NWG 111007
Item 5

Our ref: DBERR/NPC121007

Response – Nuclear Power Consultation
FREEPOST SEA 12430
Thornton Heath
CR 7XT

Friday 12th October 2007

Dear Sir/Madam

Copeland Borough Council Response – Nuclear Power Consultation

Copeland Borough Council welcomes the opportunity to respond to the Government's consultation on "whether it is in the public interest to allow energy companies to invest in new nuclear power stations."

On the 27th of July 2007, Copeland Borough Council hosted a consultation event given by the Department of Business Enterprise and Regulatory Reform with local delegates attending from a wide range of sectors within the local community. Following that debate on the 13th September 2007 a Copeland hosted a further consultation event, with a presentation given by AMEC Limited, who have been jointly commissioned by local partners to undertake a 'Meeting the Energy Challenge Study'. On the 11th of October 2007, the Council's Nuclear Working Group considered the consultation and those comments will inform the Council's response to the Government's further round of consultation on nuclear power.

In addition to the detailed answers we have given, which are appended to this letter, Copeland Borough Council asks the Government to note the following key messages:

Copeland Borough Council is acutely aware of the challenges posed by climate change, from a local, national and international perspective. The Council fully supports the Government's energy policy goals, and supports a balanced energy mix which:

- Reduces our CO_2 emissions and moves towards a low carbon economy;
- Reduces our dependency on imported gas and increases our security of supply;
- Provides for competitive and economic energy usage.

Whilst Climate Change is undoubtedly a global problem, its impacts are felt locally. Climate change threatens our region in terms of rising sea levels and coastal erosion, and increasingly extreme and unpredictable weather events which will lead to damaging economic impacts. We must all play our part in reducing our carbon emissions and moving to a low carbon economy, and this move to a low carbon economy represents an opportunity for leaders to invest and benefit from new technology, investment and skills for tangible rewards. Copeland is willing to step up its contribution, and to play its full part in meeting our energy goals with the development of nuclear power, as part of its Strategic Spatial Master Plan.

Copeland has over 50 years experience of leading the development of the nuclear industry and fully supports the Government's analysis and proposals on the Future of Nuclear Power. But more than that, Copeland is ready and willing to host new nuclear power stations at Sellafield, playing its part in leading the battle against climate change, and building on the experience of both nuclear industry workers and host communities, and existing infrastructure in harnessing the benefits of nuclear power both locally, and for the nation.

We trust that the views of the Council will be of interest.

Yours sincerely,

Cllr. Elaine Woodburn
Leader

Cllr. Alan Holliday
Chairman

(Attached)

Response 1:

Copeland Borough Council's Response to the Governments Consultation on Energy & the Future of Nuclear Power

Response 2:

Copeland Borough Council's Response to the Governments Consultation on the Justification Process and Strategic Siting Assessment (SSA)

Response 1

Copeland Borough Council's Response to the Governments Consultation on Energy & the Future of Nuclear Power

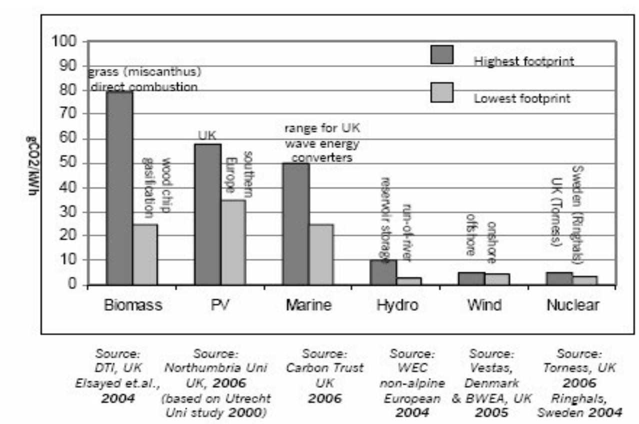
Question 1&2:

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

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?

It is now accepted by the Government, the scientific community and the general public that climate change is occurring. The balance of evidence suggests that emissions of greenhouse gases from anthropogenic sources are a significant contributory factor to climate change. Scientific studies suggest that the major contributor is carbon dioxide emitted from the combustion of fossil fuels, with power stations in the UK being responsible for approximately 30% of our total CO_2 emissions (Ref 1). Internationally, the main response to this was initially through the United Nations Framework Convention on Climate Change (UNFCCC) and, more recently, through the Kyoto Protocol.

In response to these agreements, the UK Government has published a number of documents, which commit the UK to cut carbon dioxide emissions and provide a framework by which this will be achieved. These commitments and the methods of achieving them are cascaded down to industry and local authorities.



Internationally, there has been increasing recognition of the importance of nuclear power and its potential for contributing to the provision of electricity for economic growth without increasing carbon dioxide emissions. All electricity generation emits CO_2 during its lifecycle (Ref 1). However fossil fuelled electricity generation has the largest carbon footprint (Ref 2). There has been extensive debate on the extent to which nuclear power stations could contribute to reducing carbon dioxide emissions. Considering all the stages of nuclear power, from the mining of uranium to decommissioning and spent fuel management (cradle to grave), the evidence indicates that it is not a "carbon dioxide free" energy source (Ref 1 & 3), but can be considered as having a relatively small carbon footprint (Ref 2). A number of recent detailed quantitative assessments of the "carbon footprints" of nuclear power plants have been carried out as part of wider ranging Environmental Product Declarations (EPDs) according to recognised and accepted international methodologies based on full Life Cycle Assessments (e.g. ISO 14025). These include assessments for the UK Advanced Gas-Cooled reactors (Ref 4) and for water-cooled reactors (Ref 5), which are likely to form the basis of any new build programme in the UK. These have taken account of the criticism of earlier assessments, which failed to consider the possible future need (in the absence of Fast Reactor programme or reprocessing) to employ lower grade uranium ores at the front end of the cycle and the energy used in enrichment (Ref 2 & 3). Typical results from these assessments and the comparison with other sources of energy, including renewables, are shown in the inset, which shows nuclear energy on a par with wind for CO_2 production, but significantly less than fossil fuels. Other published figures suggest that, even using extremely low grade uranium, a nuclear power plant would produce 3% of the carbon emissions from a conventional coal-fired power station and about 6% of those from a gas-fired station (Ref 6).

Taken together, the assessments indicate that nuclear power can play a part in a favourable energy balance with a very modest carbon dioxide output from the nuclear fuel cycle (Ref 3, 5 & 7). The studies show that, in the UK as a whole, a range of measures are required to combat climate change including using reducing demand, energy efficiency measures, renewables and participation in Emissions Trading Schemes to materially contribute to cutting carbon dioxide emissions. The evidence shows that part of this combined approach requires a commitment to the construction of new nuclear power stations in the UK as part of a balanced low carbon energy mix.

Summary

Therefore based on the evidence, the Council accepts that climate change and security of supply are critical issues, and that global and local action must be taken now, and in the future.
The Council recognises that the challenge posed by climate change is huge, and is fully committed to reducing CO_2 emissions.

The Council supports the Government's energy policy of delivering a low carbon energy mix, with security of supply and economic energy, and believe that nuclear must have a part to play in delivering these challenging goals.

The Council has considered the various sources of evidence and notes some key points:

- Nuclear power is a low carbon energy source and has a similar cradle to grave carbon footprint as wind power generation;
- Nuclear power would significantly reduce CO_2 emissions that would otherwise be produced by coal and gas powered generation.

The Council considers that nuclear power could make a significant contribution to the UK's CO_2 reduction targets whilst providing secure baseload electricity; therefore it should be included in the UK's future energy mix.

Copeland is ready to play its part in this global issue on a local scale and we would welcome a new nuclear power station development at Sellafield as part of our vision for "Britain's Energy Coast", and the development of the West Cumbrian Spatial Masterplan to make West Cumbria a "centre of excellence" for the nuclear industry. The Council is confident that it would be able to offer a willing host community and the facilities required for a successful project in order to help implement Government energy policy.

References - Questions 1 and 2

1) Sustainable Development Commission, 'Paper 2: Reducing CO_2 emissions – nuclear and the alternatives', March 2006.
2) Parliamentary Office of Science and Technology, 'Carbon Footprint of Electricity Generation', Postnote, Number 268, October 2006.

3) Sustainable Development Commission, 'The Role of Nuclear Power in a Low Carbon Economy'. March 2006.
4) British Energy, 'Carbon Footprint of the Nuclear Fuel Cycle'. Briefing Note, March 2007.
5) Vattenfall AB Generation, 'Nordic Countries, Certified Environmental Product; Declaration of Electricity from Ringhals NPP, June 2004 (also updated information in the Australian Uranium Association Fact Sheet, May 2007).
6) Uranium Information Centre, 'Energy Balance and CO_2 Implications', Briefing Paper No. 100, March 2006. Available at www.uic.com.au/nip100.htm (24 Sept 2007)
7) World Nuclear Organisation, 'Energy Balances and CO_2 implications', November 2005. Available at http://www.world-nuclear.org/info/inf100.html (24 Sept 2007)

Question 3:

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?

Security of supply involves a number of factors, which include access to available fuel supplies, the infrastructure to transport them to centres of demand and effective markets, which encourage supply and demand to be met in the most efficient way.

Currently, the majority of the UK's baseload energy is supplied by oil-, coal- and gas- powered generation. Supplies of these fossil fuels are finite and decreasing and their use is generally considered incompatible with securing a low-carbon future (see the response to Questions 1 & 2). Furthermore, global demand for these energy sources is likely to increase, which is resulting in greater competition for supplies (Ref 1). An alternative supply of baseload energy is nuclear power, which contributed approximately 18% of UK's electricity (Ref 2) in 2006, 100% of which was baseload supply, and is recognised as having a small carbon footprint (See the response to Questions 1 & 2 and Ref 3).

Government forecasts show that by 2020, the UK may become a net importer of energy, much of this gas from regions such as the Middle East, Russia and North Africa. This may pose potential security of supply risks as we become more dependent on energy supplies from potentially politically unstable or volatile regions. The experience of the winter of 2006 when Russia shut its supply of gas to Ukraine was instructive as to how in the future the supply of energy may be used as a powerful political or economic bargaining chip. The Partners do not wish to see our national interest put at risk in this way by being overly dependant on overseas supplies of fuel.

Curbing electricity demand and improved energy efficiency are considered to be essential aspects of the UK energy strategy (Ref 4) as they are economical and environmentally sound ways of addressing energy security. Despite initiatives at both local and global levels, energy demand is still increasing. For example, the UK's energy consumption has increased by 6.6 TWh between 2002 and 2004 and it is predicted to continue to increase in the short to medium term unless 'radical' changes are made to consumer behaviour' (Ref 5). The UK is significantly behind its European counterparts in terms of energy efficiency and research suggests that raising public awareness to the point where behaviour towards energy efficiency is altered is likely to be difficult (Ref 5).

Cumbria is currently working towards a more sustainable environment through various local government initiatives. However, it is recognised that, despite initiatives to be more energy efficient at both a community and business level, energy consumption is expected to rise (Ref

6). Thus, the UK's energy providers must be able to meet the increasing energy demands to ensure a security of supply.

The Council strongly agrees with the Government's view that an 'energy mix' is the most appropriate way to supply the UK's energy, and both nuclear and renewable power generation are present within the County.

The choice of technology within the energy mix has implications for both the environment and security of supply. The evidence suggests that a well-diversified generation portfolio, which is designed to deliver energy both now and in the future, will need to include several different technologies, which is in accordance with the Government's views.

Renewable energies, particularly solar and wind energies, are intended to become more important energy providers in the future, as they provide electricity with minimal carbon dioxide emissions (Ref 3). However, their supply can be intermittent in nature requiring a wide network with flexible operation to enable cost efficient operation. The Government has committed to a target of 20% of electricity to be generated by renewable sources by 2020 (Ref 1).

The Council fully acknowledges the necessary steps to meet this challenging target and the move to increasing renewables; indeed, there are currently 12 wind farms within Cumbria (Ref 7). However, this still leaves the remaining 80% of energy supply still to be provided. The evidence is clear, that, if the UK continues to use oil, gas and coal power stations to supply our baseload energy, we will not meet our commitments to reducing our carbon emissions (see the response to Questions 1 & 2). Thus, the Council believes that nuclear energy generation must continue to have a place and developed within the energy mix.

However, the UK is increasingly experiencing conflicts and issues over the installation of renewable power generation equipment, particularly wind farms. Copeland has experienced this first hand with many conflicts arising over the construction of the proposed and existing wind farms throughout the community.

However, the Council recognises that there remains some public concern of the risks associated with nuclear power generation and this needs to be addressed if new nuclear stations are constructed. In this context, the Council supports the strong regulatory framework that is in place to address safety issues and are confident in its effectiveness to manage the potential risks that would be associated with a new nuclear power plant.

Investment Factors

The Council considers that one of the key challenges that currently faces the UK in terms of securing an energy supply is to ensure that the market delivers substantial and timely investment in the electricity generating capacity and networks (Ref 1).

Competitive markets with cost- reflective prices are strong instruments to effectively balance energy systems in terms of economic efficiency, reliability and environmental responsibility, and evidence suggests that effective competition puts pressure on companies to use resources more efficiently (Ref 8). Long project lead times that are related to slow licensing and inefficient approval procedures may become serious barriers to timely investment (Ref 8) and potentially affect the security of supply by delaying construction.

The Council recognises and fully supports the facilitative actions that are in place for facilitating private investment in nuclear power including the Strategic Site Assessment process, preliminary Generic Design Assessments and planning procedures. Additionally, the Council have experience of such issues and consider that there is a willing community base for a new nuclear power plant within Copeland, which would further facilitate development plans.

Furthermore we believe that the ongoing and planned investment in 'Britain's Energy Coast' will act as additional enticement to investment in a nuclear power plant in West Cumbria.

Fuel Supply

The Council recognises that no energy production can provide security of supply without security of the fuel source. The supply of fossil fuels, whilst not yet rare, are readily agreed to be diminishing and the UK is predicted to become more dependant on fuel imports in the future, particularly as the UK Continental Shelf production of gas decreases. The UK is considered to have some of the best renewable energy resource in the world (Ref 4). However, although some studies indicate that 'renewables' could supply the UK with as much as 85% of the current electricity production (Ref 4), evidence suggests that it is unlikely to be suitable for baseload energy provision due to its intermittent nature.

The UK does not have its own uranium supplies, although stockpiles of uranium and plutonium exist, which under various scenarios could power between 1.5 and 3 Pressurised Water Reactors (PWRs) of between 750-1450 TWh for their 60 year lifespan (Ref 9, Ref 10 & Ref 11). Additionally, Mixed Oxide (MOX) fuel, which currently supplies approximately 2% of the total nuclear capacity in the world, is likely to make a more significant contribution in the future. This could reduce the demand for primary uranium fuel (Ref 12), particularly in the UK, where MOX fuel is produced in the existing Sellafield MOX Plant (SMP) (Ref 10). Global demand for uranium is set to increase from the 68,000 tonnes (Ref 13) consumed in 2005 to 76,000 tonnes by 2025 (Ref 12). However, demand may also decrease due to better performing new power plants, parameters relating to management decisions and, potentially, the increased use of MOX fuel, as shown in Figure 1 (Ref 12 & 14).

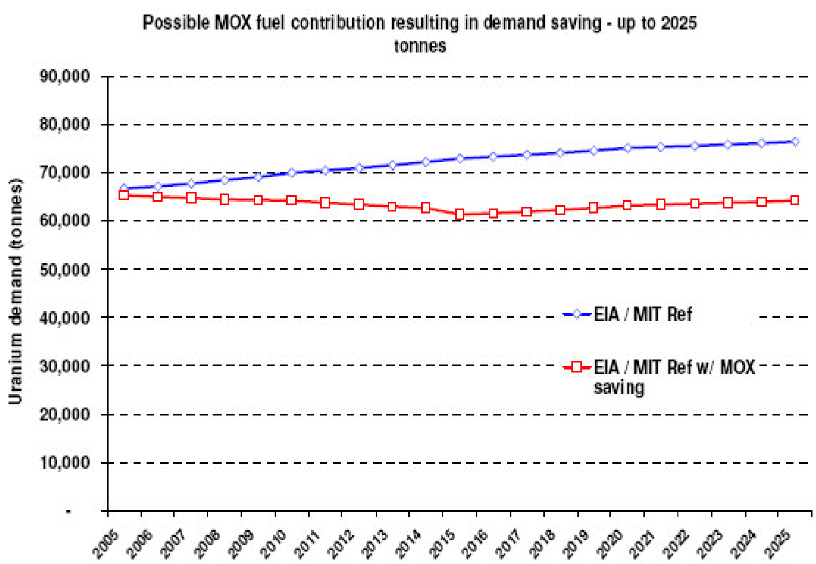


Figure 1 (Reference 12)

Comparison of demand projections with current reserve figures indicates that 'Reasonably Assured Resources' of extractable uranium at a cost below $80/kg would be nearing exhaustion by 2025 (Ref 12). Despite this, it is likely that increased investment and greater research and exploration will locate new reserves, particularly as evidence suggests that uranium reserves have been consistently underestimated in the past (Ref 6). Figure 2 below shows 'Estimated Additional Resources' and their country of origin (Ref 12).

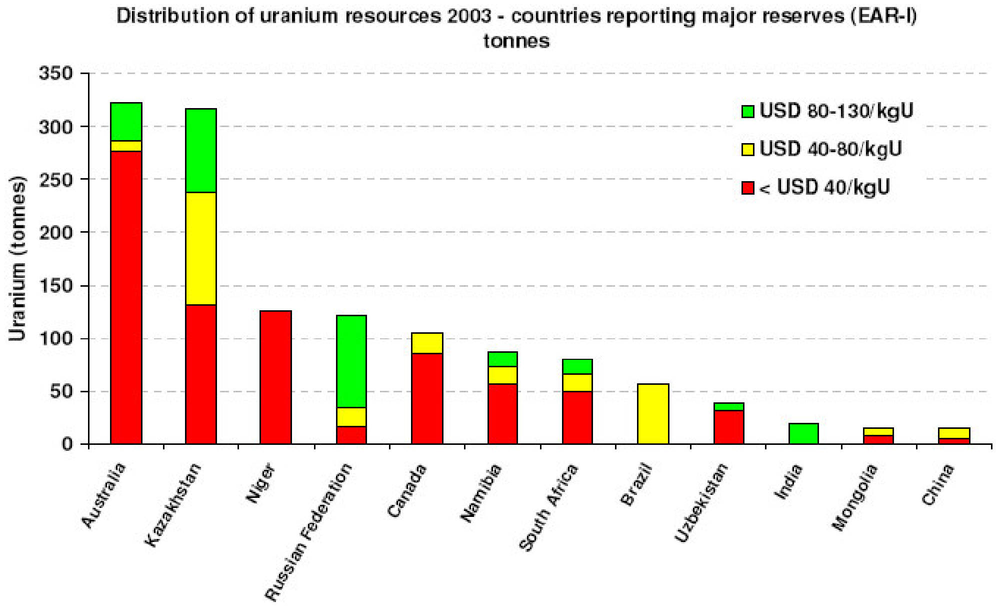


Figure 2 (Reference 12)

Additional information suggests that, with the present world nuclear fleet and the standard fuel cycle, uranium reserves would maintain nuclear generation for approximately 85 years (Ref 5). Furthermore, advances in reactor designs could mean the increase of their energy potential by more than 50 fold (Ref 14).

Uranium is an abundant mineral, which, if exploited in a timely fashion, should be able to support virtually any nuclear power expansion path (Ref 15). Using various sources of evidence, institutions across the nuclear industry are confident that reserves can supply the nuclear industry for the foreseeable lifetime of any new plant (Ref 2). The Partners recognise that the long term security of uranium supplies is heavily influenced by geopolitical issues (Ref 6). Therefore foreign and energy policy should secure uranium trade.

It is also recognised that nuclear power generally has forward price stability as only a small part of the production costs are fuel related, whereas fuel costs account for 80 to 90% of the cost of electricity produced by fossil fuel fired generation (Ref 16).

Summary

Overall, the Council considers that the security of supply of energy is a major issue, and that to prevent the implementation of a new nuclear build programme in the UK, would pose unacceptable risks to our national interest in this area. Nuclear power as part of a balanced energy mix will enhance our security of supply perspective.

References - Question 3

1) HM Government DTI Energy Review, ‘The Energy Challenge’, July 2006.
2) World Nuclear Association, ‘Nuclear Power in the United Kingdom’, September 2007. Available at http://www.world-nuclear.org/info/inf84.html (24 Sept 2007).
3) Parliamentary Office of Science and Technology, ‘Carbon Footprint of Electricity Generation’, Postnote Number 268, October 2006.
4) Sustainable Development Commission, ‘Is nuclear the answer?’, , March 2006
5) EDF Energy Review, April 2006. Available at http://www.edfenergy.com/core/energyreview/edfenergy-energy_review_response_main_document_v4-3.pdf (24 Sept 2007)

6) Sustainable Development Commission, 'The Role of Nuclear Power in a low Carbon Economy', March 2006.
7) VisitCumbria.com, 'Wind Farms in Cumbria'. Available at http://www.visitcumbria.com/wc/windfarms.htm (24 Sept 2007)
8) OECD/IEA, 'Tackling Investment Challenges in Power Generation in IEA Countries', 2007
9) World Nuclear News, 'UK considers uranium and plutonium stockpile', 04 July 2007. Available at http://www.world-nuclear-news.org/wasteRecycling/UK_considers_uranium_and_plutonium_stockpiles_040607.shtml (24 Sept 2007)
10) Parliamentary Office of Science and Technology, 'Managing the UK Plutonium Stockpile', Postnote Number 237, February 2005.
11) Nuclear Decommissioning Authority, 'Uranium and Plutonium: Macro – Economic Study', Final Report by IDM & ERM, June 2007.
12) Sustainable Development Commission, Paper 8: 'Uranium resource availability', March 2006
13) Oxford Research Group, 'Energy Security and Uranium Reserves', Factsheet 4, July 2006.
14) AREVA, 'EPR, The Advanced nuclear reactor', Press Kit, , October 2004
15) World Nuclear Association, 'Fuelling the Future: a New Paradigm assuring Uranium Supplies in an Abnormal Market', 2004. Available at http://www.world-nuclear.org/sym/2004/combs.htm (24 Sept 2007)
16) Nuclear Energy Institution, 'Nuclear Power Plant Contributions to State and Local Economies', Fact Sheet January 2007.

Question 4:

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?

Major projects such as the construction of a nuclear power station in Copeland would have significant impacts across the whole of the UK and local economy. Whilst our response to this question recognises the importance of New Build to "UK Ltd.", it naturally reflects how the Council believes the project would fit into local plans already in place in Copeland and West Cumbria, especially in terms of improved employment that is a central driver to local economic prosperity.

The Council is clear that new nuclear power stations must be implemented by the private sector, with no burden or subsidy on the taxpayer, which must include provision for the full costs for waste management and decommissioning. It is therefore ultimately for the private sector to make the necessary decisions as to whether to invest in new nuclear plant, and they will ensure that the necessary economic analysis is undertaken to inform their decisions. The Council is aware that there are a number of utilities who have stated publicly that they are ready and willing to invest in new nuclear generation in the UK, and therefore this, coupled with the Council's review of the evidence suggests that the economics of nuclear power are favourable.

Local economic effects

The main positive effect on the local economy of a new nuclear power plant in Copeland would be from increased local employment and increased income from each additional job created. Some jobs will be the direct result of the construction and operation of the plant where as others will be generated as a result of the support to the site and to these additional local workers. For example, there will be sub-contractors and additional jobs created in the retail sector.

Assessments of these employment and economic effects in a UK scenario were carried out for the proposed PWR at Hinkley Point C, a similar semi-rural local economy to that in West Cumbria. The analysis showed that, as well as jobs created in the rest of the UK economy (e.g. from manufacturing of reactor components, logistical support etc.) the local economic benefits were still of considerable significance, with jobs on the plant itself which, in turn, created additional jobs in local support industries and the service sector. Recent analyses in the United States have suggested that nuclear power plants create 400-700 permanent jobs (more during construction) with at least an equivalent number in the local economy and generation of up to $430 million in goods and services in the local community (Ref 5).

The construction and operation of any large infrastructure project, such as a nuclear power station, has some negative effects as well as positive ones; increased property prices (that make housing less affordable to certain locals) are commonly cited but these can accrue from any form of power generation system, including renewable sources. However, the studies cited above, along with actual experience in other parts of the UK associated with either the Magnox power stations or the newer AGRs, and more recently with the Sizewell 'B' PWR, suggest that nuclear power plants provide significant local economic benefits over the shorter and longer term.

Recent local stakeholder consultations suggest considerable concerns over job losses and effects on the local economy due to closure of the current Magnox reactor sites. In Cumbria, studies suggest that 5,000 jobs have been safeguarded as a result of the BNFL Community Investment and it is expected that construction of a new nuclear plant complex would help off-set potential losses as facilities at the Sellafield site are closed in the future.

UK National Economic Effects.

Economic analyses of nuclear power are now more robustly established by taking account of the costs of all parts of the cycle, from fuel production to decommissioning and waste management. Therefore, recent economic analyses offer a more solid basis for decisions regarding the overall economic benefits nuclear power, especially on national energy prices, than previously. Areas of the construction, operation and decommissioning of that are included in these cost estimates include the following:

i. ***Uranium fuel costs and enrichment costs.*** A nuclear power plant requires uranium that must be processed (enriched) to allow it to be used as reactor fuel. In the past, uranium reserves have been consistently underestimated and the recent Energy Challenge paper suggest there are unlikely to be concerns over uranium supplies and the costs of these, at least in the medium term (page 10 in Ref. 6 and response to question 3). In addition, the UK has significant stocks of uranium tails ("Hex") remaining from previous nuclear power programmes for which a second cycle of enrichment to produce useable fuel might still be economically advantageous. Improvements in reactor operating methods (increased "burn up") also greatly enhance utilisation of uranium and reduce demand for supplies (that would otherwise drive up costs).

   In addition, the proportion of the cost of electricity from nuclear generation due to the fuel is much smaller than the proportion making up the costs of that from fossil fuels. Consequently, increases in uranium price have only a minor effect on nuclear generation costs. In a potentially increasingly uncertain climate over costs of oil and gas, this is likely to result in a more stable cost of electricity generated from nuclear power. This in itself will have economic benefits for UK industries that use electricity.

ii. ***Capital and build costs***: The costs of electricity from nuclear power are heavily dependent on capital costs and thus are sensitive to construction times, construction costs and discount/interest rates (Ref 5). Construction of future plants by the private sector, increasing use of modular construction and standardised design that were lacking in previous UK nuclear build programmes, should assist in controlling all aspects of these capital costs, including reducing cost overruns and reducing the need for subsidies from central government. This is being born out by recent experience in Asia, particularly Japan (ABWRs) where construction times and the costs are now being subject to significantly greater control than in the past, with additional benefits from economies of scale, standardisation of design & 'turnkey terms' absent from earlier nuclear power station programmes in the UK.

iii. ***Operating and maintenance costs.*** Once constructed, it is important that a nuclear plant operates consistently and without teething problems (so called high utilisation or load factor) because this allows the capital costs to be spread evenly across the full operational period (of up to 60 years). Problems early in operation have the most significant negative cost impacts (due to discounting effects).

Since the late 1980's plant operators have made strenuous efforts to improve on plant utilisation and world wide, load factors now average 80%. Of the 400 plants world wide, those with the highest load factors are the newer water cooled reactor designs in South Korea, Germany and Finland; the PWR at Sizewell has a load factor of 83%. Similar designs are proposed for future build in the UK and high load factors for these should again accrue from use of standardised design and, for example, use of specialist contractors to minimise down time due to refuelling outages. With high load factors, nuclear power plants are most suitable to supply part of the baseload supply to the electricity grid, leaving peaks in demand to be met by, for example, renewables in a suitable "energy mix".

iv. **Waste costs.** The costs of disposing of high and intermediate level wastes, including, potentially spent nuclear fuel remains an area of significant uncertainty, because it is not yet clear what the total costs and timescales involved with siting a repository will be, or the marginal cost of disposing of new build wastes compared with the historical legacy. It is clear that utilities will pay for their share, but as this share is not yet clear, there will inevitably uncertainty in utilities business plans. The Council therefore acknowledges the Government's commitment to resolving this issue satisfactorily and promptly through a senior DBERR appointment to review and allocate costs for waste management and decommissioning, and to pass specific legislation in this area.

v. ***Plant Decommissioning costs:*** The new water-cooled reactors incorporate features to minimise the costs of the technologies required to decommissioning them at the end of their lives and also minimise the costs associated with the management of the waste arisings. In particular, water cooled reactors use a simple single steel pressure vessel with none of the graphite and large amounts of concrete associated with the older UK gas cooled reactor designs and there is less pipe work and other systems that can become contaminated. With 60 year design lives, there are longer timeframes in which to accumulate the funds required to cover these costs (cf the UKs AGR with 25-35 year design lives).

vi. ***Carbon emissions and fossil fuel prices:*** A 2005 survey (Ref. 9) suggested costs for electricity from nuclear power ranging from £18 to £60 /MWh, which was generally higher than prices for that from fossil fuel sources. However, more recent analyses (e.g. Ref 6) include the effects of carbon pricing and recent higher fossil fuel prices. For the so called 'central gas price scenario' and current prices for CO_2 emissions, these recent analyses show that the economics of nuclear, compared with fossil fuel sources, remain robust for generating costs up to £43/MWh. This is well above the forecast cost of power generated from the Finnish nuclear project currently under construction and by a margin that exceeds historical cost overruns associated with other nuclear projects, e.g. Sizewell B.

vii. ***External costs***: Emissions of carbon dioxide (noted in item vi above) are an example of an "external cost" of any form of power generation that, at one time, were not included in the real costs of electricity to the consumer. However, with carbon trading, the costs of these CO_2 emissions costs are now included in electricity generation costs and can be traded in an open market. However, there remain other external costs that are still only partially included in costs of electricity generation, for example:

- It has been suggested that the transport costs for solid fossil fuels and health effects from gaseous emissions (including naturally occurring radioactive materials in fossil fuels) can further weigh nuclear generation costs in favour of those of fossil fuel.
- There are currently uncertain costs associated with the decommissioning of oil and gas platforms in the North Sea.
- Nuclear may offer base-load capacity and increased stability in energy prices that have economic benefits for manufacturers and especially heavy energy users.

Nuclear energy generation can be cost-competitive, and therefore the option is worthy of consideration for utilities to invest in this power generation activities. In Finland and France, the private sector has already taken investment decisions to build new nuclear power plant at Olkiluoto and Flamanville respectively, and in the UK a number o futilities have indicated they are minded to invest in new nuclear In comparison with renewables, it has been estimated that, for the whole cycle of energy generation, the cost of electricity generated by wind power ranges from around 4 to 8 EUR cent/kWh (Ref 10) depending on wind speeds, whereas the cost of electricity generated by nuclear power has been estimated at around 3.2 EUR cent/kWh (Ref. 11). In any case, both these values are lower than the estimated values for coal, gas or oil-based generation and expected to be more stable in future and become increasingly cost competitive as fossil fuel prices increase and more factors (so called "externalities") are included in the cost make-up.

References - Question 4

1) Britain's Energy Coast – A Masterplan for West Cumbria. Executive Summary. 2007
2) Cumbria Economic Bulletin September 2006.
3) The Economy of Cumbria Centre for Regional Economic development. September 2005.
4) Local Income and Employment Multiplier Analysis of a Proposed Nuclear Power Station Development at Hinkley Point in Somerset. J Glasson, D DerWee, B Barrett. Urban Studies, 1988 Vol 25, pp 248-261.
5) Nuclear Power Plant Contributions to State and Local Economies. NEI Information Sheet Suite 400, 1776 I Street, NW Washington.
6) UK Government. The Energy Challenge.
7) Sustainable Development Commission. SDC Position Paper. The Role of Nuclear Power in a Low Carbon Economy. March 2006.
8) Nuclear Power Generation, Cost Benefit Analysis Updated from the July 2006 Energy Review to the April 2007 to take account of updated fossil fuel price predictions. (DTI UEP 28) and carbon and uranium ore prices.
9) The Economics of Nuclear Power, Analysis of recent studies. Steve Thomas, July 2005. Public Services International Research Unit, University of Greenwich.
10) Wind Power Economics. Wind Energy Costs – Investment factors. The European Wind Energy Association.
11) The Economics of Nuclear Power. Briefing Paper 8. June 2007.

Question 5:

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?

The Council considers that renewables provide potential for the UK particularly as we have some of the best renewable energy sources in the world (Ref 1 & Ref 2). Renewables offer synergies with Government policy objectives, in particular the Government's target of 20% of the UK's energy being supplied by renewables by 2020. We recognise the challenges that this target presents and fully supports the Government's strategy for working towards a more sustainable energy production.

The evidence suggests that renewables are flexible and their associated costs are likely to fall in the future due to further research and innovation (Ref 3). The Performance and Innovation Unit's assessment of long term costs suggest that renewables could be among the most cost effective options for reducing carbon emissions, which could mean that, by 2050, they would be producing a large proportion of the UK's electricity. However, issues remain regarding intermittent supplies and reserve capacity such that, even in 2050, it is unlikely that renewables alone could account for the UK's baseload energy demands (Ref 4). Furthermore, the UK is increasingly experiencing conflicts and issues over the installation of renewable power generation equipment, particularly wind farms. Copeland has experienced this first hand with many conflicts arising over the construction of the proposed and existing wind farms throughout the County.

Accordingly, the UK must find alternative ways by 2020 of sourcing the remaining 80% of its future energy demands. As discussed in previous questions, power generation using entirely fossil fuels is not in line with the Government's energy mix or carbon emissions policy and therefore it is considered that nuclear power should be included within the energy mix. In addition, a number of geopolitical issues threaten the security of supply of fossil fuels, whereas these issues are much less likely to affect the supply of uranium. Indeed, the main producers of uranium are Canada and Australia, countries which present political stability and good relationships with the UK. Alternatively, the supply of fuel is also secured with the potential use of the UK uranium and plutonium stockpiles which are estimated to be sufficient to fuel three 1000MWe reactors for their entire 60-years lives (Ref. 5).

Summary

The Council recognises that nuclear power is a more 'mature' technology than renewables, and evidence indicates that the lifecycle carbon emissions from generating nuclear power are similar to those from wind generation (See the response to Question 2 and Ref 1).

The Council agrees that nuclear power generation is suited to providing baseload electricity, but recognise that concerns still exist in the UK about nuclear waste generation and low probability but high consequence hazards. However, evidence suggests that the risk from western nuclear power plants are small compared with other commonly accepted risks (Ref 6). The Copeland Community has supported the nuclear industry for many years and are aware of how the risks can and should be managed through the regulatory regime (see the response to Question 3). Furthermore the Council recognises that new nuclear power stations will be inherently safer than existing power stations (Ref 7).

The Council considers that the justification for new nuclear power stations includes justifying the additional radioactive waste that will be produced. However it is clear that this 'new' waste will not present technical challenges that are different from those presented by 'legacy' wastes.

In terms of costs, new designs are likely to be more cost effective (Ref 7), making nuclear more competitive with fossil fuel power generation, which combined with the advantages of reduced carbon emissions, make nuclear power generation an important source of power for the future.

References - Question 5

1) Sustainable Development Commission, 'Reducing CO2 emissions – nuclear and the alternatives', Paper 2: March 2006
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3) World Nuclear Association, 'Energy Subsidies and external Costs', February 2007. Available at http://www.world-nuclear.org/info/inf68.html (24 Sept 2007)
4) The Cabinet Office, 'The Energy Review, Performance and Innovation Review, February 2002.
5) World Nuclear News, 'UK considers uranium and plutonium stocks'. 04 July 2007. Available at http://www.world-nuclear-news.org/wasteRecycling/UK_considers_uranium_and_plutonium_stockpiles_040607.shtml (24 Sept 2007)
6) 'Safety of Nuclear Power Reactors, Nuclear Issues Briefing Paper 14, July 2007.
7) Sustainable Development Commission: 'Safety and Security', Paper 6, March 2006.

Question 6:

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?

Safety

An analysis that has been carried out for the European Commission on the potential for nuclear accidents (Ref 1) suggests that, in the UK, the probability of major accidents is one in 2.4 billion per reactor per year. When compared to other energy sources, the Commission concludes that nuclear power is a safer means of energy production than coal or gas. It concludes that 'The risk from western nuclear power plants, in terms of the consequences of an accident or terrorist attack, are minimal compared with other commonly accepted risks' (Ref 1).

Calder Hall at Sellafield was the worlds first commercially operated nuclear power station, and so Cumbria has the longest tradition of safely managing nuclear power. Cumbria has, as a result, many years of experience of the safety issues associated with the operation of a nuclear facility having had this first nuclear reactor and the largest nuclear site in the UK. Safety is controlled by a number of UK regulators whose responsibility is to ensure that the risk associated with the operation of nuclear power plants is effectively managed. These include the NII, HSE, EA, SEPA and OCNS. The Council supports a strong independent regulatory framework. They also recognise that additional safety measures will be incorporated into newly designed power plants; in particular more passive safety measures and measures to prevent the occurrence of events likely to damage the core (Ref 2), which will make new power plants even safer.

Health Impacts from exposure to radiation

Restriction of routine discharges from nuclear power stations and direct radiation exposure to workers is regulated under the Ionising Radiations Regulations 1999, the Radioactive Substances Act 1993 and the Environment Act 1995. The limits of radiation to which people can be exposed are underpinned by obligations under the Euratom Treaty. The Council acknowledges that there are many issues and risks associated with the health of the public and workers from nuclear power but fully supports the UK regulatory framework in instigating and maintaining safety standards, which will ensure that the risks are reduced to acceptable levels. However, the Council looks to an independent regulator in upholding the public interest, and welcome their recent steps to increasing transparency through the ongoing Generic Design Assessment process.

Permitted dose levels to the public as a result of nuclear industry operations are only a small fraction of the natural background radiation (Ref 3) and radiation doses to workers continues to fall with new advances in safety and technology, which will result in a reduced exposure of operating and maintenance personnel to radiation compared to existing plants (Ref 2 &4). The Council considers that the radiation doses to both workers and public will continue to fall with the construction of new plants. It is important to note that the Council insists that new reactors will be built to the highest standards with multiple layers of protection and additional passive safety features to prevent accidents and reduce the risks from accidents below those due to existing nuclear stations. Therefore, the Council agrees that the regulatory framework must be strong, independent and robust to minimise the risks appropriately.

Terrorism

The Council acknowledges that nuclear power stations could be targets for terrorist attacks because of the potential disruption that such an attack would cause. Currently the Office for Civil Nuclear Security (OCNS –now part of the Nuclear Installations Inspectorate) is responsible for ensuring the security of nuclear installations and nuclear materials in transport. The OCNS also addresses the potential threat of theft of nuclear material or sensitive nuclear information. Since the World Trade Centre attacks, concern about the consequences of aircraft being used to attack a nuclear facility has been more prevalent. However, various studies show that nuclear reactors would be more resistant to such an attack than any other civil installation (Ref 1).

Although no current operating reactor design has been specifically designed to withstand a commercial aircraft impact, new designs of the type to be considered for the UK incorporate the required response to potential common mode events such as fires, aircraft crashes and design based threats (Ref 4). In addition, calculations carried out after the attacks of September 11th by US and UK analysts have shown that western nuclear reactors are more resistant to damage by aircraft strike than any other type of civil structure. In particular, the analysis used a fully fuelled Boeing 767 of over 200 tonnes at 560 km/h. In none of the scenarios would any part of the aircraft penetrate the containment (Ref. 5).

A study carried out in Switzerland in 2003 also indicates that the danger of radiation release from such a crash would be low for older plants and extremely low for newer ones (Ref 1). Aircraft no-fly zones, visitor vetting, moving speed traps and other security measures are instigated around plants in the UK. The Council therefore insists that security measures must be put in place to meet the strictest regulatory guidance in order to fully address the security issues which currently face the UK.

The Government requires that any new nuclear power station would be required to have an approved security plan. Additionally, the Convention on the Physical Protection of Nuclear Material currently obligates signatories to maintain an appropriate security regime, which protects against the threat of theft of civil nuclear material and sabotage of civil nuclear facilities. Attempts to attack or sabotage the plant are likely to result in the reactor shutting down safely once a fault is detected (Ref 3).

Terrorism associated with the transport of nuclear material must also be considered as well as the theft of fissile materials. The IAEA states that it would be ‘difficult but not impossible’ for groups to steal plutonium for a bomb although theft during transport would be extremely difficult.

Therefore Council insists that the Government's regulatory framework to protect nuclear material and facilities be able to meet the strictest security regulatory guidelines.

Furthermore the Council believes that the construction of a new plant at Sellafield could potentially minimise the risk of theft during transport as this would reduce the need for movements of nuclear material on public roads or rail by containing most of the whole nuclear cycle in one controlled site.

Climate change

The Council recognises that Copeland could be effected by climate change in the future which may affect the design and viability of a new nuclear power station in the area, as well as the integrity and therefore safety of the plant. However, the NII require operators to provide a high standard of flood risk protection and protection against other effects of global warming. For new nuclear power stations, these requirements would still apply along with flood risk and flood management being factored into the selection of site at the initial Strategic Siting Assessment process. A new development located in Copeland would have to take into consideration predictions of temperatures rises in the order of 4 degrees by 2080's and consistently increasing winter rainfall (Ref 1). Furthermore, with a location on the West Cumbrian coast, the development would be potentially at risk from inundation by seawater with UK sea levels generally predicted to rise by between 7 and 36 cm by 2080.

The risk from coastal erosion related to climate change should also be considered. Information from Nirex suggests a high potential for the Sellafield site to be affected by erosion within 300 years (Ref 6). However, erosion of the West Cumbrian coast is considered progressive but slow and the risk from inundation low until at least 2080. These issues can be mitigated through engineering design.

The Council therefore considers that with the current regulatory framework, and with the correct mitigation and management measures, climate change should not affect the integrity and therefore safety of a new power plant constructed in the area.

Proliferation

The IAEA oversees an international regulatory safeguards system under the treaty of on the Non-Proliferation of Nuclear Weapons (NPT). The UK is recognised as a nuclear weapons state under the NPT and has voluntarily made its civil facilities open for inspection by the IAEA. The system of safeguards requires operators to have a detailed nuclear material accounting and control system and to make regular reports on inventories of nuclear material. Some reports suggest that accounting for fissile materials is very problematic and transfers between civil and military stockpiles is virtually impossible to track suggesting that the safeguards could be flawed (Ref 7). Alternative information provided by the Sustainable Development Commission states that measures to account for all nuclear material 'have proved effective over many years and will be applied to any new build stations' (Ref 3).

The Council considers that the risk associated with proliferation are effectively minimised through the current regulatory framework and do not present a risk significant enough to prevent the investment in nuclear power generation. This judgement takes into consideration Copeland's long history of storing safely and securely the UK's stockpile of civil Plutonium and some of the UK's spent nuclear fuel.

References – Question 6

1) Safety of Nuclear Power Reactors, Nuclear Issues Briefing Paper 14, July 2007.
2) Press Kit, EPR, The Advanced nuclear reactor, AREVA, October 2004
3) Paper 6: Safety and Security, Sustainable Development Commission, March 2006.
4) Advanced CANDU Reactor, ACR-1000, A new level of performance from proven CANDU technology, AECL
5) World Nuclear Association. Information. Safety of Nuclear Power Reactors. 2003.
6) WP12 draft 3, Dispersed Options – Potential Effects of Coastal Erosion and Seawater Inundation on Coastal Nuclear Sites.
7) The links between nuclear power and nuclear weapons, A CND Briefing by David Higgin, April 2006

<u>Question 7:</u>

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?

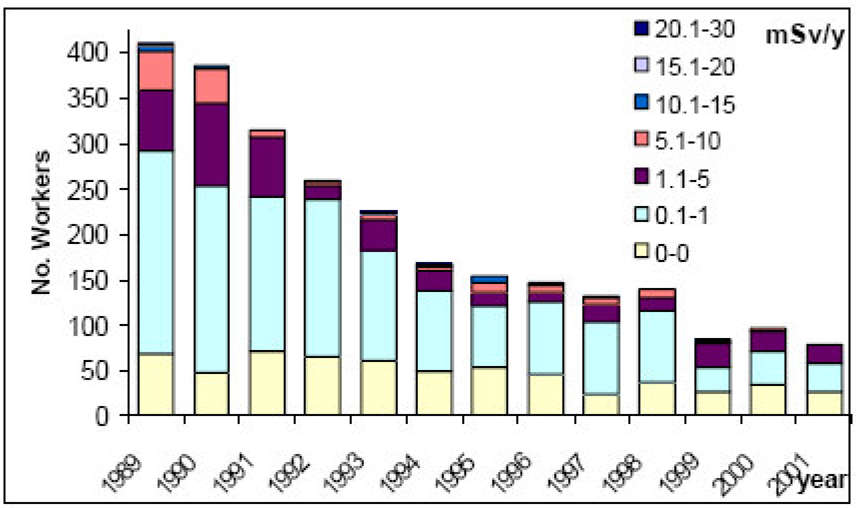
Transport of material is an integral part of the nuclear fuel cycle and materials are generally transported in solid form. Shipments to and from the UK are generally via Liverpool and Ellesmere Port docks and transported within the country by road and rail. Transport currently includes the delivery of new fuel, the removal of spent fuel and its transfer to reprocessing facilities (although this is not planned for fuel from new nuclear power stations) and the Low Level Waste repository near Drigg, and the movement of ILW and LLW. Although no incident involving leakage of a Type B transport cask has been reported to date (Ref. 1), public concerns associated with the transport of nuclear material are well recognised. The Council therefore recognises the need to minimise transport of such material, and are currently seeking to develop effective transport connectivity within West Cumbria.

In the UK, there were approximately 7,000 movements of packages containing radioactive material related to the nuclear power industry in 2001 (Ref 2). The Department of Transport regulates the safety and security of transporting radioactive materials and ensures good practice under the Nuclear Industries Security Regulations (NISR) and the recommendations of the IAEA. The principal assurance of safety to both humans and the environment is the design of the packaging, which allows for unforeseeable incidents and is categorised as "Type A" for medium activity materials and "Type B" for HLW and spent fuel (Ref 1). 'To date, there has never been an incident in which a Type B transport cask containing radioactive materials has been breached or has leaked' (Ref 1).

By siting a new nuclear power station at Sellafield, the requirement for the transport of nuclear material may be further reduced due to the location of other fuel cycle facilities. In addition, improvements to the road, rail and marine infrastructures are currently or will shortly be carried out. In particular, it has been recognised in the Energy Coast Masterplan (Ref. 3) that 'the potential to upgrade the coastal [rail] line to improve journey times and frequency of services, essential for the effective movement of nuclear materials, should be explored'. Similarly, the development of the Port of Workington, over a 10 year plan will undoubtedly support improved freight movement (Ref. 3), both for nuclear and non-nuclear material.

Individual doses received by members of the public from the transport of nuclear materials are only considered possible by external exposure to materials in the packages (Ref 4). Exposure due to contamination of the packages is prevented by specified procedures at the place of dispatch. The design of the packaging or flasks/ casks is standardised by the IAEA, and is regularly reviewed to take account of technical changes. The flasks undergo various tests set out in the IAEA recommendations and have successfully been tested under conditions equivalent to a 30mph impact (Ref 5). The Council considers that with the advancement of technology related to increased investment in nuclear energy, advancements will also be made in the design of transportation packages.

The critical groups that have been identified as being most at risk from exposure are members of the public present at regular stopping places for road transport, those living near to a rail siding used for the transport of nuclear fuel cycle materials or workers on board of a ship containing radioactive material (Ref 4). Conservative calculations from the Sustainable Development Commission suggest doses from radioactive materials in transport in the order of 0.006mSv per year for the public, which is substantially below the recommended statutory dose limit of 1mSv. The Health Protection Agency (formerly NRPB) states that the general public and road and rail workers will receive the same background radiation dose of 1.1mSv per year (Ref 6). More specific data indicates that a driver transporting flask materials for 500 hours per year would receive a dose of approximately 1 $mSvy^{-1}$ and the average dose to the rail workforce is calculated to be in the order of 2µSv (Ref 4).



UK Classified transport worker exposures (mSv) by year (Ref 4)

Overall, and based on the community's experiences of nuclear transportation in Copeland since the construction of Sellafield, the Council considers that the current regulatory framework and safety measures for transportation of nuclear materials are effective, not withstanding public perception and concern, and note that siting a new nuclear build at Sellafield may further reduce transport of radioactive material.

References – Question 7

1) World Nuclear Association 'Transport of radioactive material', October 2003, http://www.world-nuclear.org/info/inf20.html (24 Sept 2007).
2) The Future of Nuclear Power, DTI. The Role of Nuclear Power in a Low Carbon Economy. May 2007.
3) Britain's Energy Coast – A Masterplan for West Cumbria. Executive Summary. 2007.
4) Statistics on the transport of radioactive materials in the UK and statistical analysis. NRPB, December 2003

5) Paper 6: Safety and Security, Sustainable Development Commission, March 2006.
6) Health Protection Agency, Transport of Radioactive Materials at a glance, Routine Doses. Available at http://www.hpa.org.uk/radiation/understand/at_a_glance/index.htm (24 Sept 2007)

<u>Question 8:</u> 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?

<u>Question 9:</u> 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?

<u>Question 10:</u> 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?

Waste and Decommissioning

The UK has a substantial legacy of nuclear waste, which was exacerbated by the fact that many existing nuclear facilities were built with a focus on construction and operation and did not give sufficient consideration to long-term waste management and decommissioning. This has resulted in a complex and expensive waste legacy, which forms the centre of much public concern in terms of safety and costs (Ref 1). There are currently large amounts of radioactive waste in storage in the UK awaiting long-term disposal, and it is anticipated that more will be created in the future from decommissioning of existing plants, although the bulk will be low level category (Ref 2).

The NDA is responsible for securing decommissioning and clean-up of the 19 civil public sector sites that were previously owned by BNFL and UKAEA. Site management contracts are progressively being let by the NDA to the market, which is considered to encourage cost effective nuclear decommissioning. The NDA is responsible for developing a national strategy for managing the waste and ensuring continued provision of waste management and disposal facilities.

The costs of decommissioning the existing nuclear fleet, are anticipated to be high (in the order of £1.5B for each of the UK's existing nuclear power plants (Ref 1)), which reflects the early emphasis on operational rather than decommissioning issues in these older plants.

At present, 98% of the total nuclear waste volume is made up of intermediate and low level waste (Ref 1), the majority of which is LLW, which is disposed of in Copeland. The management and storage of radioactive waste and other nuclear materials is therefore already a significant activity in Copeland. It should be noted that spent nuclear fuel is not currently classified as HLW, due to our reprocessing policy (Ref 1). However, if there were a change in policy and reprocessing were not undertaken, spent nuclear fuel would have to be classified as a waste, conditioned and ultimately disposed of. The total volume of low intermediate and high level radioactive waste that exists today and is forecast to arise in the future is 2.3million m^3 (Ref 3). The Low Level Waste Repository (LLWR) near Drigg does not have the capacity to meet the anticipated future needs of decommissioning and clean up of existing nuclear sites. Currently, the policy in England and Wales for the management of intermediate and high level waste or low level waste which is unsuitable for burial in the shallow facility near Drigg is geological disposal following the acceptance of CoRWM's recommendations (Ref 4).

Having considered the evidence, the Council recognises the requirement for a long-term management facility for the UK's nuclear legacy. The Council supports CoRWM's recommendation of a deep geological disposal facility, coupled with a programme of robust interim storage for the higher activity wastes to be implemented through a voluntary and partnership approach with local communities. However, currently the Council is concerned over the approach adopted by the NDA to find alternative disposal facilities for LLW as a consequence of the volume at the LLWR near Drigg is approaching the facility's capacity.

Issues around radioactive waste are complex, controversial and of large interest and significance. As such, these issues have a major impact on the future of Copeland and West Cumbria due to the presence of 70% of the nations existing nuclear waste at Sellafield, and, having provided the County with some non-negligible economic benefits, are a key issue for the Government to address with local the local community.

New Facilities

The amount of waste that is produced by a modern nuclear power station is small by industry standards (Ref 6) and the amount of waste produced by new facilities could be substantially less (Ref 1) due to advancements in technology and operating practices (Ref 7). Less than 15,000m^3 of radioactive waste is produced by the UK nuclear industry every year compared to 40,000,000m^3 of industrial waste, 5,000,000m^3 of which are toxic wastes (Ref 6). Currently, most HLW is produced by the reprocessing of spent fuel (Ref 6) and is equivalent in volume to a taxi per year (Ref 6). The Government does not envisage the continuation of reprocessing with the construction of new nuclear power stations. Therefore, there could be a significant increase in the proportion of heat generating waste, in the form of spent fuel, that will require to be managed (Ref 1), although it will remain a small proportion of the total volume. In summary, the evidence indicates that new nuclear build will increase total waste volume by a small amount but the radioactivity of the UK's total waste inventory would increase sharply immediately after spent fuel is discharged from the new stations (Ref 3). For example, the increase in total activity could be as high as a factor of nine, 10 years after removal (Ref 4). However, the radioactivity of the new waste will vary, being dependant on the amount of time the waste is left to cool in interim storage but, as with the spent fuel from the current stations, it will remain hazardous for thousands of years. (Ref 2 & 6).

The cost of expanding a repository during the initial construction stage to accommodate co-disposal is likely to be marginal when compared to the initial construction costs as a whole, although current estimates suggest that the footprint of the repository would need to be increased by 50% to account for new waste (Ref 8). During the interim period, producers should be responsible for the safe and secure storage of waste (Ref 4).

New nuclear power stations are envisaged to comprise simpler structures, which are more compact thus containing less waste potential than the existing reactor fleet (Ref 8). For example the AP1000 design has between 35 and 80 % fewer pieces of equipment than Sizewell B design and the modular construction would simplify decommissioning (Ref 3). New power stations will burn much less fuel, produce less waste and be more easily dismantled and demolished (Ref 7).

The Aarhus Convention, which aims to protect and improve the environment and ensure sustainable and environmentally sound development, is transposed into UK Legislation therefore ensuring the social, environmental and economic impacts of new build power stations are assessed and mitigated if possible (Ref 3).

The Council supports the advancements made in the designs of new nuclear power stations will greatly reduce the volumes of waste produced during both operation and decommissioning. In addition, it has been established (Ref. 5) that West Cumbria possesses internationally competitive skills and experience in radioactive waste handling, storing and packaging and therefore could provide its valuable expertise to a new power station sited in West Cumbria.

The Partners recognise the regulatory framework in place for any future nuclear power stations and consider that it will adequately ensure that the waste from both operation and decommissioning will be reduced as far as practicable.

What are the Ethical Considerations of a new power station?

The principle of sustainable development requires that the benefits to current generations do not compromise the quality of life for future generations. Specifically it should not place unacceptable burden (in terms of cost, effort or environmental damage) on future generations and it should not involve a risk to future generations that is greater than that posed to the present generations who have enjoyed the benefit (Ref 2).

One of the major ethical considerations associated with the construction of new nuclear facilities is whether the UK should create more radioactive waste which will be hazardous for thousands of years, in the light of the UK's inability to date to demonstrate and implement an adequate long term waste management policy (Ref 3).

As the Government recognise, there is a balance to be obtained between the generation of power through nuclear energy which could benefit future generations through the reduction of CO_2 emissions, and the burden it creates in terms of producing new waste, which must be safely managed and disposed of.

The Government proposes to address the issues of costs by instigating legislation which means the owners and operators of the new build power station are obliged to accumulate funds to cover the full decommissioning costs and full share of long term waste management; thus reducing the financial burden placed on future generations.

A recent poll carried out by the Tyndall Centre indicates that more than 50% of people would support more nuclear power if it could be demonstrated that it reduced the threat of climate change (Ref 1).

However, the question remains, is it right to construct new nuclear facilities producing radioactive waste with no current long term management solution in place?

The Council has confidence in the opinion of the environmental regulators, which have concluded that geological disposal will protect humans and the environment for as long as the waste remains hazardous (Ref EA and SEPA submissions to CoRWM).

The Council sees no ethical objection to new nuclear power provided that the processes for implementing the geological and LLW repositories precede as quickly as sociological and sound scientific constraints will allow, and providing that the cost of managing waste from new build is bourn by the generations that receive the benefit, the ethical arguments against creating new waste can be better balanced against the benefits. This includes finding willing communities for repositories that will accept the additional waste from new build.

In the interim, it will be necessary to store at least some of the waste from new power stations until the repositories are available. Indeed, waste and spent nuclear fuel have been safely stored at Sellafield for decades and the Council sees no reason why this practice can not continue, in appropriate facilities, by voluntary communities into the near future.

Nuclear power in the UK provides an indigenous, secure energy supply (see response to Question 3). This reduces our reliance on other countries for energy sources. By 2020, it is forecast that up to 90% of UK energy could be sourced from Russia, Middle East & North Africa.

As fossil fuel energy sources become scarcer, the risks of conflict over energy sources will increase. Some have argued that conflicts in the Middle East for example, have been partially driven by energy supply concerns. From an ethical perspective it may be considered that if we have indigenous secure supplies, these should be used rather than risk increasing potential tensions and conflicts in sensitive areas of the world.

In addition, it is generally admitted that fossil fuels such as oil or coal can potentially be used for ethical uses as opposed to uranium which, so far, is only used in power generation activities. It can therefore be argued that the reserves of fossil fuel should be kept for these ethical uses for future generations as opposed to be burnt for energy generation, and that at the present time, the reserves of uranium should be exploited in priority.

The UK was a nuclear pioneer, and has the skills and tradition of developing peaceful nuclear energy. However, the UK alone can only make a partial contribution (2%) to global energy needs and sustainable development but it can take a leadership position. If the UK can develop efficient, non-greenhouse polluting, secure energy sources such as nuclear, but chooses not to, and instead rely on non-sustainable fossil fuels from less politically stable regions, it can only be expected that developing nations such as India and China make the same decisions.

Summary
There is no single ‘right’ answer to the issues of energy supply. Fossil fuels are not sustainable and contribute to climate change; renewables (such as wind) do not provide a reliable energy source, and take valuable other resource (e.g. land) to implement; nuclear has significant long-term waste issues. No single energy sources can be considered in isolation as either ethically ‘right’ or ‘wrong’. In order to meet the challenges posed by global development and climate change, a balanced mix of energy sources is required, which should include nuclear and renewables.

There are strong ethical arguments both for and against nuclear power. It may be argued, that in the broader context of the human situation, and its march for development across the globe whilst confronted with a changing climate and a potential political instability, in the medium term, nuclear power has a role to play in helping humanities sustainability meet its development goals.

The Council believes that the risks of increasing our dependency on fossil fuels significantly outweigh the disadvantages of nuclear power.

References – Questions 8, 9 and 10

1) Is Nuclear the Answer? Sustainable Development Commission, March 2006.
2) How should the UK manage radioactive wastes? Public Stakeholder Engagement 2, CoRWM, 4 April to 27 June 2005.
3) Paper 5: Waste and Decommissioning, Sustainable Development Commission, March 2006.
4) Response to the Report and Recommendations from the Committee on Radioactive Waste Management (CoRWM), By the UK Government and the developed administrations, 2006
5) Britain’s Energy Coast – A Masterplan for West Cumbria. Executive Summary. 2007
6) Nuclear Energy in the Environment, NIA, 2004
7) A Gap Analysis for the Nuclear Industry, An Investigation into gaps in provision based on current and predicted future skills needed, Cogent, May 2006.
8) Potential Waste Volumes Arising from New Build, NDA October 2006.
9) The viability of a phased geological repository concept for the long-term management of the UK’s radioactive waste, NIREX, November 2005.

Question 11:

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?

UK Regulatory framework for environmental protection

Copeland encompasses an environment of exceptional natural beauty and wildlife, we are therefore determined that the environmental impacts of any development, nuclear or otherwise, should be eliminated, minimised, or mitigated. The Council supports a strong environmental regulator and planning system which rigorously assesses the necessary environmental assessments and plans put forward by developers, and is insistent that the highest levels of scrutiny are deployed for such developments. However, the Council does not believe thatsee potential environmental impact of new nuclear power stations in itself justifies not allowing the opportunity for developers to make a case.

The regulation of issues of all environmental impact, including landscape and visual amenity, resource usage and other factors from new nuclear power plants is covered under planning legislation, relevant environmental and other legislation, including that required by the Environment Agency, the Health and Safety Executive, etc (Ref 1). The regulatory requirements would be the same for similar sized power generating stations irrespective of the fuel. Under European legislation, such a development would require a Strategic Environmental Assessment (SEA) and an Environmental Impact Assessment (EIA). Furthermore, Section 36 of the Electricity Act states that no station generating over 50MW of electricity may be constructed without the Secretary of State's consents.

In July 2004, new regulations were introduced implementing the EC Strategic Environmental Assessment (SEA) directive (Ref 2). The regulations ensure that the environmental consequences of plans and programmes are identified and assessed during their preparation and before their adoption and implementation. The SEA will generally comprise the following stages (Ref 3):

- Context, Baseline and Scoping;
- Alternatives and assessments;
- Preparing the Environmental Report;
- Consultation; and
- Monitoring.

It is intended that this Directive will contribute to the integration of environmental considerations into decision-making on plans and programmes, and will help to promote sustainable development (Ref 4). The Council acknowledges that the Government intends to incorporate the SEA within the Strategic Siting Assessment process, and so long as there is no compromise in the rigour with which this assessment is undertaken in this way, the Council is satisfied that all the necessary requirements and assessments will be met.

Additionally an EIA must be completed before development consent is granted. The requirement for EIA comes from a European Directive (85/33/EEC as amended by 97/11/EC). The procedure requires the developer to compile an Environmental Statement (ES) describing the likely significant effects of the development on the environment and proposed mitigation measures. The ES must be circulated to statutory consultation bodies and made available to the public for comment. Its contents, together with any comments, must be taken into account by the competent authority (e.g. local planning authority) before it may grant consent.

Other documents such as the Landscape and Visual Impact Guidelines provide guidance on assessing the landscape and the visual impacts of development projects. The document provides guidance on a number of key points such as assessing integration of landscape and visual issues into the development process; the need for a transparent approach to landscape and visual impact assessment; describing the baseline conditions; determining the magnitude and significance of impacts; and reviewing the landscape and visual components of an EIA (Environmental Impact Statement) (Ref 5).

The Council believes that it is important to ensure that the regulatory framework in place is adequately monitored by both the UK and Europe and insists that any new development must and would undergo stringent assessment of its environmental impacts.

The siting of new nuclear power stations

If, as the Government plans, private investment funds new nuclear power, it will be up to each developer to propose, construct and operate such power stations, which would include selecting a location. Energy companies would need to ensure that their selected sites would fall within the criteria or sites developed by the Government's own Strategic Siting Assessment which would determine the suitability of the site for new nuclear power stations.

The Government announced its intention to undertake a strategic Siting Assessment (SSA) in July 2006. It will assess the suitability of potential sites for new nuclear electricity generation (Ref 6). The SSA will incorporate the SEA as discussed above and is likely to take in the order of 18 months to complete the following three stages:

Stage 1: Exclusionary criteria & discretionary criteria for assessing the suitability of possible sites;
Stage 2: Published statement on criteria, invite nominations for potential sites to be considered in the SSA; and
Stage 3: Proposal on draft list of nominated sites, which meet the criteria.

The Council welcomes a debate on the criteria to be used for the SSA. In addition to criteria such as physical setting, virtual setting, site criteria, and seismology and interface criteria, we believe it is important that the wishes of the local community and stakeholders be taken into account, through an appropriate and agreed process of volunteerism and explicit local public support.

It is accepted and supported, by the Council as well as more widely, that new nuclear build is likely to be considered first at or adjacent to existing nuclear sites. This is because of the presence of existing infrastructure, skills, experience and training, as well as higher levels of local public and community and political support. Before any other siting options are considered it would be prudent to assess the viability of these existing nuclear sites, particularly as they would have some of the infrastructure and grid connections required in a new build (Ref 2). The Council considers that this is best practice economically and environmentally, and in particular would consider a development at Sellafield particularly compelling for these and other reasons. It is the Council's view, that the local community would be more likely to support a development at Sellafield as opposed to at a 'non-existing nuclear' or brownfield site elsewhere in the county.

Nuclear power plants require large volumes of cooling water for operation. Cooling towers are unattractive to developers due to decreases in efficiency of the power station, and the very significant visual impact. Therefore coastal locations tend to be preferable (Ref 1). New cooling towers for nuclear new build at Sellafield would be significantly larger than the ones which used to support Calder Hall, and the Council would expect sea cooling to be used at Sellafield. The physical siting of a nuclear development should have the ability to significantly contain the visual impact of the proposal, which is the same for any large facility.

Whilst the Council considers that the proposed SSA will adequately address the issues involved in choosing a location for a new nuclear power plant, they understand that it will be developers who make the specific case for a development at a particular location, including the detailed environmental impact assessment. Therefore the Council supports the rigorous regulation and enforcement of appropriate legislation in this area.

Landscape and construction

Nuclear land requirements would be the highest during the construction phase when aggregates for road and plant construction are extracted and new transmissions installed. It is likely that large volumes of material will require excavation and removal from site, and large equipment such as tower cranes may be used. Therefore the construction phase will present particular environmental impacts, including increased traffic and alteration to the visual characteristics of the site, more so than the finished plant. However, this would be true for the construction of all large scale electricity generating technology (Ref 1). The total land requirement for 1,000MW of nuclear capacity, including mining and the fuel cycle is between 100 and 1000 ha (Ref 1).

The construction phase of a new nuclear power station is likely to take of the order four to five years. It should be noted that as well as the plant itself there will be infrastructure requirements to service the operations such as roads, cables and pipe work. The Council considers that the construction of new infrastructure could be minimised if Sellafield chosen, as the existing infrastructure could be utilised where appropriate. This would reduce the impacts on habitats, the environment and potentially the visual aesthetics of the site. Additionally, the Council considers that sea transport could be utilised at Sellafield for supply of construction materials etc, thus reducing road traffic movements and further reducing the impacts of the construction phase on the surrounding area.

The visual effect of the completed plant is the appearance of the facility relative to the landscape and people (Ref 1). Light pollution from large power plants should be considered, the effects of which are very difficult to quantify. On coastal locations the development could have implications on shipping navigation which may need to be considered (Ref 1). The Council would expect these and other effects would be routinely assessed through the EIA as part of the planning system.

It is accepted that some upgrades to the transmission and grid network for new power plants, both nuclear and other energy sources, may be necessary. These infrastructure developments ("Transmission corridors") will also have their own, often significant environmental impacts, including visual and impacts on wildlife. Whilst the land either side of the corridor need not be redundant as it can be utilised for pastoral farming or wildlife buffer zones (Ref 1), transmission corridors can also adversely effect wildlife habitats, for example by fragmenting woodland. These effects can be mitigated and the impacts of transmission lines on the landscape apply to all centralised electricity generating sources (Ref 1). Transmission is an important element of power generation, particularly nuclear as power stations are often located in remote locations due to public acceptability issues and environmental constraints (Ref 1). The Council supports and would expect similar rigour to be applied to the environmental impacts of transmission lines as for any other development, but does not see this as a reason to not allow developers to be able to make the case.

The existence of operational plant at Sellafield means that a significant level of traffic already serves the site. The Council recognises that construction traffic and haulage movement will inevitably increase with a new development but this will be comparable to the existing baseline conditions at the site. It is envisaged that a new power plant would not have a significant effect on the visual characteristics of Sellafield, again because of the current appearances of the site. Despite this, the Council would require the design, materials and colours used to harmonize with the surrounding landscape to reduce the visual impact as far as possible. Furthermore, landscaping works should be employed to screen or integrate as much of the development as required by the community.

Water and cooling

It is recognised that production of electricity, whether it is from a nuclear, coal or gas-fired plant, requires large amounts of water for cooling, and therefore coastal sites are often favoured. Whilst it has been reported that the current design of nuclear power plants can consume more water per megawatt produced than fossil-fired power stations (Ref 7 & Ref 8), large variations are observed within the nuclear industry depending on the design used, whether it is once-through, pond- cooled or tower-cooled (Ref 7). New build at Sellafield would be cooled from water from the sea, and so involve minimum water usage, although water discharged to sea would be ~10degrees C warmer than when taken in. It is important that the design would mitigate the environmental impacts, and again this would be assessed by the regulator.

Such demands on water volumes cannot be filled without disruption to a certain extent of the local aquatic environment, whether it is a river, lake or sea. Due to the quantities of water involved, use of coastal sites, such as Sellafield, significantly reduces the environmental impact. Issues arise both during water intake and discharge of cooling water, and such activities have an impact on the local flora, fauna but also river/ lake/ sea bed. To assess and mitigate these effects on aquatic life, the Council insists that a detailed assessment of the impact of water abstraction must be undertaken on a site specific basis in accordance with the regulatory framework.

The main impacts of cooling water discharges are associated with the large volumes of water released at relatively high speed (estimated at up to 4m/s for the EPR), along with temperature and composition of the water released. Modelling tools are a useful to predict these impacts. Such assessments should include (but not be restricted to) impacts on the ecology of the receiving environment, local geology and hydrology, hydrodynamics, navigation and climate (Ref 9).

Considering the evidence, the Council believe that, although the requirements for water supply are high for a new nuclear power station (whether it is for use as cooling water or any other purpose), and the impact on the local environment exist, these should not prevent the new nuclear build programme from being implemented. In particular, we believe that additional abstraction of water via the existing channel at Sellafield would not cause a significant issue, subject to full environmental impact assessments.

Uranium mining and milling

Uranium mining has a major environmental impact, although it is often located in a different country to electricity production. Most of the uranium ore used in the UK is sourced from Australia, therefore Australian and not UK environmental regulations apply. However, the Council recognises the importance of considering the impacts of mining and milling on their local environments to promote sustainability in accordance with European and UK guidance. Most mines in Australia and Canada possess ISO14001 qualification (Ref 10). Overall, uranium mining is very similar to any other metalliferous mining activities, and is therefore subject to preliminary environmental assessments and approvals, as well as environmental, safety and occupational health requirements. Although uranium mining is relatively well regulated in Australia and Canada, concerns have been raised about the environmental impacts of these activities in other parts of the world (Ref 1).

Four methods can be used for recovering uranium from the environment, specifically (part of the world production in 2006 in brackets. Ref 11):

- Open cut mine (24%);
- Underground mine (41%);
- In-situ leaching (ISL) (26%);
- As a by-product of other process (9%).

Open-cut mining presents the most visual impact and surface disturbance on the local environment due to the large amount of material requiring removal. It is estimated that a ratio of waste produced to uranium retrieved in the order of 3.5 is common in Australian mines (Ref 12). Underground extraction presents much less surface disturbance and the volumes of material displaced are much lower. From a pure landscape point of view, ISL is the least disruptive method (out of the three main processes); however, this technique can have a major negative impact on water tables and aquifer, particularly because of the extensive use of acids and other chemicals used to keep the uranium in solution (Ref 13).

Sustainability requirements also include the need to rehabilitate the land after exploitation of a mine. This has been successfully carried out at a number of locations worldwide, for example Australia (Rum Jungle deposit – open mine, Nabalek - ISL, Radium Hill – open mine), or Germany (Wismut – both open and underground mine. Ref 14).

Following excavation of the ore, a number of steps are required in order to obtain ready to use fuel. The first one, known as milling, consists of producing “yellow cake”, i.e. a material containing around 80% uranium. Milling is generally carried out in a location close to the place of excavation of the uranium ore, before the yellow cake can be exported to the fuel preparation location. Milling activities employ the use of strong chemicals (acid or base) to dissolve the uranium before being precipitated. The environmental impact of milling activities is important, as, once the uranium is removed from the ore, a large volume of waste containing long-lived radionuclides and toxic material is created which needs to be disposed of.

Overall, the Council believes that the environmental impacts associated with uranium mining and milling should not prevent the pursuit of a UK new nuclear build project as the amounts of uranium required in the UK new build programme would be negligible in comparison to the volumes produced globally, and so long as acceptable environmental standards are applied to its extraction.

Fuel Preparation

Once the uranium has been extracted from the ore and is available as yellow cake, a further three steps are carried out before it can be used as fuel in a nuclear power plant. Conversion of the yellow cake into uranium dioxide (UOx) and then uranium hexafluoride (UF_6 or hex) is required prior to enrichment of the material. The main environmental issue associated with the conversion operations is the use of hydrogen fluoride, however this issue is considered minor (Ref 15).

Enrichment operations of the hex take place at Urenco Capenhurst in the UK, through a gas centrifuge process. The environmental impact of this method of enrichment is lower than the gaseous diffusion technique which requires the use of cooling towers and larger amounts of electricity. In the case of the new nuclear build programme, the direct environmental impact will be similar or even lower than at present, as some of the potential new build design can be fuelled using Mixed Oxide MOX (obtained from reprocessing operations) as opposed to UOx.

Once enriched the hex is reconverted into enriched UOx powder, which is in turn pressed into ceramic pellets, encased into zirconium alloy (or sometimes stainless steel) and assembled into fuel rods. In the UK, these operations are carried out at Springfields.

Overall, we believe that the successive operations associated with the fabrication of the fuel for the new build programme will not generate any significant different environmental impact than the current operations. Decommissioning and clean-up of the fuel fabrication facilities will be required, but to the same extent as it is currently required. In addition, because the process is well controlled, it is unlikely that any impact will remain on site after decommissioning.

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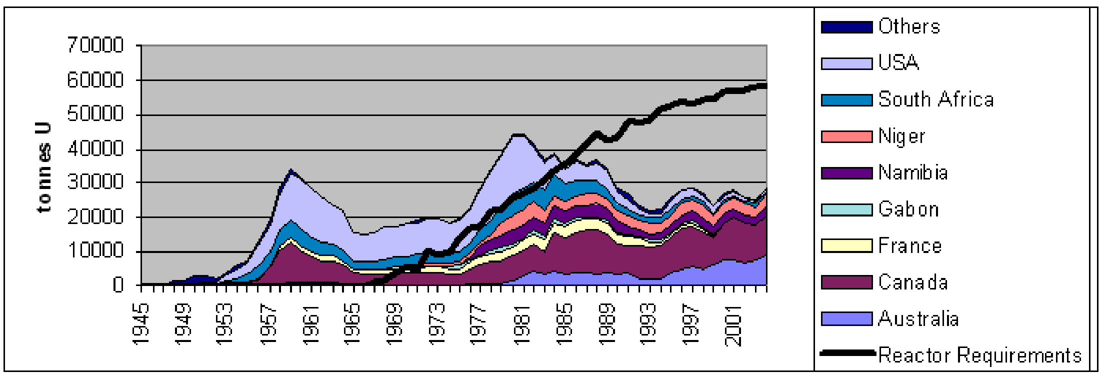
Question 12:

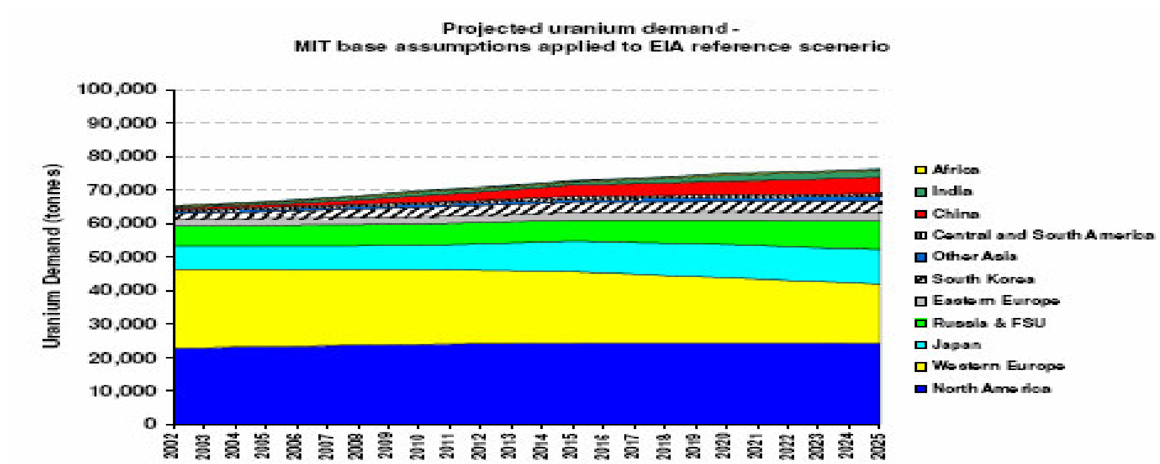
Do you agree or disagree with the Government's views on the supply of nuclear fuel? What are your reasons? Are there any significant considerations that you believe are missing? If so, what are they?

As in the case of oil and gas fired plants, a reliable supply of fuel is required in order to generate electricity from a nuclear power plant. Currently, a majority of nuclear power stations in the world produce electricity using uranium-based fuel, consisting of enriched uranium and manufactured in a large majority from uranium ore (Ref 1). Mixed Oxide fuel (MOX), which is produced from the uranium and plutonium products of reprocessing operations, currently only contributes to around 2% of the world's total nuclear capacity (Ref 2).

The global demand for uranium has been steadily increasing for over a decade (Ref 3), and it is expected, as already discussed in Question 3, that the current uranium production of around 65,000t/ year (2005 estimates, Ref 4) will need to reach around 76,000t/ year in order to satisfy demand in 2025 (Ref 2).

Western World Uranium Production and Demand 1945-2004





The increase in uranium demand has recently resulted in an increase in the price of uranium ore. Whereas the price of the ore dropped in the 1970s and 1980s, which resulted in the closure of some of the lower-grade ore mines (Ref 5), the incentive for increased power generation and nuclear new build has lead to a dramatic rise in the cost of the ore more recently. Indeed, the price has risen by more than five times in the last two years (Ref 6), from US $44/kg in 2005 to over US$240/kg earlier this year (2007).

A number of studies have reported that uranium reserves have been consistently underestimated in the past (Ref 5, Ref 7), and, in comparison to the oil or gas industry, which have spent billions of dollars in the exploration, technology development and extraction of crude material, very little money has been invested in the evaluation of uranium reserves. In addition, various grades or ore can be found in the environment, making the overall reserves potentially much larger than first estimated.

Despite this and the minor impact of crude material on the final price of electricity (Ref 5), it is still legitimate to ask firstly how long the stocks may last, and secondly how sustainable is it to use very low grade uranium excavated at a high price.

In an attempt to answer these questions, and knowing that the UK possesses a large stockpile of uranium stocked (as opposed to no uranium ore), the Council believes that the UK stocks of uranium and plutonium could be reused to fuel some of the new nuclear stations. Indeed, it has been estimated that the current stocks would be sufficient to fuel three 1000MWe reactors for their entire 60-years lifespan (Ref 7, Ref 8 & Ref 9), with no Government funding (Ref. 10). To a certain extent, and although it has been argued that even a price of uranium ore at US $1,000/kg would only incur an increase in electricity price of 1 to 2 cents/ kWh produced in nuclear stations (Ref 5), the use of the current uranium stockpiles would both help to buffer against the increase in electricity price and be more sustainable than using some lower-grade uranium. In addition, and as reported in the Energy Coast Masterplan, this option would prevent any geopolitical issues and therefore provide a security of supply, along with a strong platform for the 4th generation reactors available in around 2002 that would provide localised power, a MOX fuel burning capability and heat transfer technology to produce hydrogen and other forms of energy (Ref. 10).

Overall, the Council agrees with the Government's view that the supply of uranium ore shall not prevent the implementation of a new nuclear build programme in the UK. However, they also believe that reuse of the uranium and plutonium stocks currently present at Sellafield could provide an additional source of fuel and that therefore the option should be left open for further discussion in the future.

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Question 13:

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?

It has been recognised that 'a skilled and competent workforce' is vitally important if local authorities and the waste industry are to meet existing and emerging challenges presented by new and existing legislation, developments and technologies' (Ref 1). A number of studies have assessed that, during both the pre-construction and construction phases of a new nuclear power station, around 250 project management and technical staff would be required (Ref 2). In the case of the construction of five twin-unit power stations, this figure would be increased to around 400. However, these figures are not believed to represent more than 2 to 3% of the total UK resource level, and therefore it is not believed that major skills shortages will be encountered in these areas.

Despite this, it is forecast that some specific skills to the nuclear market, such as reactor safety, licensing or operational staff will be required in the next five to ten years, mainly due to increase in demand and current staff reaching retirement age. Because the North West hosts more than half of the UK's 40,000 nuclear sector employees, with Cumbria being the main lead, these skills are largely developed in the Cumbrian region (Ref 3), where it would be possible to provide training and support to staff for a new build project, in line with the Engineering Contracting Industry Training Board (ECITB) process (Ref 2). It is indeed recognised that, if tackled now, the predicted shortage of these skills could be avoided by implementing a training programme to provide a new generation of nuclear specialists, ensuring continuity in the UK Nuclear programme.

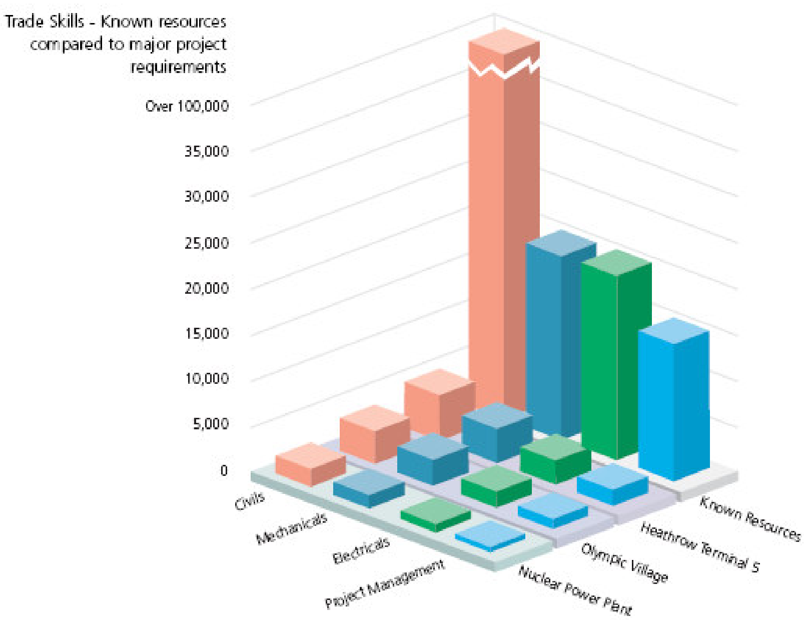
As such, and as detailed in the Energy Coast Masterplan, West Cumbria's plans to strengthen enterprise skills training in schools, to develop skills for Sellafield and existing supply chain workers, along with the presence of a number of high value science and research assets and skills in the region (Ref 4), constitute a real advantage for the region to host a new reactor. In particular, projects currently underway such as the development of the University of Cumbria, the National Skills Academy for Nuclear and the Nuclear Academy North West will all ensure that appropriate skills for the nuclear industry are provided. These institutions will not only provide a tool to offset the declining skills base as the current workforce retires, but also ensure support is provided to the industry as it evolves and moves towards decommissioning (Ref. 4). As such, the expertise already developed at Sellafield in decommissioning and reprocessing will be an invaluable advantage to the construction of a new nuclear plant. Overall, training and skills development is led by the Sector Skills Council (SSC) and for the waste management sector by the Energy & Utility Skills (EU) which represents the needs of employers in the electricity, gas, waste management and water industries.

Indirectly, and in addition to the technical nuclear skills required for the construction and operation of a new nuclear power station, support from research activities is required within the supply chain. Research activities are already largely developed in West Cumbria, as developed in the Energy Coast Masterplan, and a number of institutions have been created. The Northwest Development Agency has worked to develop a strong evidence base and understanding of existing and future business and individual needs at all levels of skills and research (Ref 4). In particular, the research facilities present in West Cumbria are already generally considered as a developing centre of excellence for the Nuclear Sector. This will be further emphasised by the linking of existing and new provision with population centres, businesses and research locations, such as the National Nuclear Laboratory and Dalton Institute, the new University of Cumbria, the National Skills Academy for Nuclear, the Nuclear Academy North West and the Westlakes Research Institute (Ref 4). As a result, West Cumbria can strengthen its position as a leading region in the UK for Nuclear Research.

In terms of civil engineering and construction skills, a number of companies in the UK have experience and resources that could be involved in a nuclear new build project. It is estimated (Ref 4) that, during the construction phase of a twin reactor, an average of 1,500 civil engineers and construction staff will need to be employed on site (this excludes the project managers and technical supports mentioned previously). Although these numbers only represent a fraction of the workforce available in the UK, competition with other major projects and remoteness of the location of potential new power station may incur a shortage of workforce. However, it has been established that West Cumbria’s existing working population, although highly specialised for part of it, also possesses highly transferable skills to wider industrial markets such as construction and mechanical engineering, potentially tackling a shortage of workforce (Ref. 4).

Competition with other major projects:

The pre-licensing process is expected to be shorter than it has been for the existing power stations in the UK, as the design of the new power station chosen will have already undergone pre-licensing in other countries. Despite this, it is expected that about 5 years would elapse before the construction activities commence, which would allow enough time for contractors to plan and potentially recruit and train staff if shortage of skills in general construction became apparent. Additionally, construction would initiate predominantly after the current major projects, such as construction for the London 2012 Olympics or the Terminal 5 at Heathrow Airport. Overall, and as shown on the figure, the civil engineering and construction resources required for the construction of a new nuclear power plant are envisaged to be minor in comparison to the resources available (Ref 4), and it is understood that the UK construction industry has the technical capacity for a potential nuclear new build programme (Ref 5). This is in particular true in Cumbria.



Remoteness of the location of a potential nuclear new build:

As mentioned above, the remoteness of the potential locations for nuclear new build, with limited local available labour, has also been identified as an issue for the supply of sufficient number of skilled resources. This has in particular been identified in West Cumbria, and a number of projects have recently received approval to facilitate access to Sellafield. Improved access to and from Workington from the A66 will be provided after upgrading of the A595 (Ref 6), which would help opening up the region, and the presence of about 3,000 construction workers on site, of whom 90 per cent are local residents, would help reduce the number of workers to be moved to the area (Ref 7). In addition, West Cumbria is fully committed in ensuring that the existing workforce adapts and develops the skills required to take advantage of the nuclear sector as it evolves, and in developing a future workforce with high technical, managerial and business skills to be fully involved in the future of the nuclear sector and its associated supply chains and markets. As mentioned above and developed in the Energy Coast Masterplan, West Cumbria is also currently investing at a high level to attract and keep young talents in the area, and insure a higher involvement of teenagers by tackling a number of generally-recognised concerns met amongst them (Ref. 4).

The remoteness issue is therefore not considered to be a major drawback for the construction of a new power station, especially as it has been identified early and is currently being tackled. In addition, it has already been overcome at Sellafield in the past, and improved access and facilities will help attract and assimilate a large influx of workers not available in the area into West Cumbria.

In terms of supply chain for plant material and equipment, it has been established that the construction of a new power plant would not incur shortage of non-specialist nuclear items, and that the increase in the demand created by the construction of one or more reactor could be addressed within the UK. In particular, it is estimated that the increase in the demand due to the construction of one twin reactor project would create around 1,000 jobs.

However, there are a number of nuclear-specific components that are not currently available in the UK, and would therefore either need to be imported from overseas, or would require high level of investment and training to be manufactured in the UK. In particular, this is the case for the reactor pressure vessels, steam generators, turbines and generators, switch gears, forgings and control and instrumentation equipment (Ref 2). This issue is not dependent on the location chosen for the new build, and considering the lead times prior to the start of the construction, it is unlikely that shortages will be encountered.

The Council welcomes the investment in nuclear skills within the region, including the Government's commitment to establishing a National Nuclear Laboratory at Sellafield, investment by the Dalton Institute, and the setting up of a Nuclear Skills Academy. All these initiatives will be important in maintaining and growing the necessary nuclear skills and expertise for the region, and for the nation.

Summary

Overall, the Council recognises that West Cumbria has recently invested considerable time and effort in tackling the issues associated with supply chain and shortage of skills. Although the requirements of a new nuclear build are considerable on the skills and workforce, the early response from West Cumbria to the potential skills shortages, along with the expertise already present in the area, provide confidence in its ability to tackle future demands. Therefore, the Council agrees with the Government's view that supply chain and skill capacity should not prevent the implementation of a nuclear new build programme in the UK.

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Question 14:

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?

Reprocessing operations in the UK currently only take place at Sellafield. These operations involve the recovery of uranium and plutonium from spent fuel, usually either coming from other power stations in the UK or overseas; Japan, Germany and Switzerland being the main customers (Ref 1). These materials (uranium and plutonium) can in turn be recycled for reuse as nuclear fuel, usually known as Mixed Oxide (MOX). MOX currently constitutes a minor source of fuel for nuclear power stations, with estimates of around 2% of total nuclear capacity in the world being currently powered by MOX. In the future, MOX use is expected to increase (Ref 2), particularly in new nuclear plants.

Reprocessing can be viewed as a means of maximising utilisation of uranium and managing storage problems associated with Magnox fuel especially. However, the Council acknowledges that there are a number of issues associated with the process, in particular (Ref 3):

- The significant financial provision associated with the whole process and the amount of investment needed prior to the commencement of reprocessing operations
- The economics of the whole process, including market price of uranium
- The use of chemicals and plant which become contaminated with radioactivity;
- The emission of radioactive materials into the environment. Despite evolutions in techniques which have reduced such emissions a hundredfold to a very low level, the majority of nuclear discharges into the north east Atlantic are from the reprocessing plants at Sellafield and Cap de la Hague.

The Council also believes that options should be left open for future reassessment, a view which is shared by the Plutonium Working Group (Ref 6) relating to existing Pu stockpiles. Evidence suggests that a number of reactor types that were taken into consideration in the Generation IV Forum, specifically require the reprocessing of spent fuel to recycle nuclear material into a new fuel. More generally, a significant increase in the use of nuclear power across the world might imply that recycling and sustainability should be encouraged and could contribute to the security of supply and have economic advantages (Ref 7).

Therefore, and as mentioned above, the Council believes that, from a nuclear new build point of view, the option of reprocessing should be reviewed in the future for the following reasons:

1. Firstly, it has been established that uranium prices have been increasing steadily since 2003, increasing more than five-fold between 2005 and early 2007 (Ref 8). Reprocessing and the use of MOX could provide an alternative source of fuel contributing to an increased security of supply. Indeed, an increase in the number of plants worldwide, combined with geopolitical issues, could potentially mean that uranium prices are likely to continue to increase in the near future, inevitably generating an increase of the price of the fuel. Although reprocessing is currently considered an expensive option and in the UK, the requirement to reprocess a high proportion of fuel has led to extra costs to generators (Ref 9), the financial argument is likely to

alter in three to five years' time. If this is the case, the use of MOX may become more attractive as the new build programme is implemented. The Council therefore supports the idea that the different options relative to reprocessing should be reassessed once planning permission for the first new nuclear power plant has been obtained. This would result in 'the development of new reprocessing methods in association with new build, which would allow consideration of the integration of partitioning and transmutation technologies as a means of managing the long-lived radionuclides produced in the fuel cycle' (Ref 7). As previously mentioned, the use of MOX could potentially improve the security of supply of fuel in the future.

2. Secondly, it has been established that different countries have different approaches to reprocessing. France for example, uses reprocessing for much of their own spent nuclear fuel, along with a number of 'customers'' spent fuel, and generates a vast income from these activities. Japan, Russia and India all have major reprocessing programmes, and the US, which stopped reprocessing in the 1970s now has tentative plans to build a new plant (Ref 10). Therefore, we believe that, considering the international context and the expertise available in the region, completely abandoning the possibility of reprocessing activities for a new nuclear power programme, would deprive the UK from a potentially large source of income, transferring it to competitors like France or Japan. Inversely, by keeping the reprocessing option open and reassessing its requirements in the future, the UK would still be able to compete in this very specialised market. As such, the Council believes that, the reprocessing programme should not be completely abandoned meaning that the capabilities and skills currently available in the UK would be maintained and use made of the large investments over the last decade. Indeed, as developed in the Energy Coast Masterplan, West Cumbria possesses major research facilities and skills both for reprocessing and waste management, and therefore has the potential required to successfully develop and commercialise its reprocessing business and be a key player in this competitive market (Ref 11).

Finally, it is understood that, if spent fuel from new plants is not reprocessed and classified as a waste, conditioning and encapsulation of the spent nuclear fuel would be required before disposal of the spent fuel in a deep-geological repository could be undertaken. Due to its past activities and the facilities present on the Sellafield site, the Council believes that Sellafield would potentially be a strong location for building such a plant, as part of its vision of becoming a centre of excellence, although discussions with stakeholders and regulators would be required.

References - Question 14

1) West Cumbria: Socio-economics study. The Environment Council: BNFL National Stakeholder dialogue. ERM economics, November 2001.
2) The role of Nuclear Power in a low carbon economy. Paper 8: Uranium resource availability. Sustainable development commission. March 2006
3) NIA website. 06/09/07
4) The Energy Challenge. Energy Review. DTI document. July 2006.
5) Managing out Radioactive Waste Safely – CoRWM's recommendations to Government. November 2006.
6) BNFL National Stakeholder Dialogue. Plutonium working Group. Final Report. March 2003.
7) The role of Nuclear Power in a low carbon economy. Paper 5: Waste and Decommissioning. Sustainable development commission. March 2006
8) What's behind the uranium red-hot boom? Steve Hargreaves. CNN Money. April 2007.
9) Potential New Build in Cumbria – An assessment of Implications for the County. IDM & ERM, March 2006
10) UK abandons nuclear fuels reprocessing. New scientist. August 2003.
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Question 15 &16:

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?

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?

As stated previously in the response, the Council believes that it is in the public interest to give energy companies the option of investing in new nuclear power stations, based on the evidence and the analysis addressed in the previous questions. The Council supports the Government's position, and believe it is incumbent on all communities to play their part in tackling climate change, whether it be through reducing energy demand, increasing energy efficiency, or investing in the development of new low carbon energy sources. Because of their unique nuclear history, pedigree and infrastructure, Copeland is ready to play their part through hosting a new nuclear plant at Sellafield.

Question 17&18:

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)

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?

The Council supports the facilitative steps which the Government is proposing to put in place, which are fair and reasonable. There should not be any further limits or conditions put in place other than that of local community support. The Council believes that the views of local communities must be taken into account, and that there should be, on-balance, local political, public and stakeholder support for a new nuclear power station in the locality i.e. a willingness to participate. Therefore we would welcome further discussions with Government on how this might be achieved.

Response 2

Copeland Borough Council's Response to the Governments Consultation on the Justification Process and Strategic Siting Assessment (SSA)

Questions 1a to 1e:

Detail and Appropriateness of the Justification Process

Copeland Borough Council recognises and supports the Government's intent and proposals in establishing a Justification process. The Council is clear that the process must encompass a full and rigorous public and stakeholder engagement programme on the proposed Justification. We expect this to fully take into account local benefits including socio economic benefits for communities.

Questions 2a and 2b:

Appropriateness of the Strategic Siting Assessment (SSA) Process in Identifying Suitable Sites, and Robustness of the Approach adopted for the Assessment of Environmental Issues

Question 2a: The Council recognises and supports the Government's intent in establishing a Strategic Siting Assessment process. We insist that the process must encompass a full and rigorous public and stakeholder engagement programme, both on the process, the objectives, and content of the criteria which will be set. For example, it is not clear what the outputs of the SSA process are for example:

- Identification of actual sites, and if so what scale (for example a region, a locality, a grid reference with a radius (of how far?), or an existing site); or,
- Identification of criteria will be specified, against which a developer must demonstrate compliance, and how this should be done.

Furthermore the Council supports the principle of local acceptance and would endorse an approach to establishing criteria relating to public acceptance through community or council support, or a voluntary process.

Question 2b: In addition, the Council supports the principle of incorporating SEA into the SSA, such that appropriate rigour is applied to the process and that it is procedurally and legally robust. The demands of the energy market are such that procedural delays due to ill-founded processes can have a significant detrimental impact on the implementation of energy policy.