

**Market Assessment for the
Sector Skills Council
For the
Chemical, Nuclear, Oil and Gas,
Petroleum and Polymer Industries**

**CHEMICAL INDUSTRY
APPENDIX**



November 2003

TABLE OF CONTENTS

SECTION 1

1.1	THE SECTOR	3
	1.1.1 The main areas of activity in the sector	3
	1.1.2 Profile of sector employees	3
	1.1.3 Size and Structure of the Sector	4
1.2	DRIVERS OF SECTORAL CHANGE	4
	1.2.1 Economic conditions	4
	1.2.2 Patterns of competition	5
	1.2.3 Consumers	6
	1.2.4 Globalisation	6
	1.2.5 Government Policy	6
	1.2.5.1 The Climate Change Levy	6
	1.2.5.2 The EU Chemicals Policy	7
	1.2.5.3 The Chemical Industry – Specific Legislation	7
	1.2.6 Technology trends	7
	1.2.7 Sustainable development	8
1.3	THE CURRENT STATE OF PLAY	9

SECTION 2

2.1	EMPLOYMENT PATTERNS	11
	2.1.1 Numbers employed in the UK	11
	2.1.2 Recent and Expected Changes in Employment	12
	2.1.3 Regional clusters	12
	2.1.4 Occupational shifts	13
	2.1.5 Trends in replacement demand	14
	2.1.6 Trends in qualifications requirements	15
	2.1.7 Trends in skills requirements and skills use	17
	2.1.8 Summary of Major Skills Gaps and Anticipated Changes	17
	2.1.9 Generic skills needs	17
2.2	SKILLS SUPPLY AND EMPLOYER TRAINING	18
	2.2.1 Key groups in the workforce	19

SECTION 1: MARKET PRESSURES AND PERFORMANCE

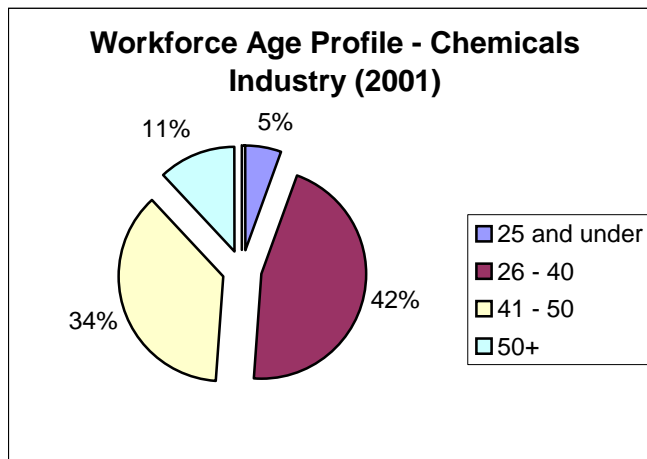
1.1 THE SECTOR

1.1.1 The main areas of activity in the sector

- Manufacturing of commodity and specialty chemicals
- Manufacturing of consumer products, such as cosmetics and detergents
- Manufacture of active ingredients for the pharmaceutical industry

1.1.2 Profile of sector employees

Age Profiles: Chemicals Industry



The data represents the overall workforce: for engineering trades the age profile is slightly different, with those under 25 representing 4% of the workforce, and those over 50 at the significantly higher proportion of 23%.

The demographic issue is also more distinct in certain UK regions.

Within the chemicals industry, existing skills issues may be made worse by demographic factors. Currently, there is an aging population, with fewer young people opting for a career pathway in scientific disciplines – the industry is seen as unattractive. Thus, the workforce is retiring at a faster rate than those entering into the industry. Demographic trends indicate that there is a decreasing amount of available talent entering the industry. Fewer than 4% of process operators are under 25, while 23% are over 50¹.

AREA	MALE	FEMALE	WHITE	OTHER	COMMENT
CHEMICALS					Of 2%, 1.5% of Asian origin, working mainly at professional level.
All Areas	80	20	98	2	
Process Operations	97.7	2.3			
Professional roles	80	20			

¹ Chemical Industry's Employment and Training Survey, 2001

1.1.3 Size and Structure of the Sector

Within the chemicals industry, the existing workforce is made up of 170,000 employees. 24% (40,800) are employed as Skilled Trades, with 26% (44,200) employed as Process Plant and Machine Operators.

1.2 DRIVERS OF SECTORAL CHANGE

1.2.1 Economic conditions

United Kingdom Economic Conditions²

HM Treasury has recently released data that demonstrated the robustness of the UK labour market. Thus, employment is rising and unemployment falling, thereby decreasing the pool of available labour for sectoral recruitment.

In February 2003, UK trade deficit in goods and services was £2.2 billion. This increased to £2.3 billion in March (although this may be due to statistical volatility caused by the recent war). Non EU goods deficit was £2.7 billion in March, an increase from £2.4 billion in February. EU goods trade deficit in March was 0.9 billion (1.1 billion in February).). The EU is a major market for UK-based chemicals manufacturers.

March 2003 saw fairly strong output producer price inflation; however it decreased slightly in the following month. This was primarily the affect of a fall in the inflation rate of petroleum products. In addition, input prices in April were affected by an 18% per cent fall in crude oil prices.

In March 2003, goods export volumes fell by 1.1% - Imports by 1.2%. In the 12 months to April, materials and fuel prices increased by 0.1%.

Economic Conditions in Main Markets³

Western Europe: Growth within the Euro zone was disappointing during the second half of 2001, especially in Germany. Rising exports aided an initial recovery in early 2002. Indicators suggest a weak recovery during 2003. Growth for 2003 is projected at 1.1% (1 ¼ % lower than in September 2002). Germany is a particular concern – industrial production, business confidence and retail sales are continuing to decrease. Furthermore, unemployment figures are at three year high. France is also experiencing a soft labour market and weak consumer confidence. Italy experienced slow pick up during the initial part of 2002 – this compounded by restrained consumer and business confidence demonstrate the potential for a slower recovery than originally predicted. However, strong growth is expected in Greece, Spain and Ireland.

Japan: is currently experiencing weak economic prospects and entrenched deflation. Within the country, prices for goods and services have fallen for four successive years. The government's commitment towards structural reform is likely to have a negative impact on short term growth and inflation. However, this may produce longer term benefits. The economy is unlikely to improve in the short term with surveys⁴ predicting deterioration of business conditions in the second quarter of 2003.

² All data Sourced from HM Treasury

³ All data sourced from IMF

⁴ March 2003 'Tankan' survey

Asia – Pacific Region: Economic conditions in this region are currently fruitful. Excluding Japan, performance has been impressive. Real GDP increased by over 6% in 2002. However, the recent outbreak of SARS and tensions regarding North Korea place added risks on the region.

Middle East: Within the region, GDP growth weakened during 2002. This reflected lower oil production (a result of reduced quotas by OPEC) and the September 11th terrorist attacks on America (tense political and security aspects). However, during 2003 GDP is projected to pickup – the result of higher oil prices and production and continued global recovery. The war in Iraq has resulted in those countries with close economic links to Iraq suffering (namely Jordan and Syria).

North America: The US emerged from a recession at the end of 2001 with great momentum. However, the economy was unable to sustain this into the second half of 2002. However, in early 2003, the medium term outlook was sound.

Latin America: During 2001 and 2002, Latin America experienced its worst downturn for two decades. Furthermore, economic prospects in this region remain uncertain. Economic conditions in 2002 varied across countries. The overall economic outlook in the region remains unstable and is very dependent upon developments in the US.

1.2.2 Patterns of competition

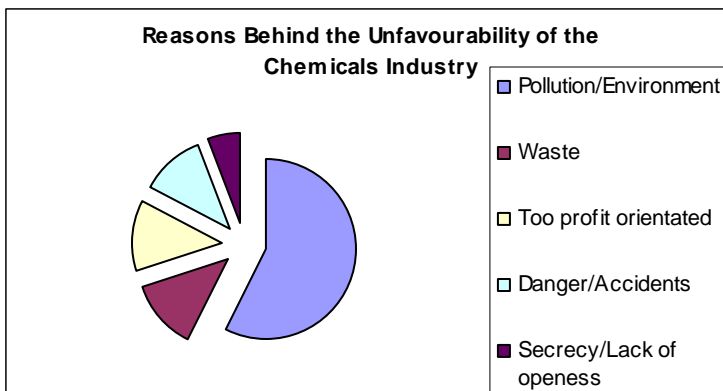
The advent of the Single European Currency has diminished trade barriers between European Countries and thus reduces national price differences. This will increase competition throughout the **chemicals manufacturing** industry on a European echelon. In addition, the increase in globalisation will mean the companies (UK) will face greater competition both overseas and at home. This has meant that many companies are moving away from bulk /commodity chemicals, to higher added value chemicals. This could lead to UK manufacturers losing their bulk/commodity markets. This may result in companies operating on a small scale within niche markets.

Furthermore, the industry could be further disadvantaged by levies on feed-stocks and energy that are not applicable to operations in the remainder of Europe. In addition, the UK is not regarded as an advantageous location to base the 'traditional' sectors of the industry. The reason is three fold: distribution costs are increased due to the UK's geographic position in comparison to the remainder of the European market: currently, as a whole, the UK manufacturing sector is experiencing low growth: in addition, patterns of global investment are favouring both the Middle East (low cost gas feed-stocks) and the Far East (where the markets are currently growing rapidly).

Within the speciality chemicals market (between 1996 and 2001), there was a reducing trade balance. This was brought about by UK imports of Fine Organic chemicals from countries such as India, China and Ireland.

1.2.3 Consumers

The products developed by the **chemicals industry** are often essential to how modern society operates. However, the overall public perception of the industry continues to deteriorate. Currently, the percentage of UK consumers who



perceive the industry to be favourable has dropped from over 40%, to approximately 20% since 1980⁵. The primary reason for this is thought to be the perceived impact of chemical products on both the environment and health.

Due to the above opinions held by consumers, there is an increasing importance being placed on higher technology products that have little or no harm on either individuals' health or the environment.

1.2.4 Globalisation

Globalisation has led to increasingly intensified competition across all aspects of manufacturing. In fact, the chemicals industry is one of the most globalised of all manufacturing industries, with the trend continuing. In an attempt to compete efficiently, the chemical industry is continually improving sector performance by improving efficiency, reducing waste and cutting costs. Currently, the UK chemicals industry is the sixth largest in the world.

The result of globalisation has meant an every increasingly complex business environment. It has led to a distributed, multicultural workforce. Within the industry, there is continued consolidation among companies on a global echelon (e.g. Glaxo Wellcome and SmithKline Beecham, to form GSK, and Novartis from a consolidation between Rhone Poulenc and Hoechst).

Companies dealing in both speciality and bulk chemicals currently find it more desirable to base operations overseas (e.g. the Third World and Middle East). This allows companies to reap the benefits of cheap feedstock providing a cost advantage in competitive export markets.

1.2.5 Government Policy

1.2.5.1 The Climate Change Levy

The Climate Change Levy has been signposted as having a significant impact upon the Cogent sector. The Levy came into force on April 1st 2001, and represented a new energy tax (within the non domestic/business sector). The cost of this is to be matched by an equivalent cut in employers National Insurance Contributions. However, information from

⁵ 'Enhancing the Competitiveness of the UK Chemicals Industry': A Report by the Chemicals Innovation and Growth Team, December, 2002

companies shows that at best they will only recoup one fifth of the taxation. This will have an associated negative impact on the UK manufacturing base, in particular, the chemicals industry (with sales of £32 billion, the chemical industry is one of the UK's largest manufacturing industries). The impact of the levy will produce a ripple effect that will weaken the competitiveness and attractiveness of the entire UK economy as a location in which to manufacture.

1.2.5.2 The EU Chemicals Policy

In 2001, a white paper was published (entitled 'Strategy for a Future Chemicals Policy') addressing the perceived shortcomings of the current system. The paper relates primarily to the following legislation:

- Directive on the classification, packaging and labelling of dangerous substances
- Directive on the classification, packaging and labelling of dangerous preparations
- Regulation on the evaluation and control of the risks of existing substances
- Directive on restrictions on the marketing and use of certain dangerous substances and preparations.

The White Paper is the initial stage in the redevelopment of the EC Chemicals Policy and introduced a new system of chemicals control for both new and existing substances. On May 7th, 2003 a draft proposal of the legislative proposal was issued for consultation by the European Commission.

1.2.5.3 The Chemical Industry – Specific Legislation

There is now much greater emphasis on environmental pressures e.g.

- Integrated Pollution Prevention and Control Regulations
- Water Framework Directive
- EU Strategies of Chemicals Testing

The Chemicals Agents Directive will mean an increased focus on health and safety responsibilities by individuals across the industries.

1.2.6 Technology trends

Recently, the Chemical Industries Association has launched a report entitled 'Trends and Research Priorities for the Chemical Industry – Looking to the Future.' In addition to other information, the study provides market information and intelligence on research and development needs and issues. The primary science and technology research priorities can be placed into the following three broad headings:

- Pacing Technologies – e.g. Bioscience, Catalysis, Combinatorial Technologies, Nanotechnology and Process Intensification.
- Key Technologies – e.g. Computational Technology, Environmental Technology, New Materials Research, Measurement Sciences, Formulation and Separation Sciences.
- Platform/Base Technologies – e.g. each division of chemistry and chemical engineering and their interface with additional disciplines (for example, materials and biotechnology) – This is an area of significant growth⁶.

⁶ Chemicals Manufacturing and Processing NTO, Sector Workforce Development Plan, 2002

The report highlights that high-growth areas (e.g. pharmaceuticals and high value added chemicals) should be given future support. In addition, there will be increasing importance placed on speciality or 'effect' chemicals. Furthermore, the commodity area of the UK industry remains significant and is necessary to support the high growth sectors.

The continuing evolution of IT will result in technological implications for the UK chemicals industry, especially those segments of the industry that supply the IT sector. The global market for IT equipment will be enormous.

In addition, key advances will be made in improving computer models of molecular behaviour. This will replace some experimental work and facilitate the invention of catalysts and pharmaceuticals prior to the use of any test tubes. There will also be improvement in models of processes. This will enable chemical engineers to design a safer, greener and more efficient plant⁷.

Towards 2010, there will be technological developments in medicines for viral and bacterial infections, non – infectious illnesses and the way in which drugs are delivered.

1.2.7 Sustainable development

Sustainable Development is often defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Therefore, it can be seen as the patterns of production and consumption that can be taken into the future without degrading either the human or natural environment while doing so.

In the chemicals manufacturing sector, the Responsible Care programme is in operation. Members of the Chemicals Industry Association are committed to ensuring chemicals are made, distributed, used and disposed of safely. Members are continually working with other organisations, government and local communities to ensure this is maintained. Since 1989, chemical companies throughout the United Kingdom have been committed to an international programme termed 'Responsible Care'. This means that companies place the protection of health, safety and the environment at the heart of their operations.

In 2001, the European Commission published a white paper entitled 'Strategy for a Future Chemicals Policy'. The basic aims of this white paper are fully endorsed by the Chemicals Industry Association. The white paper proposes that in order to enhance protection of human health and the environment, legislation for 'new' and 'existing' should be bundled into one. It recommends all chemical manufacturing over one tonne be tested and registered. The heart of the white paper stipulates the setting up of a regulatory system termed 'REACH' (the Registration, Evaluation and Authorisation of Chemicals)⁸.

⁷ Chemical Industry Association Statement, 2000

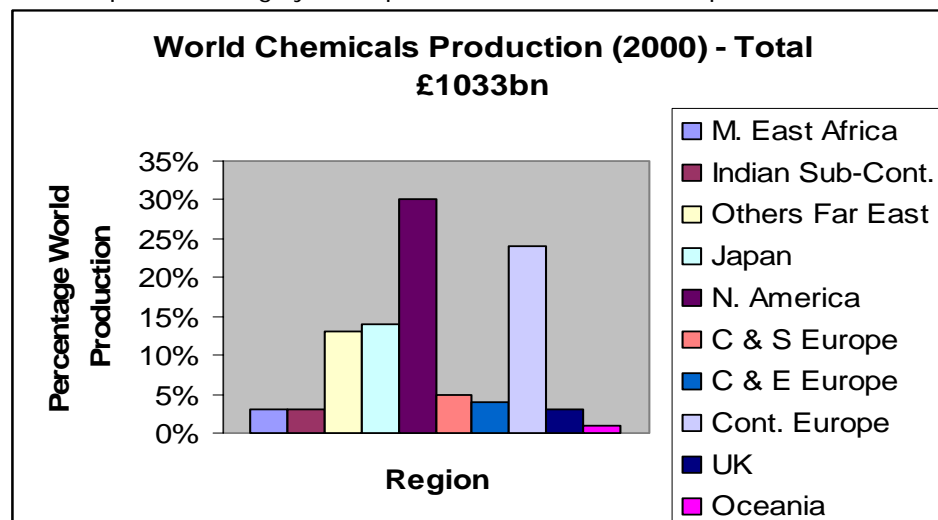
⁸ Commission of the European communities; White Paper: Strategy for a Future Chemicals Policy, 2001.

1.3 THE CURRENT STATE OF PLAY

The **chemicals manufacturing industry** is a core element of the UK manufacturing sector. Within key regions across the UK, the chemicals industry is a significant employer and contributor to added value. The current size of the industry is comparative to that of the UK economy, making a positive contribution to the UK balance of payments. The position of the industry within the current UK economic climate can be seen in the following light:

- In 2001, the chemicals industry employed 170,000⁹, with a comparatively high percentage being employed in SMEs (when compared to France and Germany).
- The industry contributes approximately 2.5% of UK Gross Domestic Product (GDP)¹⁰.
- The chemicals industry contributes 11% of manufacturing industry gross added value¹¹.
- In 2001, investment on capital investment stood at £2.7 billion, representing 16% of total manufacturing investment. Annually, the industry spends around £3billion on new capital investment¹².
- On a domestic basis, the chemicals market stands at £23.7 billion. Demand originates from all sectors of UK industry¹³.
- Every household in the UK, on average, spends £30 per month on chemicals products.

On an international perspective, the UK chemicals industry is the sixth largest in the world; this equates to roughly three percent of world chemicals production.



Adapted from 'Enhancing the Competitiveness and Sustainability of the UK Chemicals Industry'. A Report by the Chemicals Innovation and Growth Team, December 2002.

- In 2001, the UK had a positive trade balance in chemicals (£2.4 billion). This positive situation has been sustained over a long period of time.
- Sales of UK manufacturing chemicals (excluding pharmaceuticals) are worth £26.1 billion. This figure represents 7% of value added in UK manufacturing.

⁹ 'Enhancing the Completeness and Sustainability of the UK Chemicals Industry'. A Report by the Chemicals Innovation and Growth Team, December 2002.

¹⁰ The Chemical Industry Employee and Training Survey, 2001

¹¹ Same as 9

¹² Chemical Industry Association Statistics

¹³ Same as 12

- The UK has a relatively high proportion of speciality chemicals and consumer products within its chemicals portfolio. The speciality business (as a percentage of total UK chemicals business) is greater than all the UKs major competitors except Italy.

There are a number of economic factors that attribute to the struggle for profitability. Namely, those factors that impact upon the UK's performance relative to Europe (the strength of the pound against the Euro) or the UK's position within Europe in comparison the rest of the world (the potential financial burdens associated with the EU chemicals strategy)¹⁴.

- The Middle East and Far East are expected to capture the bulk of global growth in petrochemicals.
- Ethylene capacity is predicted to grow in the Middle East by 8 – 10% per annum, Far East and Latin America 6 – 8% pa and Europe by 2% pa¹⁵.

¹⁴ 'Enhancing the Completeness and Sustainability of the UK Chemicals Industry'. A Report by the Chemicals Innovation and Growth Team, December 2002.

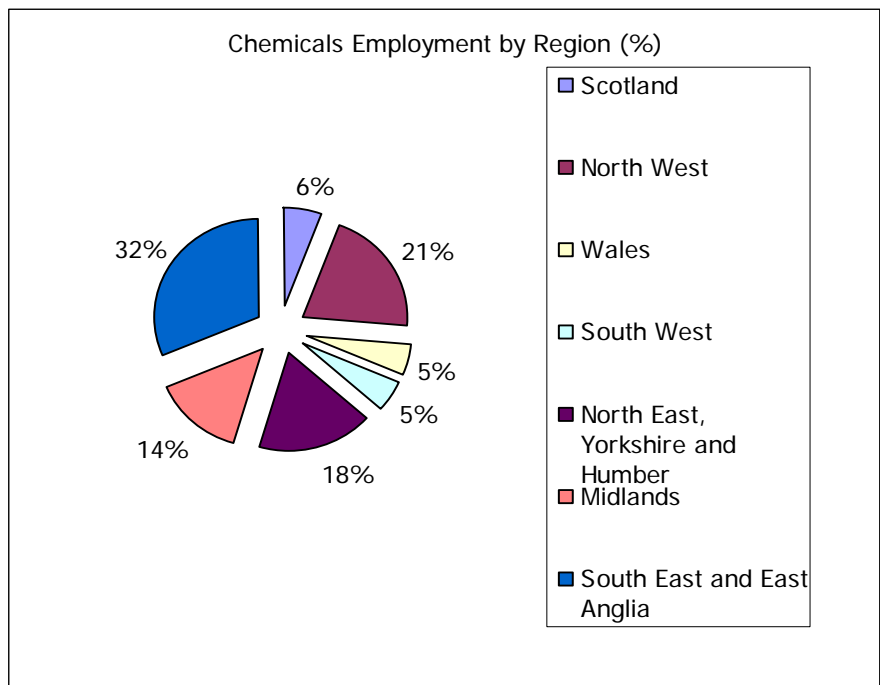
¹⁵ Same as 12

SECTION 2: CHANGING SKILLS NEEDS

2.1 EMPLOYMENT PATTERNS

2.1.1 Numbers employed in the UK

The number of employees within the sector is continuing to fall, whilst productivity continues to rise. The UK distribution of employment is as follows:



Source: Sector Activity Information 2002, Cogent

Region	Number Employed
Scotland	10,200
Northern Ireland	??
Wales	8,500
NW	34,850
NE	30,600
York & Humber	
West Midlands	23,800
East Midlands	
South West	8,500
South East	53,550
London	
East of England	
TOTAL	170,000

2.1.2 Recent and Expected Changes in Employment

Within the chemicals industry, companies have not been major recruiters for some time. However, recruitment needs are changing. In the future, many companies will be recruiting sizeable numbers of young people, graduates and adults over the next decade.

The UK bulk chemicals sector was originally dominated by one company (ICI). However, as ICI began to change focus and direction a wide range of international companies have invested in previous ICI businesses. This has led to associated employment opportunities for the UK chemicals workforce. For example, US based company Huntsman acquired \$2.5 billion of ICI's operations in 1999. Since then, they have invested over \$225 million, showing their commitment to the UK¹⁶.

- During 2003, Japanese chemicals company Nippon Gohsei are to open a chemicals production facility in Hull¹⁷. This will bring 70 permanent jobs to the UK chemicals industry.¹⁸

2.1.3 Regional clusters

Within the North East of England, the chemicals (organic) sector makes up almost a quarter of UK employment. There is a strong core of 30 organisations producing organic basic chemicals.

The North West accounts for over 55% of the UK basic inorganic chemicals, thus providing significant employment for the industry.

Yorkshire and Humber is also a key region for employment within the UK chemicals industry, employing 32,000 people. Within West Yorkshire, speciality chemicals – the manufacture of dyes and pigments are produced by 25 firms, employing 4,400. This accounts for 40% of the UK total¹⁹.

¹⁶ DTI – Invest UK, September 2002

¹⁷ Same as 16

¹⁸ Same as 16

¹⁹ Same as 16

2.1.4 Occupational shifts

Site Predictions of Workforce Change by Occupation					
Occupation	Change	Since 1998	+ 12 Months	+ 1-2 years	+ 3-5 years
% of responses for occupation and time period					
Managers	Stable	37	82	72	74
	Increase	20	4	12	6
	Decrease	43	13	16	20
Professional	Stable	49	71	60	59
	Increase	18	19	25	34
	Decrease	33	10	15	6
Supervisors	Stable	47	78	73	67
	Increase	16	12	8	7
	Decrease	37	10	19	26
Technical	Stable	48	63	69	69
	Increase	14	20	25	28
	Decrease	38	12	6	3
Craft	Stable	43	81	80	74
	Increase	7	7	10	7
	Decrease	50	12	10	19
Process Operators	Stable	38	54	68	55
	Increase	12	28	25	33
	Decrease	50	17	7	12
Graduate Recruits	Stable	65	68	63	61
	Increase	10	27	31	31
	Decrease	25	5	6	8
Apprentices	Stable	67	67	55	68
	Increase	14	21	31	24
	Decrease	19	12	14	8

Source: Data from the Chemical Industry's Employment and Training Survey, May 2001

These statistics are based on a postal survey, conducted by CMPNTO, of 51 (from 366) industry respondents. The survey was carried out in February and March 2001 and follows a previous survey conducted in 1998/9. From the statistics, it can be deduced that there is a strong emphasis on the occupational stability of the workforce within the chemicals industry.

Projected Employment Change by Main Occupational Groups				
Occupational Group	1999 (%)	Number 2010	2010 (%)	Change (%)
Corporate Managers	11.2	24507	11.5	-10.2
Science/Technical Professions	3.2	7791	3.7	-0.2
Business/Public Service Assoc Prof	4.8	11274	5.3	-4.2
Admin and Clerical Occupations	5.7	11905	5.6	-14
Skilled Metal/Electrical Trades	7.7	15626	7.3	-16
Skilled Construction Trades	3.2	6129	2.9	-20.7
Process Plant & Machine Ops	20.7	42614	20	-15.4
Transport Drivers & Operatives	9.7	20688	9.7	-12.3
Elementary: Trades/Plant/Machinery	11	24323	11.4	-8.8
Elementary: Clerical/Service	7.6	15601	7.3	-15.2
All Occupations	100	212809	100	-12.5
Manufacture of Chemicals Products, Rubber, Plastic and Other Wood Products				

Source: Process Industries Skills Dialogue, July 2002

The data presented in the table above is extracted from the Process Industries Skills Dialogue (July 2002). However within the aforementioned report, the data has been collated under the broad category of 'manufacture of chemicals products, rubber, plastic and other wood products' (including SIC 25). Thus, the statistics are unable to be broken down further into more specific 'Cogent Sector' definitions.

2.1.5 Trends in replacement demand

Data collated demonstrates trends associated with businesses replacing staff as required. This may be the result of natural wastage (e.g. retirement and deaths whilst in employment) or occupational mobility (people changing jobs).

As with the data sourced from the Skills Dialogue, Institute of Employment Research (IER) analysis has been used and is limited to a two digit SIC code. Therefore, the data (although providing an adequate picture) is related to a broad sector grouping – containing information non specific to the Cogent sector.

Projected New Entrants by Main Occupational Groups 1999 – 2010				
Manufacture of Chemical products, rubber, plastic and other wood products				
Occupational Group	Employment 1998	Expansion Demand²⁰	Replacement Demand	Net New Entrant Needs
Corporate Managers	27298	-2791	4744	1953
Science/Technical Professionals	7806	-15	2347	2332
Business/Public Service Assoc Prof	11769	-495	8566	8071
Secretarial and Related Occupns	5109	-1457	2543	1086
Skilled Agricultural Trades	3210	-665	2719	2054
Skilled Metal/Electrical Trades	18605	-2979	12240	9261
Skilled Construction Trades	7592	-1522	2247	725
Process Plant and Machine Ops	50359	-7745	39312	31567
Transport Drivers and Operatives	23581	-2893	14718	11825
Elementary: Trades/Plant/Machinery	26675	-2352	24279	21927
Elementary: Clerical/Service	18403	-2802	9955	7153
All Occupations	243150	-30341	103604	73263

Source: Process Skills Dialogue, July 2002

2.1.6 Trends in qualifications requirements

Previously, the science and technology workforce (in its broad sense) has been shown to be highly reliant on high level qualifications at both degree and sub degree level. Thus, due to predicted growth in these occupations, a closer relationship between this labour market and Higher Education will have to be fostered.

There has been a steady decrease in the relative number of individuals passing 'A' level mathematics and physics. In addition to this, there has been a perceived drop in the standard of mathematics at both GCSE and 'A' level. This trend is of concern to all industries, with mathematics and physics being core qualification requirements across the sector.

Position within Scotland

Subject	Trend in Entries at Higher Grade(1997 – 1999)			Trend in Entries at New Higher (2000 – 2001)	
	1997	1998	1999	2000	2001
Mathematics	20,469	20,221	20,038	20,050	20,730
Biology	11,921	11,347	10,729	9,237	9,309
Chemistry	11,876	11,072	10,489	7,479	9,903
Physics	11,680	11,449	10,560	9,572	10,015
Geography	9,005	8,437	7,911	7,765	7,984

Source: SQA 2001 Annual Statistical Report, SQA, 2002

²⁰ The expected changes in labour needs as a result of business expansion or contraction

% Trend in Pass Rates at Higher Grade(1997 – 1999)			% Trend in Pass Rates at New Higher (2000 – 2001)		
Subject	1997	1998	1999	2000	2001
Mathematics	68	68	69	71	70
Biology	65	64	66	66	67
Chemistry	71	72	72	73	73
Physics	69	71	70	71	75
Geography	72	74	73	77	75

Source: SQA 2001 Annual Statistical Report, SQA, 2002

Trends in Entries at Standard Grade 1997 - 2001					
Subject	1997	1998	1999	2000	2001
Mathematics	62,411	59,683	59,689	60,149	59,597
Biology	22,626	22,055	22,717	22,612	23,049
Chemistry	24,048	22,744	22,945	23,275	23,237
Physics	20,483	19,133	19,391	19,284	19,272
Geography	24,467	22,850	22,553	21,998	22,403

Source: SQA 2001 Annual Statistical Report, SQA, 2002

Modern Apprenticeships remain vital to the sector as a whole, and frameworks are maintained for all appropriate areas, as shown in appendix 7. In due course, Cogent needs to extend provision, to ensure that new industry-specific markets are covered.

Foundation degrees also form part of the new qualifications framework in England and Wales. Cogent will assist in the development of foundation degrees where there is recognised employer demand.

2.1.7 Trends in skills requirements and skills use

The table below has been formulated from data held in the Chemical Industry Employment and Skills survey (March 2001). A key skills deficiency can be seen in relation to the area of control technology (roles affected currently include process operators, craft grade engineers and managers and supervisors).

Identified skills Gaps and Shortages – Chemicals Industry (%)				
Job Role	Existing Skills Shortage	Changing Work Practices	Staff Turnover	Shortage of Skilled Recruits
Manufacturing managers	40	64	24	18
Research managers	13	29	18	13
Other managers	16	33	16	20
Manufacturing professionals	16	31	16	24
Research professionals	11	24	13	16
Other professionals	16	27	20	20
Manufacturing supervisors	36	56	11	22
Research supervisors	9	11	9	7
Other supervisors	13	18	9	16
Manufacturing technicians	16	38	18	27
Research technicians	9	20	13	13
Laboratory technicians	13	36	13	22
Process craft grades	11	33	7	11
Engineering craft grades	24	53	18	27
Other craft grades	9	11	7	7
Process operators	29	62	20	29
Trainers and Instructors	11	18	9	11
Clerical and administration	18	53	18	16
Services	11	18	11	11

Source: The Chemical Industry's Employment and Training Survey, May 2001

2.1.8 Summary of Major Skills Gaps and Anticipated Changes

Within the chemicals sector, the most notable skills deficiencies are within the area of control technology. The roles currently affected include process operators, craft grade engineers, managers and supervisors.

In addition, there is an increasing need for graduates to have experience of a broader spectrum of multidisciplinary skills²¹.

This trend is expected to continue for the next two to three years.

This has been primarily attributed to changes in working practices (technological innovation and legislation).

2.1.9 Generic skills needs

A number of studies have highlighted the importance of generic skills and their increasing importance to employers. Generic skill needs reflect changes in work organisation and work practices, technological change and a general increase in the expectations of employees. Primarily, the following generic skills are required:

²¹ Process Industries Skills Dialogue, July 2002

Engineering Base

- Communication
- Team working and getting on with others, including being able to work in self-managed teams
- Problem solving and diagnosis, and at professional levels, greater abilities for forward thinking and 'whole system' thinking
- Taking responsibility, showing initiative and becoming more involved
- Organisation and management

Source: Skills Dialogue: Listening to Employers – An Assessment of Skill Needs in Engineering

2.2 SKILLS SUPPLY AND EMPLOYER TRAINING

Within the industry, there is not merely a requirement for an increase in new entrants, but for better quality recruits. Aspects of globalisation have increased the need for continuous improvement and cost cutting leading to flatter structures. Thus, at all levels there is a need for high calibre recruits with the right mix of technical and key/core skills.

The industry uses frameworks such as sector focused Modern Apprenticeships as part of the initial training of new entrants and currently foundation degrees are under development as part of the continuing professional development of existing employees. This helps address issues such as the image and attractiveness of the industry as well as addressing skill needs.

Provision of suitably skilled people into the industry is essential. The following section outlines the state of provision of employer and publicly funded training.

The sector traditionally recruits from both further and higher education for specialist jobs at three different levels.

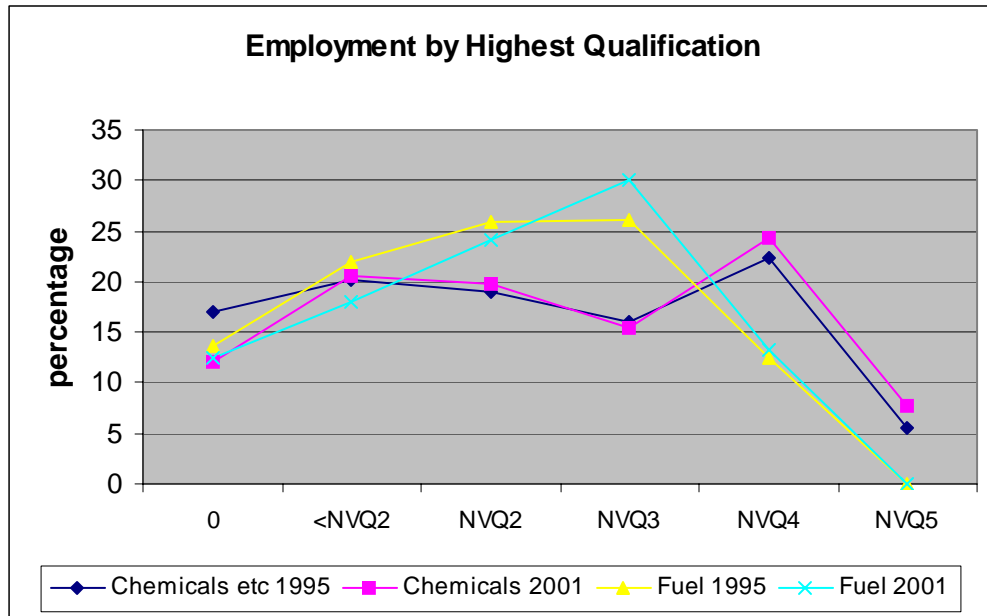
- Highly specialised research and technical staff for a wide range of pure applied scientific and engineering roles. These people are likely to have degrees, higher degrees and PhDs.
- Generalists, usually graduates, for a wide range requiring a level of scientific/technical understanding and numeracy, that will allow the individuals concerned to operate effectively in a technology-based environment.
- Technicians with practical competence in the application of management of science and technology, especially for manufacturing. These people are likely to have HNC's / HND's / Modern Apprenticeships. A typical MA will have the equivalent of 5 GCSEs at grade C or above, including maths and science. Many will have higher qualifications.

In addition, the industry also recruits graduates and technicians in other disciplines to work in areas such as administration, accounting, marketing and Human Resources.

The NTO Employment and Skills Survey and Workforce Development Plan shows while numbers of employees in the industry continues to decline slightly overall, there is an ongoing need to recruit, train and develop employees at technician and associate professional level as skill levels and needs are set to rise. This also means that the existing workforce needs up-skilling to meet the demands of new technology and changing work practices.

Vocational routes and learning frameworks (such as Modern Apprenticeships, Foundation Degrees and Graduate Apprenticeships), based on National Occupational Standards, are key to producing appropriately developed people with the skills and knowledge base that the industry needs, and have the ability to benefit mature employees as well as those entering the workforce. They offer a chance to create routes to higher level qualifications which compete on a level playing field with traditional, academic routes.

There has been an upward trend in qualifications attainment of the workforce (note that statistics cover greater employment base than the Cogent footprint).



Around 31% of 18 – 19 year olds now enter higher education as opposed to 15% in 1990. Therefore, there has been a rapid transition from an elite system of higher education provision, to a position where opportunities for higher education provision have become more widely available and more extensively promoted.

This development has been mainly at the expense of technical and vocational routes within further education. Declining provision has led to course closure of, for example, National and Higher National courses, which has had a dramatic effect on manufacturing industries.

2.2.1 Key groups in the workforce

The main groupings within the sector can be categorised as

- Managers
- Process supervisors and engineers
- Technicians
- Process operators
- Other support staff

Managers within the sector tend to be graduates, with professional qualifications. The focus for Cogent is on the life-long learning agenda, maintaining managerial skills at the leading edge.

Process supervisors and engineers are an important group, with a need for provision of occupational standards as the focus for assured training and competence (for example, contractor passport, offshore safety certificates, N/SVQs, HNC/Ds).

Technicians are seen as one of the main focuses of Cogent activity, in both recruitment and retention. They form part of the career path for supervisors and engineers.

Process operators form the largest group of employees in some of the Cogent industries, and are also one of the groups showing a rapidly aging profile. As technology impacts on processing skills, there is a need to ensure that process operators are trained and retrained to maintain standards of competence in line with the higher skills requirements. Cogent must maintain the currency of occupational standards in a fast-moving environment.

Other support staff within the industries e.g. accountants, administrators etc, are served by standards and qualifications within the remit of other current and prospective sector skills councils. However, they are still integral to the businesses within the Cogent sector, therefore the role of Cogent for this group is in the area of generic industry-based training and competence, such as health, safety, security and environment, and in awareness of the products.

Many of the businesses within the sector are SMEs (90% +), and Cogent must rise to the challenge in engaging and providing for their skills needs, at an acceptable cost to both parties.

In summary, the key groupings are: **professional engineers and scientists, technicians and process operators.**

Areas of learning supply that need most to be enhanced in order to meet employer's needs

In terms of **occupational standards**, the sector has developed and maintained an extensive framework and is constantly seeking to promote their use within the industries. An occupational and functional map for the newly formed sector would be the recognised starting point to seeking gaps in provision, bearing in mind that some parts of Cogent have never had representation by an NTO. The wider sector recognises that there is also overlap in some of the standards currently in use, and would seek to rationalise, to minimise the number of units and thus aid transferability between industries. Known gaps are in the areas of management (contextualised from general standards), vapour recovery, drilling operations at higher levels, process engineering maintenance and engineering maintenance and emergency response roles across the sector.

For **Modern Apprenticeships**, promotion of MA frameworks throughout the industry will be continued.

At the present time, we (Cogent) are unable to provide data regarding the distribution of qualifications and training by age, occupation and size of occupation. Therefore, future work would need to be undertaken to gather, collate and disseminate this information.