



**Unite Amicus Section response to the Nuclear Consultation -
'The Role of Nuclear Power in a Low Carbon UK Economy'**

1 Introduction

- 1.1. **This response is submitted by Unite Amicus Section. Unite is the UK's largest trade union with 2 million members across the private and public sectors. The union's members work in a range of industries including manufacturing, financial services, print, media, construction, transport, local government, education, the health service and not for profit sectors.**
- 1.2. Unite Amicus Section represents approximately 7,000 people directly employed in the nuclear industry, as well as others in companies in the nuclear industry supply chain, construction and manufacturing, all of whose futures depend on the UK remaining competitive in the global marketplace.

2 Q1 **“To what extent do you believe that tackling climate change and ensuring the security of energy supplies are critical challenges for the UK that require significant action in the near term and a sustained strategy between now and 2050?”**

- 2.1. The Stern review’s realisation that by continuing a business as usual approach would, in the long term, cause greater losses to global Gross Domestic Product (GDP) than would the cost of mitigation, shows that no industry can afford to be complacent about the issue of climate change. Unite Amicus Section rejects the business as usual approach.
- 2.2. The events following the natural gas shortages during the winter of 2005/6 in the UK clearly illustrate what can happen when a key resource becomes unavailable, other than at an exorbitant and uncompetitive price. The reliance on a single form of energy could create a situation where industry, their employees, the respective supply chains and respective governments are forced into taking desperate measures.
- 2.3. As a result of past events and due to fears over the cost of Carbon, and supply insecurity, it has been the experience of this union that many high energy users are actively considering relocation to locations outside the EU. Such a move can only be counteracted with considerable inward investment in the UK which cannot be left to market forces who have failed us so many times in the past as highlighted by Sir Nicolas Stern and others. **Unite Amicus Section believes that the government clearly needs to intervene in the national interest.**
- 2.4. Although the private sector has significant resources at its disposal, unless these resources are supported by central government and steered into fulfilling the needs of this country, business will always go for the safest option, providing the quickest return on the investment. Currently this assessment will result in a new dash for fossil powered generation which will have the potential to incorporate Carbon Capture and Storage (CCS) but only at some later date, resulting in a net increase in overall UK emissions.
- 2.5. Likewise energy shortages and insecurity increase the price of these resources swelling the numbers affected by fuel poverty. Although the government has pledged to eradicate fuel poverty the numbers affected continue to grow.
- 2.6. Nuclear power requires a very large initial investment but once constructed, will produce a very low cost electrical supply with low greenhouse gas emissions. The problem lies with public perception, availability of suitably trained personnel and this high initial cost. All of these have potential solutions and opportunities for training and investment, which government involvement and support could resolve.
- 2.7. There are sufficient known sources of fissionable material to power any new build to 2050 and beyond¹. The volumes of waste are also several factors of ten less

¹ The oceans contain considerable amounts of naturally occurring uranium and over 90% of spent fuel can be recycled by utilising a reprocessing programme.

than the mega tonnes of harmful greenhouse gases (GHG) produced by some other currently available methods of generation.

2.8. The published technological reports in nuclear fusion technology suggest that within thirty years, this method of generation may no longer be science fiction if a fast track approach is adopted², providing the possibility of unlimited cheap energy. Until nuclear fusion power does come on stream, nuclear fission provides the best option for base load supply, solving the twinned problems of climate change and a reliable secure energy supply.

3 Q2 “Do you agree or disagree with the Government’s views on carbon emissions from new nuclear power stations? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”

3.1. Unite Amicus Section firmly believes that the government evaluation of the volume of emissions from nuclear facilities using current mining and refining methodologies are correct.

3.2. The comparison with wind powered generation may need revision, given that they fulfil two radically different generation types which are not in competition. Additionally the low and unpredictable levels of return from wind turbines that has been the experience of investors so far must also be accounted for. In the UK, the onshore load factor has dropped to around 25% of capacity³. Offshore wind on the other hand has proven to be more dependable although more expensive to service and maintain than predicted. Consequently, given the experiences to date, estimates of output and cost per kWh have been miscalculated, pushing the price in terms of emissions and the investment per kWh up. This provides a far more favourable picture for nuclear power. Technological advances in turbine design may redress this balance in favour of wind power but as the development of wind power utilising the best locations gives way to less favourable sites, the specific output at each new site is likely to decline further.

3.3. Based on the experiences of Denmark where the load factor is just 20% it is estimated that to fulfil the renewables targets by 2020 using wind power alone would require 41 gigawatts of generation capacity at a cost estimated at a billion pounds a gigawatt.⁴

3.4. Emission levels quoted for coal & natural gas powered facilities would appear to be on the low side as these levels need to incorporate the emissions from mining and transport of these fuels. The previous DTI figures show that lignite would produce approximately 1.3kg per kWh, whilst coal facilities would struggle to achieve a figure below 900g per kWh. The amounts of fissionable material required per kWh produced in a modern nuclear facility are minute, resulting in far

² Annual Report of the EURATOM/UKAEA Fusion Programme 2005/06 – referring to ITER project which aims to have a working prototype 500MW fusion reactor operational by 2021

³ Proceedings of ICE - Civil Engineering 158 May 2005 Pages 66–72 Paper 13663 - Why wind power works for Denmark - <http://www.thomastelford.com/journals/DocumentLibrary/CIEN.158.2.66.pdf>

⁴ Annual Report of the EURATOM/UKAEA Fusion Programme 2005/06 – referring to ITER project which aims to have a working prototype 500MW fusion reactor operational by 2021

fewer emissions per kWh from mining, transportation and refining. Predictions would suggest that emissions from coal could be cut to just 185g per kWh using CCS, this still leaves a considerable amount still to be accounted for.

4 Q3 “Do you agree or disagree with the Government’s views on the security of supply impact of new nuclear power stations? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”

- 4.1. Unite Amicus Section believes it would be unwise to rely on a single energy supply source and that the UK should diversify to ensure a greater security of supply and a contingency should one source become problematic.
- 4.2. Although nuclear energy is not the magic bullet to solve the energy supply needs of this country, it does have some significant advantages. Nuclear energy provides a solid foundation of base load supply on which to build and accommodate other forms of generation. The price of fissionable material may have increased significantly over the years but the quantities required are minute in comparison to other forms of generation. 500,000m³ of coal or over 160 million m³ of natural gas are required to produce the same amount of electricity produced from just 1m³ of uranium fuel in a modern Pressurised Water Reactor (PWR).⁵ Sources of this material are also very different from sources of other fuels (See Appendix 1). This provides a very significant benefit as it does not tie the UK to the fortunes or otherwise of a handful of nations which might be politically unstable.
- 4.3. Over 90% of spent fuel can be recycled to provide even greater security of supply. Constructing a deep recoverable storage facility for this high level waste may provide an alternative to mined imports should supplies become too expensive from known mineral deposits.
- 4.4. Uranium is however a very common metal found in a wide range of locations, including coal and phosphate deposits as well as sea water although in concentrations which are currently uneconomic to consider (See appendix 2). Estimates by the IAEA-NEA suggest that there is at least 200 years worth of uranium extraction potential from known conventional resources. In recent months, however, the monthly end spot price of Uranium has been increased significantly from a low of \$15.65 US/kg of Triuranium octaoxide (U₃O₈) in December 2000 to \$299.83 US/kg U₃O₈ in June 2007 on the world markets before falling back suddenly as a result of the US release of very large quantities⁶. The current high price of this resource is making some otherwise less commercial fuel sources, such as reprocessing, viable propositions. Despite this recent rapid climb in price of late the market⁷ is relatively stable at an average of approximately \$22 US/lb U₃O₈⁸.

⁵ Source :- British Energy

⁶ Source :- http://www.cameco.com/investor_relations/ux_history/complete_history.php

⁷ Caused principally by the temporary forced closure due to flooding of the Cigar Lake mine development in Saskatchewan Canada which has the capacity to provide 17% of global demand.

⁸ Average monthly spot price of U₃O₈ since August 1997 till August 2007.

- 4.5. Despite this price climb being far greater than that seen in gas prices during the winter of 2005/6 (See appendix 3) reaching highs that have not been seen at any time in the history of civil nuclear generation, this has not caused any of the wide spread industrial problems. This illustrates the underlying security of this form of energy generating fuel given the small quantities involved by volume.
- 4.6. The 2007 second quarter energy trends⁹ show, a 9.6% decline in gas production allied to an 84.3% growth in gas imports on earlier this year caused in part by a 26.5% increase in demand from electrical generation. Predictions on a continued growth in the UK's dependency for natural gas are therefore worrying as predictions continue to suggest that this commodity will be in high demand globally without the production levels or reserves to meet requirements. Given natural gas is the raw material used to make everything from contact lenses to fertilisers, the sweeping effects of gas shortages will have wide reaching effects way beyond the supply of electricity.
- 5 Q4 **“Do you agree or disagree with the Government’s views on the economics of new nuclear power stations? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”**
- 5.1. Speculation over the price of carbon, during Phase II of the European Emissions Trading Scheme (EU ETS) are highly dependent on the outcome of legal challenges raised by Poland, the Czech Republic, Slovakia and Latvia, to their allocation. Phase I of the EU ETS was plagued by over allocation leaving the price to collapse, as the average EU nation’s emissions increased by just less than 1%.
- 5.2. To achieve a significant reduction in the amount of carbon released, the number of emission certificates has to be far fewer than are required in a business as usual model. Despite the UK’s predicted failure to meet emissions reduction targets, it was provided with all of its requested allocation, whilst Latvia by contrast which is on target to reduce emissions by 46% by 2010, was provided with just 55% of its National Allocation Plan (NAP) for 2008 to 2012. Phase I of the EU ETS failed as nations requested a far larger allocation than was needed. Consequently whether these nations’ requests were also in line with requirements or not, will no doubt be determined by the European Court of Justice.
- 5.3. Whatever the outcome of this challenge, its result and any reallocation of the current EU ETS phase II certificates will have a marked effect on the price of carbon. If there is redistribution in favour of those nations who have raised a challenge, the price per tonne of CO₂ will climb dramatically, making nuclear energy and other mitigation methods more economically attractive but at a potential cost to smaller manufacturers who may not be able to afford to shoulder this burden. Any increase in the price of carbon would lead to the stated projection to also be revised upwards beyond the stated £15 billion.

⁹ published 27 September by the Department for Business, Enterprise & Regulatory Reform

5.4. The real economical cost to be addressed would be that faced if new build does not go ahead and alternative fossil fuelled plants are relied on to produce the increased base load. A diverse energy supply which includes nuclear generation will reduce this dependency and thereby diminish the global impact of this countries demand for electrical power.

6 Q5 “Do you agree or disagree with the Government’s views on the value of having nuclear power as an option? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”

6.1. Given the importance of the nuclear industry to this country’s economic and environmental future, nuclear power has to be a component part of the energy strategy. Unite Amicus Section therefore disagrees with the Government’s view that nuclear power should be an option. It should be a minimum requirement in any energy strategy that some new capacity is built.

6.2. A decision of this magnitude should not be left to private investment and to the markets to arrive at on purely economic grounds. There needs to be incentives to attract investment into this industry to assist the market in raising the finance needed for a programme of new build.

6.3. The target of a 60% reduction in emissions by 2050 has been, according to the Intergovernmental Panel on Climate Change (IPCC,) revalued and shown to be far to low to avoid the effects of climate change, estimating that a 80% reduction would be required if a disaster is to be avoided. At present, despite the government’s good intentions, emissions have continued to rise putting in doubt any realistic alternative solutions which do not include nuclear power generation.

6.4. Electrical energy generation is currently the principal source of GHG emissions in the UK, due to its heavy reliance on fossil fuelled generation. Whilst generation using fossil fuels should not be ruled out, such methods should be forced to incorporate CCS technology despite the decline in efficacy that this would cause. Currently investment in this technology has been dependent upon the economic benefits of enhanced recovery from oil and gas wells. Unless the price of carbon is suitably high, a model based on commercial sector investment will be doomed to failure.

6.5. Nuclear power generation is therefore the keystone of an over arching solution to both our economic and environmental needs and as such should not be left to the whims of the market.

6.6. At present a total of 39% of the UK’s electricity is produced in gas-fired stations, accounting for just 30% of the total gas demand with the rest dominated by domestic consumption. Coal fired generation has, in the recent past, accounted for up to 50% of generation capacity when supplies of gas ran short. If the UK invests in a return to the 25%¹⁰ proportion of nuclear power generation it can

¹⁰ Based on the 25% quoted in Box 8.4 of the Role of Nuclear Power in a Low Carbon UK Economy Consultation document – page 135

release some of this dependency in the future, especially when supplies of gas are far from certain.

7 Q6 “Do you agree or disagree with the Government’s views on the safety, security, health and non-proliferation issues? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”

- 7.1. Unite Amicus Section agrees with the views contained in the consultation on safety, security, health and non proliferation issues.
- 7.2. The concerns over the safety of this technology as a result of the nuclear arms programmes of the past have served to instil an innate fear of civil nuclear energy. The industry has over the years taken every reasonable effort to ensure the security, and safety of this form of generation. Events in the recent past, including that of 9/11, have shown up potential flaws in security which can now be catered for in reactor designs.
- 7.3. The union wants to see the country taking a major part in the Global Nuclear Energy Partnership (GNEP), which is a consortium of nations with advanced nuclear technologies who provide fuel and reactors sized to meet the grid and industry needs of other countries, should new build go ahead. The GNEP has expressed goals that closely correlate with those expressed by government in relation to non proliferation issues and provides a market place for nuclear technology.
- 7.4. The existing regulatory system does not have the flexibility required in order to allow a balanced energy policy to operate in the UK. Unite Amicus Section supports competition, but believes there will have to be detailed discussions with the industry, the regulators, the DTI and other stakeholders regarding the construction of a regulatory model that would be flexible enough to allow all forms of generation, including nuclear, to operate within a framework that would have restrictions but still remain competitive.
- 7.5. There are a number of issues that need to be addressed apart from cost and these include security of supply, environmental impact, national competitiveness and social concerns. In the view of Unite Amicus Section, the advantages that nuclear provides with regards to the first two issues are significant and if combined with the overall cost of generation, makes it a viable component of a diverse energy policy. The high safety standards set by the World Association of Nuclear Operators (WANO) and the Institution of Nuclear Power Operators (INPO) are intrinsic to the industry and must be exported to other developing countries alongside the technology and expertise.
- 7.6. The various key government departments involved in nuclear licensing can create considerable potential delays in the new build process and are in need of funding. The Nuclear Installations Inspectorate (NII) for example is severely under resourced yet will be playing a key role in the licensing of any new nuclear build.

8 **Q7 “Do you agree or disagree with the Government’s views on the transport of nuclear materials? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”**

8.1. **Unite Amicus Section believes that the best method to transport nuclear material is by rail when such movements are necessary.**

8.2. Movements of such materials from nuclear generation by road and waterway as suggested requires a slow and steady pace to be maintained and disruption to those avenues for other road and waterway users.

8.3. Given today’s climate of heightened security, the union strongly believes that any such movements should be kept to an absolute minimum and scheduled at random times throughout the day, week and month to make the targeting of such shipments unpredictable. The routes used by such rail shipments are far less variable and in the recent past, have occurred at times to suit the rail companies’ schedules, resulting in a regular predictable slot in the weekly timetable.

8.4. **Unite Amicus Section firmly believes in the safety and security of these shipments believing that central rather than distributed storage of material, for example, would weaken the security of these materials.**

9 **Q8 “Do you agree or disagree with the Government’s views on waste and decommissioning? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”**

9.1. **Unite Amicus Section agrees with the government assessment as to the volumes and costs associated with waste and decommissioning but feels that the proposals to cap any potential long term storage facility rather than have a retrievable storage facility is a mistake.**

9.2. Although the sources of Uranium are plentiful, the extraction of this material can be very expensive. As over 90% of spent nuclear fuel can be reprocessed and reused it is an extremely wasteful policy to just dispose of such materials in such a manner. Granted the reprocessing of spent fuel will lead to additional irradiated material requiring long term storage, but given the amounts involved and the potential benefits to the nation that recovered Uranium Oxide & Plutonium Oxide mix (MOX) can provide, it would be foolish not to utilise this resource¹¹.

9.3. As highlighted previously in the Amicus response to the Energy Review, Anglesey Aluminium is totally dependent upon the supply provided by the Wyfla Magnox facility on the island which is scheduled to close in 2010. Although it may be feasible to extend the life of this station to 2015 this would depend on the extension of the life of the nuclear reprocessing at the Sellafield MOX Plant (SMP). Wyfla power station and the Aluminium smelting facility on Anglesey are the two leading employers on the island and their closure will lead to mass unemployment in this small community.

¹¹ Westinghouse Commercial estimates that such business this could be worth on a pessimistically £34 million plus the additional value of Uranium Oxide and Plutonium Oxide recovered.

- 9.4. Additionally, the NDA have stated that de-conversion is “the only sustainable option” for the management of tails of depleted Uranium hexafluoride (UF₆), from the enrichment process.
- 9.5. Further fissionable material could be created by the utilisation of a fast breeder reactor programme but given the public concerns over standard reactor designs, it may not be prudent to consider this option in today’s climate.
- 9.6. The NDA have suggested in their License Termination Plan (LTP) for the Capenhurst site that the decommissioning process could take until 2120. Westinghouse has claimed that they have a strategy and the capability to close Capenhurst 100 years earlier than suggested by more fully utilising facilities at other locations.

10 Q9 “What are the implications for the management of existing nuclear waste of taking a decision to allow energy companies to build new nuclear power stations?”

- 10.1. Unite Amicus Section believes that a single national repository of excellence should be constructed for the UK’s legacy of radioactive waste which should incorporate a retrievable storage facility of spent nuclear fuels and other radioactive waste material from medical, military and other sources. The union does not believe that a price tag of between £2 and £10 billion for a long term storage facility should deter investment in new nuclear build providing this cost is divided up proportionately by volume of waste requiring storage. Richard Mayson of EDF Energy stated at the London consultation meeting on the future of nuclear¹² that speaking from the viewpoint of a potential investor, EDF would happily make provisions to meet these costs.
- 10.2. The volume of additional waste added to the existing legacy is estimated in the consultation at just 8%¹³ the total. If this is accurate, the price paid should reflect this relatively small additional cost in the licensing of any new station. If additional storage is required a relative price per tonne could then be calculated.
- 10.3. If assessed on this basis a practical business model could be incorporated into each design of new build, requiring an initial upfront payment per design followed by subsequent payments if the volumes exceed predicted levels. Such payments could then be used to initiate the construction of such a single centralised storage facility.
- 10.4. The advantages of a centralised facility over a geographically spread of facility types and locations are many and varied. The Cumbria centre of excellence is set in a location ideal for such a retrievable facility if one were constructed.

¹² Held at the Park Plaza Victoria hotel in London

¹³ Based on a 25% of capacity model

11 Q10 “What do you think are the ethical considerations related to a decision to allow new nuclear power stations to be built? And how should these be balanced against the need to address climate change?”

- 11.1. **Unite Amicus Section believes that although an additional quantity of radioactive waste will be left behind for future generations, not to allow nuclear generation to be part of the mix would create even greater problems associated with climate change.**
- 11.2. Given the content of the data coming from the IPCC and other environmental and research bodies, ethically the UK cannot afford not to invest in nuclear power. The largest source of GHG's in the UK is currently from the energy generation sector and if the UK fails to invest in Nuclear the alternative involves a heavy dependency on imported gas and coal generation which would destroy any efforts by this country to reach its emissions targets.
- 11.3. The amounts of additional radioactive material involved is disproportionately small as to make nuclear fission a realistic possibility for the UK's energy needs for the next 60 years at least.
- 11.4. Gordon Brown said at his first address to the Labour Party conference in September, stated *“Britain leading the global economy – by our skills and creativity...a world leader in energy and the environment from nuclear to renewables; a world leader in the creative industries; and yes – modern manufacturing too – drawing on the talents of all to create British jobs for British workers.”*
- 11.5. If nuclear fission generation fulfils on its initial promise, the UK will need a skills base from which to draw the next generation of nuclear scientists, engineers and technicians. Without a programme to bridge this gap supplied by new build such skills and knowledge will be lost.

12 Q11 “Do you agree or disagree with the Government's views on environmental issues? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”

- 12.1. **Unite Amicus Section agrees in the main with the Governments assessment although it should be noted that the refining methods used are not GHG emission free being reliant of supplies of natural gas and other chemicals derived from this fossil fuel.** It should also be noted that the facilities at both Capenhurst and Springfields do not just provide nuclear fuel for UK consumption, providing a valuable service and export facility to this nation.
- 12.2. New Nuclear build could secure the future of these facilities ensuring the job security of nearly 400 employees at Urenco and 1,400 staff at the Springfields facility¹⁴.

¹⁴ Source: ICC Information Group Ltd

13 Q12 “Do you agree or disagree with the Government’s views on the supply of nuclear fuel? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”

- 13.1. **Unite Amicus Section believes that the analysis of the nuclear fuel supply chain as detailed earlier is correct but has missed some vital aspects.** About 1/3 of the world’s uranium supply annually is obtained via Cameco, Canada and Rio Tinto, UK¹⁵, making us uniquely placed on the world stage to capitalise on this form of generation.
- 13.2. Although the SMP facility at Springfields has only a limited spare capacity due to its successes on the international market for MOX, it does not mean it has a secure future. **Unite Amicus Section believes that this facility should be expanded to meet demand from new build throughout Europe.**
- 13.3. The recent government decision to seal long term storage facilities rather than invest in a recoverable resource would deprive the future of nuclear generation of this resource and condemn them to a future reliant on further imported fuel. At current rates of consumption, the International Atomic Energy Agency have estimated that there is approximately 85 years worth of known economic uranium reserves globally. British Energy believes that a programme of new build would not have a significant impact on the market given that the UK currently only accounts for 3% of world demand. Even if low grade ores are used, the energy consumed and emissions released are still far below that quoted even for clean coal.
- 13.4. Additionally due to the recent price increases, the total exploration and development expenditure has more than doubled over the last 3 to 4 years. This dramatic increase in price has been driven by the global need to replace supplies from inventories with a primary source rather than utilise MOX.

14 Q13 “Do you agree or disagree with the Government’s views on the supply chain and skills capacity? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”

- 14.1. **Unite Amicus Section believes that the Governments views on the potential skills capacity are significantly flawed.** The nuclear industry in this country is currently suffering due to the severe lack of government and employer investment into a truly fit for purpose skills base.
- 14.2. The current obsession with quantity rather quality in most government criteria is leading to a widening skills gap in various industries, none more so than nuclear industry where the average age of the typical employee is now in the high forties.
- 14.3. IBM Business Consulting Services have carried out a research study to evaluate the capability and capacity of the UK and global supply chains to support a new nuclear build programme in the UK, to investigate the key issues and barriers that exist and to identify what actions could be taken to facilitate a UK programme.

¹⁵ Source: Spectron

This research study assumes, inter alia, a replacement/new nuclear build programme in the UK would commence shortly after 2010 and concluded that the UK supply chain has the capability to deliver many of the elements of a new nuclear build programme, particularly the non-nuclear systems and infrastructure, but would require investment in facilities and staff in some of these areas.

- 14.4. **Unite Amicus Section feel therefore that given the large amount of intellectual property rights held on nuclear components and the capacities shown by this report that it should be possible to source around 70% of the components required domestically.** Given the huge inward investment this would generate and opportunities that could be forthcoming as a result, the union feels that any approved designs should be required to source its supply chain from within the UK wherever it is possible and practicable to do so.
- 14.5. Unite Amicus Section has already obtained such an agreement from both the Westinghouse group and AECL to this percentage level whilst the other two front running design companies have, as of yet, refused to discuss this issue. The UK has the opportunity to work with these companies to develop a manufacturing and skills base which would provide a foothold into the lucrative European market for nuclear power and competition. This foothold could revitalise the nuclear industry in this country to the extent that once again the UK becomes a major player on the world stage for the supply of such technology. The UK still holds a considerable amount of intellectual property rights in this area of technology making it uniquely placed at any negotiation table about this form of generation.
- 14.6. Following the introduction of the EU directive on emissions, current coal powered plants in Germany for example will either be forced to close or incorporate some form of CCS technology. Although politically sensitive, predicted delays in the availability of CCS would suggest that Germany may also be rethinking its policy on nuclear generation. If so the UK has the potential to capitalise on this if it allows nuclear to become an option.
- 14.7. Gordon Brown stated in his speech to the 2007 TUC Congress that “Britain can be a world leader creating new jobs for the future”. If inward investment is a requirement of new build this statement could never be more true. The Prime Minister added “I found that while in the next decade we will need less unskilled jobs, we will need 5 million more skilled jobs”. This investment needs to start now with involvement in the provision of training for the potential staff of the future to fulfil the demand created if new build goes ahead.
- 15 Q14 **“Do you agree or disagree with the Government’s views on reprocessing? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?”**
- 15.1. The reprocessing of nuclear waste provides the UK with a far greater security of supply especially given the increases in the spot price of Uranium. It is currently more cost beneficial to reprocess than to purchase fresh fissionable supplies in today’s market.

- 15.2. Although there was a dramatic drop in price during August due to the US Department of Energy selling 520 thousand pounds of U_3O_8 contained in UF_6 in order to pay for remediation of the Department's contaminated uranium inventories, the price remained way above the average seen in recent years and continues to climb. Currently demand remains weak however and this upward trend cannot be sustainable.
- 15.3. If new build was to go ahead the demand for MOX would remain high and would provide a valuable resource stream for the economy.
- 15.4. The consultation recognises that there is no proven alternative to reprocessing fuel from the early Magnox reactors in the UK, which cannot be stored long-term in water. It suggests that the separated plutonium would be a waste product whereas it could be utilised, to a far greater degree in nuclear generation, using modern designs.

16 Q15 “Are there any other issues or information that you believe need to be considered before taking a decision on giving energy companies the option of investing in nuclear power stations? And why?”

- 16.1. Although much has been made of alternatives to nuclear energy, nothing currently available comes close to the combination of the predictability, environmental impact and potential capacity of this form of generation. Although there are long term waste storage issues the volumes concerned are far less than most members of the public would realise and many millions of times smaller than are proposed by the option of CCS.
- 16.2. Fossil fuelled generation utilising CCS has also a place in the mix given its flexibility to react to fluctuations exacerbated by the unpredictable and unreliable nature of renewables.
- 16.3. Renewables too have their place in reducing emissions but of themselves would never be sufficient to replace total demand requirements.
- 16.4. The position taken by the Scottish Parliament not to support nuclear new build based on the potential capacity from wind, wave and tidal generation is Unite believes ill-founded. No one is suggesting that sites such as the Pentland Firth¹⁶ and other tidal races have not got great potential as a potential source of generated capacity but given its great depth the harnessing of such a flow may prove to be a technical nightmare. Tidal generation also suffers from inflexibility in that the time of operation is fixed by the orbits of the moon resulting in periods of in activity.
- 16.5. The Pentland Firth is, for example, very deep with 63% of the tidal stream resource estimated to be in waters deeper than 40m. The area is a known location for whale and other cetacean spotting with over 1400 sightings in 2000/2001 alone¹⁷. Current methods of harnessing flow rely on submerged turbines, not

¹⁶ Currents at this location between the mainland and Orkney can reach 12 knots.

¹⁷ Source : <http://www.caithness.org/nature/whalesurvey/surveyresults.htm>

unlike those seen in wind farms which would have difficulty surviving an encounter with a basking shark or other large inhabitants of this stretch of water. Other shallower locations limit the diameter of the turbine that can be deployed although designs incorporating hydrofoils are in development¹⁸.

- 16.6. Combined Heat and Power (CHP) generation does offer considerable benefits by utilising the waste heat to save energy. To fully utilise this form of generation would require a considerable increase in the number and location of these plants given the amount of heat loss during transmission over distances. Additionally CHP units are simply adaptations of existing forms of generation which produce heat as a by product. The potential for Nuclear CHP is a realistic option with real potential but would require a substantial redesign of existing designs with the associated costs that that would entail.
- 16.7. The failure to create a fully liberalised market in Europe despite the actions of the European Parliament has cost this country significantly in terms of gas security in the recent past. In the nuclear industry, the UK has an edge as discussed earlier¹⁹.
- 16.8. Overall, every form of electrical energy generation available at the moment has both advantages and disadvantages which can be resolved by combining methodologies to produce the most energy for the least possible environmental impact. Unite Amicus Section believes nuclear provides a reliable foundation upon which this can be built.

17 Q16 “In the context of tackling climate change and ensuring energy security, do you agree or disagree that it would be in the public interest to give energy companies the option of investing in new nuclear power stations?”

- 17.1. Unite Amicus Section agrees that it would clearly be in the public interest to invest in nuclear energy. It believes, however, that this investment should come from government rather than relying on the whims of the market to decide the fate of the UK economy.

In the absence of such government support the second best option for security of supply is to allow companies to invest in the nuclear option. The union was concerned that the decision by government to require adequate provision to be made to cover the cost of waste storage may have deterred investment unless this cost can be quantified and underwritten by government but this fear has eased somewhat by Richard Mayson’s statement. (See 10.1 above)

18 Q17 “Are there other conditions that you believe should be put in place before giving energy companies the option of investing in new nuclear power stations? (For example, restricting build to the vicinity of existing sites, or restricting build to approximately replacing the existing capacity)”

¹⁸ <http://www.pulsegeneration.co.uk>

¹⁹ 14.4 to 14.6

- 18.1. Unite Amicus Section believes that the most sustainable methodology for new build would be the utilisation of existing locations. Unite Amicus Section believes that there should be a requirement in any new build proposal for it to be located at or in the vicinity of an existing location. Given the economics and clear advantages of such locations as opposed to the problems associated with the potential utilisation of a green field location, the union strongly believes that green field sites should not be considered.
- 18.2. As stated previously given the capability available domestically there should be a requirement that any prospective design sources components and its supply chain wherever possible from UK domestic sources.
- 18.3. For a new nuclear build programme to be successful in the UK and to attract both the UK and global supply chains there are a number of critical issues and enablers which the supply chain cannot control and where strategic direction would be required. These include an energy policy with a clear position on nuclear power, a nuclear waste strategy, site selection, the public inquiry process and the impact of the regulatory environment along with the current planning requirements which include:
- Statement of need
 - Justification - Justification of Practices Involving Ionising Radiation Regulations 2004
 - Strategic Environment Assessment - Strategic Environment Assessment Regulations 2004
 - Section 36 Application & Environmental Impact Assessment - Electricity Act 1989
 - Discharge Application - Radioactive Substances Act 1993
 - Article 37 Submission - Euratom Treaty
 - Nuclear Site Licence - Nuclear Installations Act 1965
 - Security & Safeguards Arrangements - Nuclear Industry Security Regulations 2003 & Euratom Treaty
 - Also: Building Regulations, PPC Authorisations, Marine Construction Works Approval and CDM notification.

19 Q18 “Do you think these are the right facilitative actions to reduce the regulatory and planning risks associated with such investments? Are there any other measures that you think the Government should consider?”

- 19.1. The efficacies of modern nuclear reactors and the number of new facilities discussed are predicted to produce just an 8% increase in the quantity of nuclear waste. As the legacy of this waste will continue to be around for millennia the long term storage cost need not be prohibitively high, if funds are properly invested in the correct solutions.
- 19.2. The government’s decision to concentrate on up to three key designs concurrently within the specified timeframe, whilst creating options for investors, does increase the decommissioning costs from that envisaged from a single

designs approval. However, it is true to say that the diversification of nuclear energy generation designs will reduce any design flaw net closures.

19.3. **Unite Amicus Section welcomes the Government proposal to carry out a strategic assessment of the suitability of potential sites for new build nuclear and intend to participate fully in this process**

19.4. It is clearly essential that the various regulatory bodies with a role in the approval of designs for UK deployment are able to adequately resource the necessary workload in a co-ordinated fashion. To facilitate this it is helpful to restrict the options available to internationally accepted designs for use in the UK without preventable modification. All of the current leading four designs have been recognised by various competent regulatory in other jurisdictions as suitable for purpose. Due credit should be given to this work in any assessment of these designs when considering the UK environment.

19.5. Although the Government should continue to press for international agreement on an environmental framework beyond the Kyoto period and to press its European Union partners on a robust EU ETS for phase 3 starting in 2013, it should be prepared to introduce a UK price for carbon if international efforts fail.

19.6. The reforms to the planning process are long overdue and Unite Amicus Section has already submitted its response to this consultation. Unite Amicus Section believes that in the case of nationally important, major infrastructure projects, there is a clear need to streamline the process. This is essential if the government to instil confidence in any potential investors.

20 Conclusion

- 20.1. **Unite Amicus Section believes there are clear advantages to allowing a full replacement nuclear programme to commence.** It feels, however, that this is too important to be left up to market forces, given the vital role nuclear has to play in order to reach GHG emission reduction targets. This country has the sites ready and waiting to commence construction and there currently are potential investors ready to maximise nuclear potential. Investors are looking for a clear direction from Government and a swift progression through the planning and licensing requirements. This is a window of opportunity which the UK can ill afford to miss and could exploit to its advantage.
- 20.2. The UK can resurrect the nuclear industry and with it gain a foot hold on the world stage. Too often it's in built innovations and technology has been left to drift to other nations to develop. As a high percentage of supply chain for new build nuclear can come from within our domestic manufacturing base then this should be a requirement. There is enormous scope for international co-operation on projects of this scale with the potential that this brings.
- 20.3. Section 7 of the Energy Act 2004, charges the NDA with the education and training of persons about their prescribed activities and *“giving encouragement and other support to activities that benefit the social or economic life of communities living near designated installations, designated sites or designated facilities or that produce other environmental benefits for such communities.”* Such a requirement would go a long way to improve the acceptability and longevity of this technology in the communities directly effected.
- 20.4. The skills and knowledge of current and future employees of British Energy and the NDA should be fully utilised, not exploited by potential investors, especially where there is an easy transition between the two.
- 20.5. Nuclear build is a realistic, proven and clean option bringing with it enormous potential for the UK, its neighbours and the ecology of this planets future. Its promise is too good to miss, due to unjustified fear and political expediency. A decision needs to be taken now, before it is too late.

Doug Rooney
National Officer
Unite Amicus Section
Hayes Court
West Common Road
Bromley BR2 7AU

For further information please contact Colin Potter, Research Officer in the Unite the union (Amicus Section) Research Department on 0207 780 4011, colin.potter@unitetheunion.com

Appendix 1

Known Recoverable Resources of Uranium

	tonnes U	percentage of world
Australia	1,143,000	24%
Kazakhstan	816,000	17%
Canada	444,000	9%
USA	342,000	7%
South Africa	341,000	7%
Namibia	282,000	6%
Brazil	279,000	6%
Niger	225,000	5%
Russian Fed.	172,000	4%
Uzbekistan	116,000	2%
Ukraine	90,000	2%
Jordan	79,000	2%
India	67,000	1%
China	60,000	1%
Other	287,000	6%
World total	4,743,000	

Source World Nuclear Association (WNA) <http://www.world-nuclear.org/info/inf75.htm>

Appendix 2

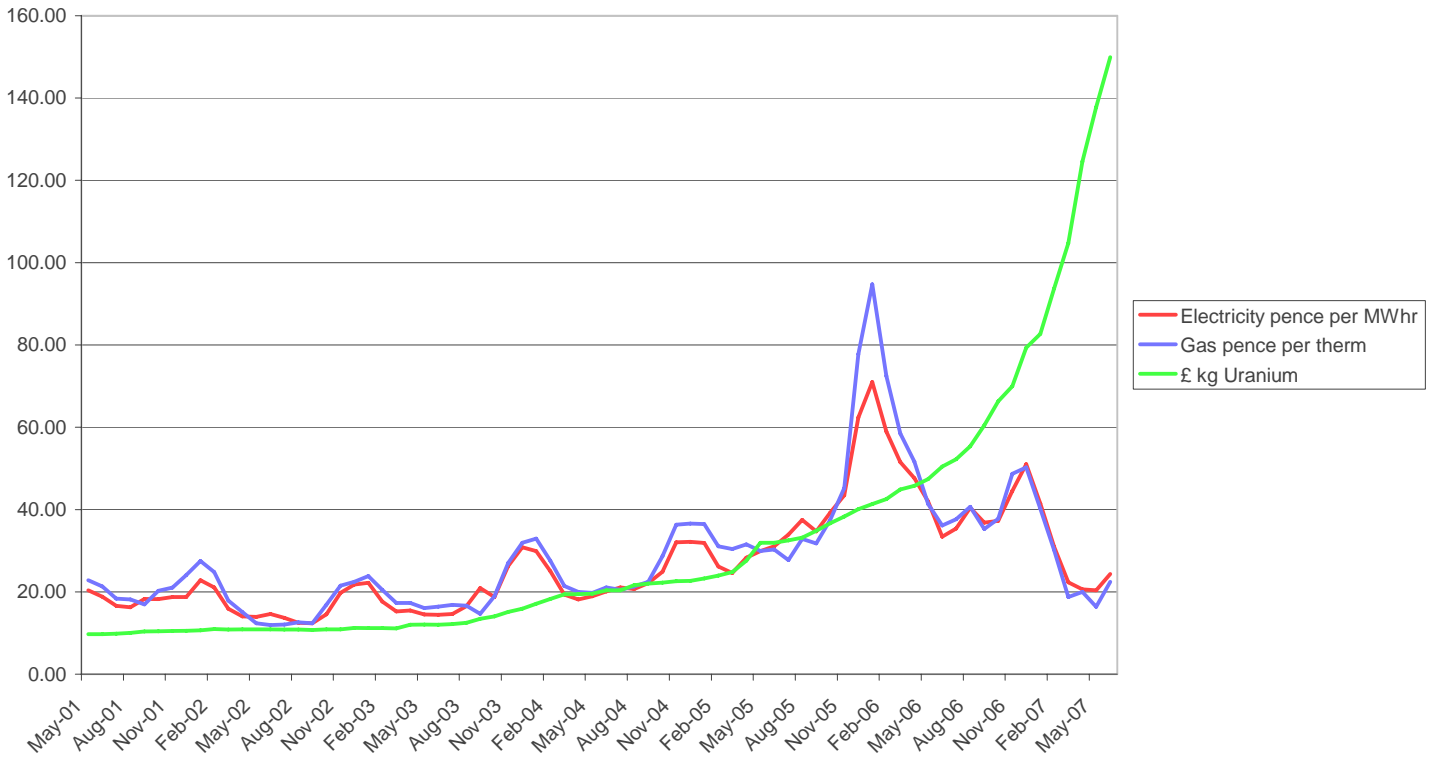
Typical Concentrations of Uranium

Granite	4 ppm U
Sedimentary rock	2 ppm U
Earth's continental crust (av)	2.8 ppm U
Seawater	0.003 ppm U

Source World Nuclear Association (WNA) <http://www.world-nuclear.org/info/inf75.htm>

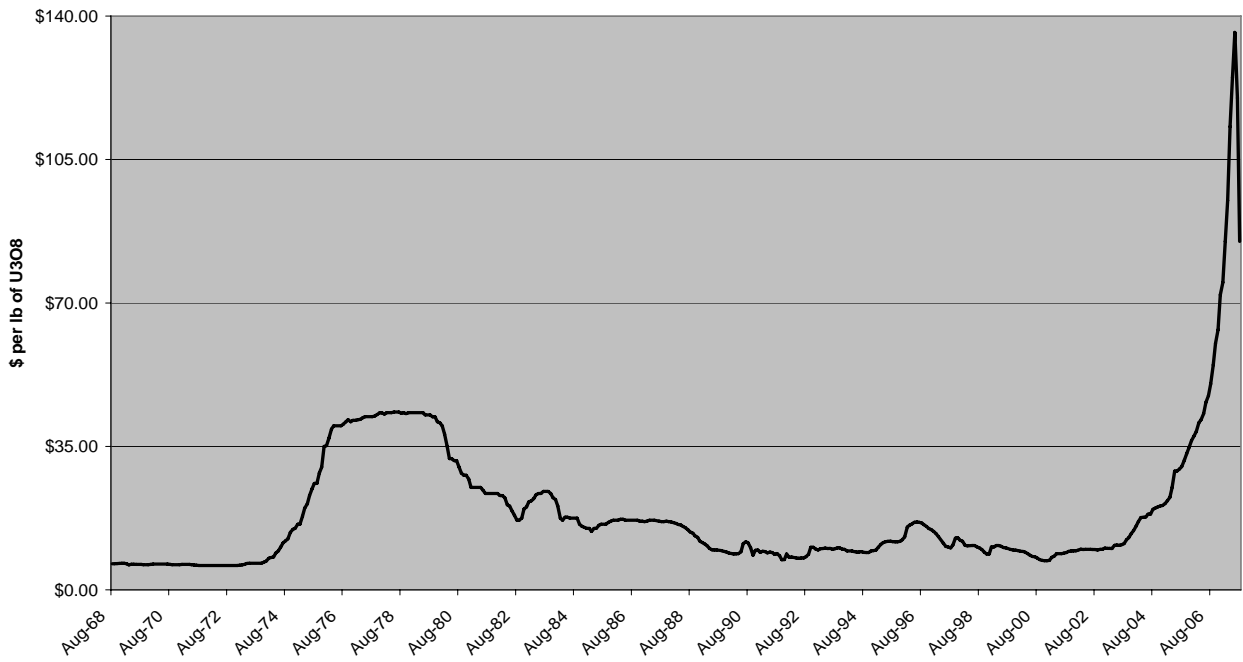
Appendix 3

Average Wholesale Energy Prices



Historic Value of Uranium

Market Spot Monthly Price of Uranium



Source NUEXCO Exchange Value (Monthly Uranium Spot)