear specific content.

Bachelors Degrees

There are currently no Bachelors degrees within England and Wales which offer a very specific Nuclear content. However, Lancaster University is planning to offer a new BEng course, and 15 other universities in the UK teach some Nuclear component or module in their Bachelors courses. It appears that entrants to the industry would need to take a more generic route, through Engineering or Science based Bachelors degrees and then move on to specialise at postgraduate level or through CPD within the workplace.

Postgraduate qualifications

Nuclear (and radiation) specific qualifications are offered at five institutions. These are the Universities of Birmingham, Kent, Liverpool, Manchester and Surrey. Several universities offer more general engineering courses with very specific nuclear focussed modules these include the Universities of Cambridge, Hull, Lancaster, London (Imperial College) and Manchester.

FE and HE provision in Scotland

HNCs and HNDs in Scotland

North Highland College, Thurso, which is relatively near to the Nuclear site located in the North of Scotland offers HNC and HND Decommissioning qualifications. Decommissioning at Dounreay will increase the demand for engineering specialists. In total there have been 16 entries onto the HNC in Nuclear Decommissioning between 2003 and 2005.

Bachelors degree

For the Nuclear industry the UHI Millennium Institute, Inverness offers engineering degrees in Mechanical and Electrical Engineering with Decommissioning Studies.

Postgraduate qualifications

For the Nuclear industry only Glasgow University offer a specific postgraduate degree qualifications.

FE and HE provision in Northern Ireland

There are currently no Nuclear specific courses available at any level within FE/HE in Northern Ireland.

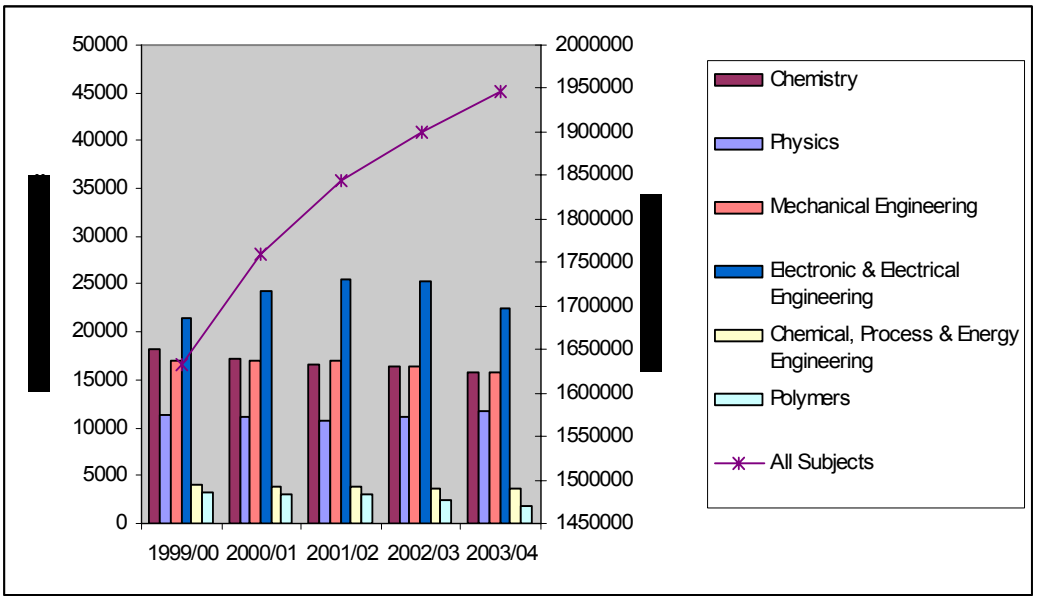
Throughout the UK, entrants to the Cogent sector often come from the more generic engineering routes, having qualified in subjects such as Mechanical Engineering, Electrical and/or Electronic Engineering or Geology. More universities offer these types of courses rather than those that are tailored to careers within the Cogent industries.

Analysis of data covering current student numbers on under and postgraduate courses

Overall, across the UK the number of students (UK domiciled) has increased by 19% in the period from 1999 to 2003. The approximate numbers of UK domiciled students enrolling at UK universities in the 2003/2004 was 1.95 million.

In the same period however, many of the Cogent related subject areas have seen a reduction in numbers ranging from 8% for Mechanical Engineering (17,000 to 15,725) to 41% for Polymers (3,240 to 1,885). The largest decrease exists within Chemistry where 18,290 enrolled in 1999/2000 compared with 15,830 in 2003/2004 (15%) – although there may be more students taking up combined courses. This decrease is larger still when viewed alongside an overall increase in students attending university.

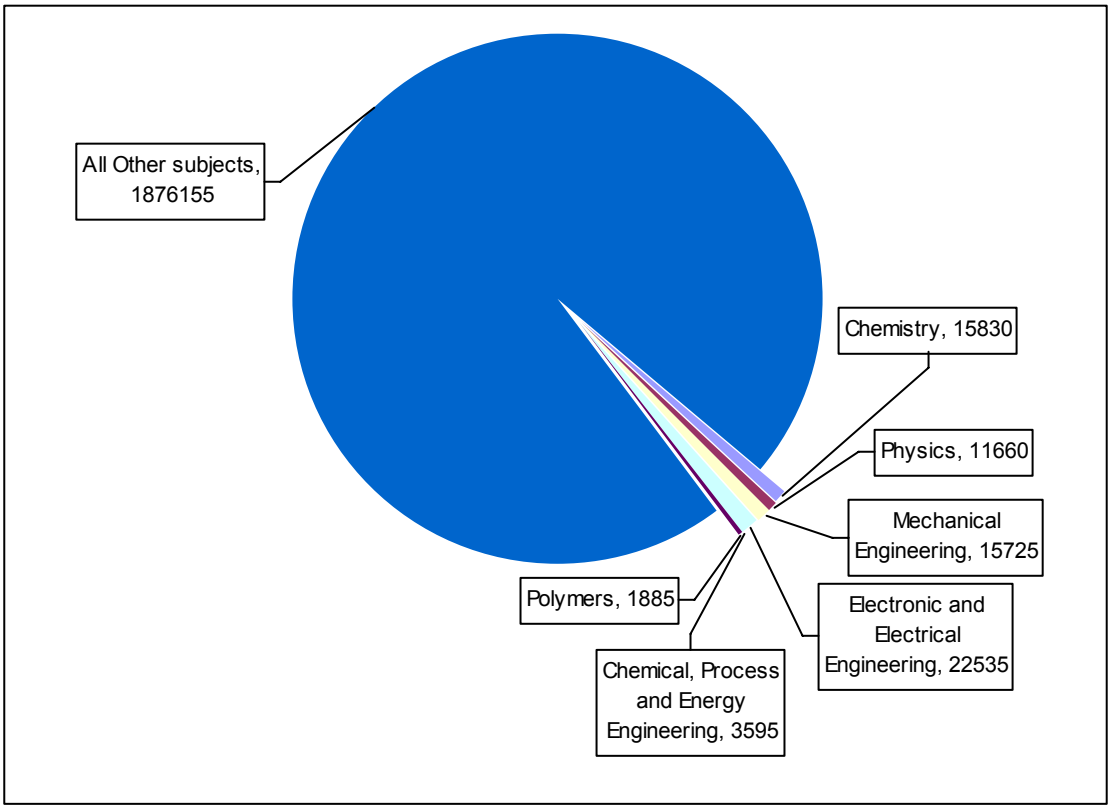
Comparison of the number of UK domiciled students taking subjects relevant to Cogent, and the total number of UK domiciled students taking all subjects



Source: HESA Tables 2e - All HE UK domiciled students by level of study, subject of study, domicile and gender

The relative share occupied by some of the subject areas relevant to the Cogent industries can be seen in the pie chart on the following page.

Relative share of total U.K under and postgraduate students enrolled on Cogent related subject classifications, 2003 to 2004



Source: HESA Tables 2e - All HE students by level of study, subject of study, domicile and gender

As previously reported the overall student population has seen a 19% increase and therefore the decrease in numbers applying to and qualifying in most of the subjects relevant to the sector is a cause for concern. It would be interesting to gauge the perceptions of potential applicants with regards to these subject classifications. There are some hints of a brighter future, with a few of the subject classifications at certain levels reporting a slight increase in numbers over more recent years. However, since 1997, the lack of interest in these courses has resulted in the closure of 18 Physics departments and 28 Chemistry departments, with far more due to close. As a result we now produce only 3,000 Physics graduates a year.

The percentage of students completing their qualification is a cause for concern, with every subject classification at every level reporting some rate of student 'drop out'. The average (mean) drop out for first degree level students (for the reporting period 1995 to 2002) based upon the assumption that the average first degree course taken full-time takes three years to complete is as follows:

Average number of first degree students leaving courses before completion

Subject Classification	Average 'drop out' (no of students)	Average % loss
Chemistry	1330	30%
Physics	785	30%
Mechanical Engineering	1500	36%
Electrical Engineering	280	31%

Subject Classification	Average 'drop out' (no of students)	Average % loss
Electronic Engineering	1915	40%
Chemical Engineering	160	17%
Other Materials Technology	100	24%

This is clearly an area where there is scope for action to influence drop-out rates in Cogent related Higher Education. To support this there is a need for further investigation to understand the reasons behind these figures and whether this is an issue that affects other HE subjects.

A more detailed analysis of first year student and qualifying student numbers is available in the full version of the Assessment of Current Provision.

HESA destinations data

The HESA Destinations of Leavers from Higher Education (DLHE) data supplied to Cogent covers all United Kingdom (UK) domiciled students reported to HESA for the reporting period 1 August 2003 to 31 July 2004 as obtaining relevant qualifications and whose study was full-time or part-time (including sandwich students and those writing-up theses). The destinations reported to Cogent covered those studying the following at HE level:

- Chemistry
- Physics
- Geology
- Mechanical Engineering
- Electronic and Electrical Engineering
- Chemical, Process and Energy Engineering
- Materials Technology not otherwise specified
- Polymers and Textiles.

This includes those who have studied at Postgraduate, First Degree, Foundation Degree, HNC, HND, and other undergraduate level. The total reported on is 13,956.7 representing 69.75% of the total qualifiers for the same period.

The data shows that students following the above routes, in the reported period fall within 192 Standard Industrial Classification (SIC codes). As a result of incomplete or unclassifiable responses HESA have only been able to report the destinations for 47% (9,435) of those students qualifying in 03/04. Ranking the SIC codes in descending order, with those attracting the most leavers ranked at the number one position (509.1 in SIC 8030 – Higher Education) and the least at 192 (SIC 7521 – Foreign Affairs), Nuclear industry relevant SIC codes are positioned as follows:

Ranking of Nuclear industry specific SIC codes by HE student destinations, 2003 to 2004

SIC Code	Total	Rank
(2520) Manufacture of plastic products	30	**78**
(2500) Manufacture of rubber and plastic products	5	**146**
(2510) Manufacture of rubber products	5	**151**
Total	**40**	

Overall, students moving into the SIC codes relevant to the Cogent footprint make up just 6.5% of those whose destination is known, and those moving into the Nuclear industry are only a small proportion of this.

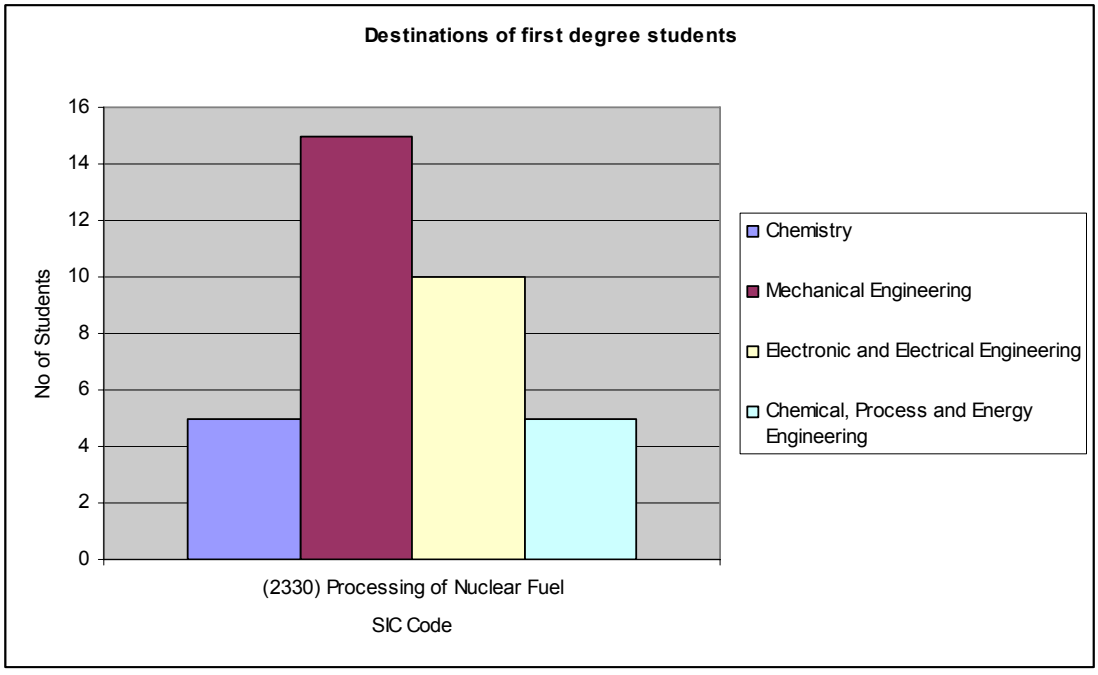
The data supplied by HESA shows that the majority of students qualifying at HE level within the subject classifications relevant to the Cogent footprint are moving into industries outside of it once qualified. This is no surprise as feedback from employers suggests that attractiveness of our industries is a big issue, as graduates perceive other industries offer better opportunities for career progression.

Higher Education routes into industry

Focussing on the routes that those who have completed HE level courses have taken to come into Cogent industries provides an insight into how the industry rates certain types of qualifications and subjects.

For SIC codes relevant to Nuclear, the bulk of students moving into these areas came from the First degree route – 30 of the 45 reported. The majority had moved into industry from a Mechanical Engineering first degree (10 full-time, five work and further study), followed by 10 from Electronic and Electrical Engineering route (all full-time).

Number of students moving into the Nuclear industry by subject classification



At postgraduate level five students had all moved into full-time paid work in the SIC code area of (2330) Processing of nuclear fuel, from Physics, Mechanical Engineering, Chemistry and Chemical, Process and Energy Engineering. From a HND route, five students had moved into roles within the industry – from Mechanical Engineering into full-time work, Electronic and Electrical Engineering into full-time work, and into work and further study. There were also five students from the HNC route, all of those who had studied Electronic and Electrical Engineering moved into work and further study and those who studied Mechanical Engineering moved into full-time work. Part-time work did not feature at all as a destination for this industry during this period.

Foundation Degrees

Foundation degrees were launched in England in 2001. They are a new higher education qualification – each foundation degree is developed by a Higher Education Institution in collaboration with one or more Further Education Institutions, employers and Sector Skills Councils.

Foundation degrees are designed to be flexible, and can be delivered in a variety of ways, to suit employer needs.

They integrate academic and work-based learning and have flexible teaching arrangements involving part-time or evening attendance at college, distance learning or learning via the internet.

In 2001, the first Foundation Degrees attracted 4,000 students, by 2004/05this increased to around 38,000, half of which were studied on a part-time basis.

In the last year, 500 new Foundation Degree courses have been launched and all the time new institutions are needed to help design and deliver. At present there are 700 more Foundation Degree courses in planning, soon to add more choice to the 1300 already running.

Steps are being taken to meet the increased demand. HEFCE has allocated an additional 11,500 FTE Foundation Degree places for 2004/2005 and a further 14,000 for 2005/2006.

From Sept 2006 Lakes College, West Cumbria will be offering the Foundation Degree in Nuclear Decommissioning Skills.

These relatively recently developed qualifications have been well received in principle, although their uptake in many cases is still very small, both within industry, but increasingly by non work-based learners seeking a clear progression route from 14-19 qualifications into higher education and industry. However, in this respect they are perhaps not being used to the extent by the target audience. It is worth noting that employers within the Cogent industries had often expressed their approval of and investment in HNC and HND qualifications as the best route from 14-19 qualifications into work or higher education. In contrast, the Foundation Degree was designed for work-based learners seeking access to higher level qualifications, but who did not perhaps possess the credit recognised by achievement of traditional 14-19 qualifications.

Centres of Vocational Excellence (CoVEs)

Centres of Vocational Excellence catering directly for industries in the Cogent footprint are few in number, in fact there is currently only one specific to the Nuclear industry. However, there are a number which offer more generic qualifications in the area of engineering or manufacturing technologies which have relevance.

Overall the offering can be derived as:

- Four General Manufacturing CoVEs in the East of England, Yorkshire and Humberside, West Midlands and East Midlands
- Seven Engineering CoVEs in the South West, East Midlands, North West, North East, and the West Midlands
- One Nuclear Technology CoVE in the North West.

These CoVEs may form part of the delivery for any future Skills Academies; therefore employers should take advantage of opportunities to influence current and future provision.

Other Provision

Training Provision in England, Wales and Scotland

Commercial and private training providers have long been used by employers to deliver the specialist training necessary to ensure a competent workforce. Perhaps because of a perception that publicly funded provision only takes the learner so far along the route to specialist skills and knowledge. These providers are able to offer courses that can adapt and remain relevant to those working within the Cogent industries where technology is constantly changing. Employers can find the world of publicly funded training difficult to access and negotiate, when compared with the private and commercial training available.

Delivery methods for these courses are broad ranging, and can be on site, at a specifically developed training facility or at various other venues throughout the U.K. The majority of training providers offer courses with set content, but also offer the opportunity to tailor course content to suit the customer's specific requirements. The modes of learning available also vary greatly, each provider offers courses in a range studying methods, these include group learning, online learning, individual learning, part time (evening weekend or day-release options) or full time study and work based learning.

Duration of training varies from half a day up to three years depending on the style of delivery and type of provider. Some of the training offered can be used as standalone or modular courses that link together to form a broader provision – particularly the training available from providers associated with universities and colleges.

Those that have a particularly long standing and successful relationship with industry are the providers who lend themselves to flexibility with regards to content, delivery methods and location.

Cogent is aware of at least twelve commercial training providers in specialist technical areas who are training people for the nuclear industry employers. There is also a huge network of individual consultants, trainers and small partnerships. This diversity and variety is a strength but lacks standards or assessment in many cases.

There is clearly an abundance of training available for industries within the Cogent sector. However, there is a distinct lack of impartial information regarding the quality and relevance of this training. Employers have reported that they tend to use only training providers who they already have an established relationship with, as finding quality provision outside of this can prove to be an arduous task.

Information available to prospective employees

Cogent has developed a range of materials to inform pupils, students, educationalists, career advisors, guidance teachers, parents and the general public of the range of careers and opportunities available within the Cogent sector in order to create a potential future workforce with the skills, knowledge and attributes to secure the future competitiveness of the industry.

Cogent has one employee dedicated to the role of sector attraction and they have worked in partnership with employers and industry associations to develop this resource.

Resources currently available to prospective employees are listed include fact sheets that explain the structure of the industry, providing a brief outline of some job roles and where to find other sources of industry information, individual's profiles – 'Day in the life of a…' including:

- Instrument Mechanic
- Maintenance Optimisation Coordinator
- Fitter
- Dragon Project Decommissioning Planner

Careers web are also available these provide the following information:

- Industry Overview
- Frequently Asked Questions
- Useful Links

Planned for 2006

Cogent, along with seven other Sector Skills Councils and the four pathfinder SSCs are working on the SSC Information, Advice and Guidance (IAG) Project which links directly to the government review for reform for information, advice and guidance for adults and provides the Skills for Business Network (SfBn) with an excellent opportunity to position Sector Skills Councils (SSCs) to help fill skills shortages and provide sectoral IAG services that offer careers opportunities across their respective industries.

The project is based on piloting and evaluating the potential SSC contribution to a universal careers IAG service with three groups of SSCs at different stages of development of their IAG function through Sector Skills Agreements.

Outcomes of this project for Cogent are:

- Providing sectoral LMI accessible to practitioners through National Guidance Research Forum (NGRF) website.
- Developing a programme in order to train and support careers professionals in how to use LMI to provide a better service to clients and devising a system for ensuring ongoing provision of updated LMI.
- Linking in to the UfI's Guidance Trial project for extended IAG through its telephone helpline service.
- Developing a sustainable plan for IAG provision through the mentoring agreement with Cogent's allocated pathfinder SSC.
- Linking with the TUC, trades unions and the work of the Union Learning Representatives to share LMI and enhance the IAG offer.
- Exploring and showcasing the extent of employer engagement in IAG services within the participating SSC sectors.
- Contributing to the government's review of IAG services for adults.

Input from the Employer Workshop

A number of Nuclear employers provided insight into various issues surrounding training provision relevant to this industry. These comments have been amalgamated into a larger report that forms part of the complete Assessment of Current Provision for the Cogent Sector. The relevant sections of this report are presented below.

Who provides training now?

The numbers employed at basic operative level are relatively low – with the exception of the fuel production part of the fuel cycle – the majority of employees working in these roles are trained in-house and have very little transferable skill.

For those in skilled job roles, many doubt the relevance of N/SVQs for this industry. This is due to the heavy bias towards technical and knowledge based skills. However, Apprenticeships in the industry are expanding. There is a Nuclear Technology CoVE in the North West and several relevant CoVEs around the country. At this level, on an industry wide basis, there is a continuing upskilling strategy in place through Skills in Engineering Joint programme.

At technician level it has been reported that there a very few relevant Nuclear qualifications, and it appears that Technicians are generally trained in Nuclear applications by their employers.

It appears that those entering the Nuclear industry at professional/managerial level tend to be at postgraduate level. However, only very few of these entrants will have any specific knowledge of the Nuclear industry, as there are very few specifically Nuclear qualifications. None will have had exposure to the nuclear environment, which means that all entrants at this level require an intensive on-site induction and specific skills training.

At this level, there is CPD provision available through the Institute of Nuclear Engineering and the Society of Radiological Protection. Graduates are encouraged to achieve Chartered status through these routes or via Masters degrees. With regard to CPD in general, most sites have established appraisal systems that trigger continuing job specific training needs. The individual normally assumes responsibility for identifying the appropriate resources and the employer will normally fund this.

Assessing training provision

Employers reported that in most areas, there is no common framework of standards; each major operator has set its own. They feel that it is difficult to criticise training providers for inappropriate provision if they have not been given a skills framework for the industry from which to plan their inputs.

What could be developed?

There is a view from employers that there are opportunities to make better use of existing resources. In many respects, the Nuclear sites in the UK are not in actual competition with each other. It was suggested that this could provide the opportunity for more co-operative/collaborative working and also draw in trainees from other critical areas in the supply chain.

The concept of some form of benchmarking such as a ‘Skills Card’ is attractive to the industry. It is felt that this would provide a more reliable way of checking that individuals coming onto sites are specifically qualified for the tasks they are required to carry out.

Specific training for project management is currently lacking. It was suggested that it may be useful to engage with the Association of Project Managers in order to develop this.

The concept of a Nuclear Skills Academy is attractive, not only to create a centre of excellence, but also to promote the image of the industry.

Employers feel the industry could benefit from an innovative and consolidated training facility, similar to the experiential type on offer in the USA. Failing the development of such a facility the alternative suggestion was to allocate training responsibilities for specific topics to different sites.

Next Steps

Nuclear employers are key to the development of the Sector Skills Agreement and Cogent is acting as their voice, under their guidance and input, in ensuring that the UK skills supply meets their current and future needs.

The SSA process takes place over five important phases. We are asking employers to get involved at every stage.

- The first phase resulted in the production of **Skills Needs Assessment (SNA)** which provides an overview of the Cogent SSC sector in relation to workforce size and shape and current skills needs both now and in the future. The full Skills Needs Assessment report and industry specific summaries are available on the Cogent website.

- This document is summary of phase two, the **Assessment of Current Provision (ACP)** which reports on both the quantity of training and qualifications provision and the quality and relevance to employers. The full Assessment of Current Provision report is available on the Cogent website.

- The third phase in this process is the **Gap Analysis**. This will use the findings from the first two reports, as well as a study of future scenarios as agreed with employers, to identify gaps in current training and qualifications provision. During this phase Cogent will be consulting with employers via its website, telephone surveys and through its Employer Advisory Councils to develop a series of possible skills solutions as the basis for an action plan.

- Phase four is the **Assessment of Scope for Collaborative Action** and this will build upon the solutions suggested within the Gap Analysis. We will be joining with stakeholders an employers to look at how these deficiencies can be tackled and what form action might take.

- The final phase, **Developing an Action Plan**, completes the SSA process, and results in the development of a resourced plan. This will include the contribution of each partner (private and public), quantified outputs, estimated impacts on productivity and competitiveness and an evaluation mechanism.

The resulting **Sector Skills Agreement** will fundamentally alter the way skills are demanded, delivered and developed throughout the UK and employer contribution is vital to their success.