



House of Commons
Defence Committee

The Future of the UK's Strategic Nuclear Deterrent: the White Paper

Ninth Report of Session 2006–07

Volume I

Report, together with formal minutes

*Ordered by The House of Commons
to be printed 27 February 2007*

HC 225-I
Published on 7 March 2007
by authority of the House of Commons
London: The Stationery Office Limited
£0.00

The Defence Committee

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Cover image of HMS Vanguard.

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Summary

The Government's White Paper on the future of the UK's nuclear deterrent was published in December 2006. It states that decisions are required now on the future of the deterrent and warns that delaying the decision would imperil the future security of the UK. In the White Paper, the Government recommends the retention and renewal of the UK's Trident system. It announces its intention to procure a new generation of nuclear-powered Trident submarines, to participate in US plans to extend the life of the Trident D5 missile, and to continue to invest in the UK's nuclear deterrent infrastructure.

This report analyses the White Paper's findings and conclusions. We do not express a view on the merits of retaining and renewing the UK's nuclear deterrent. Instead, our intention is to inform the public debate by exploring the key issues and questions which should be addressed in that debate. We hope that our report will be useful to Members of Parliament prior to the debate in March, and, with this in mind, include tables in each chapter summarising the arguments for and against.

The Government states that decisions are required now on the future of the UK's nuclear deterrent on the grounds that it would be unwise to plan to extend the life of the UK's current ballistic missile submarines beyond 30 years and the procurement of the new submarines would take 17 years. Our report considers the challenges to this timetable and the Government's response.

We welcome the reduction in warhead numbers announced in the White Paper and believe that, through these and earlier reductions, the UK has set an example which other nuclear weapon states should follow. But since the White Paper proposes no changes to the number of warheads deployed on UK submarines, we are uncertain of the *operational* significance of this measure. The UK's nuclear deterrent is small compared to that of other nuclear weapon states, but we are unclear how the Government determines what constitutes a "minimum" nuclear deterrent.

The Government's view is that the principles of nuclear deterrence have not changed since the end of the Cold War and that deliberate ambiguity about the circumstances in which the UK's nuclear deterrent might be used is necessary. The White Paper also refers to the utility of nuclear weapons in defending the UK's "vital interests", but it offers no clarification of the nature or geographical scope of those interests. Although we understand the need for ambiguity, the Government should be clearer that this ambiguity does not lead to a lowering of the nuclear threshold.

The Government maintains that the White Paper's proposals are fully consistent with all of the UK's international obligations and refutes the suggestion that they breach the Nuclear Non-Proliferation Treaty. In the absence of consensus among lawyers, political, rather than legal, issues will be decisive in shaping the debate over the future of the UK's nuclear deterrent.

The UK has made significant cuts in its nuclear arsenal since the end of the Cold War and has made significant efforts to prevent the spread of nuclear weapons. There is a need for a much stronger narrative on the forward commitment of the Government to achieve nuclear non-proliferation.

The White Paper outlines the options considered by the Government for the future of the nuclear deterrent. While its preference for a submarine-based system over other options has been broadly accepted by witnesses to our inquiry, the Government should set out in more detail what were the comparative advantages which led it to conclude in favour of ballistic missiles over submarine-based cruise missiles.

Decisions on the future of the UK's nuclear deterrent should be informed by detailed estimates of the likely costs involved. The White Paper estimates that the overall procurement and infrastructure costs will be around £15–20 billion. The Government has subsequently confirmed that the annual running costs are expected to be £1.5 billion. The Government should make it clear when it will be in a position to give more accurate estimates of the costs of the Vanguard-class life extension programme, and what work needs to be done to achieve this.

The report acknowledges that the Government has been more open about its decision-making on the deterrent than any in the past.

1 Introduction

1. The Government's White Paper, *The Future of the United Kingdom's Nuclear Deterrent*, was published on 4 December 2006.¹ It states that decisions are required now on whether to retain the nuclear deterrent in the long term and argues that delaying these decisions would risk “a future break in the UK's deterrent protection”.² The White Paper maintains that retaining a nuclear deterrent is essential to the UK's security and argues that the global context does not justify the abandonment of the nuclear deterrent. It says that we can only deter possible future nuclear threats through the continued possession of nuclear weapons. Conventional capabilities cannot have the same deterrent effect. While no direct threat to the UK's vital interests currently exists, it says it is important to guard against the re-emergence of such a threat in the future.

2. The White Paper announces no fundamental change in the UK's policy on nuclear weapons. But it does announce changes to the scale of the UK's nuclear warhead stockpile. It considers various options for the future of the nuclear deterrent—air-based, land-based and ship-based—but concludes that a renewal of the submarine-based system provides the most effective and credible deterrent. The White Paper announces the Government's intention to procure a new generation of ballistic missile submarines (SSBNs), to commit to the US life extension programme for the Trident D5 missile, and to invest further in the UK's onshore deterrent infrastructure, including at the Atomic Weapons Establishment, Aldermaston. It provides an estimate of the costs involved and discusses the industrial factors involved in the procurement process. It points to the risk that, in the event of a significant gap between the end of the work on the Astute-class conventional role nuclear-submarines (SSNs) and the start of the detailed design work on the new SSBNs, some of the difficulties and costs experienced on the Astute programme would be repeated because of the loss of key design skills. It states that these decisions are in full compliance with the UK's international legal obligations.

3. In this inquiry, we set out to analyse the White Paper: to consider the arguments put forward by the Government for the retention and renewal of the UK's current Trident system; to assess the White Paper's assessment of the role of nuclear deterrence in the 21st Century; to examine the Government's analysis of deterrent options, solutions and costs; to consider the international treaty implications of the Government's decision to retain and renew the deterrent and the possible impact of the decision on the UK's non-proliferation efforts; and, to examine whether decisions on the future of the nuclear deterrent are required now. **Our intention is to encourage and inform the public debate on the future of the nuclear deterrent by exploring the key issues and questions which should be addressed in that debate. We do not express a view on the merits of retaining and renewing the UK's nuclear deterrent. Endorsing or rejecting the Government's proposals will be for the House of Commons, as a whole, to decide.**

1 Ministry of Defence and Foreign and Commonwealth Office, *The Future of the United Kingdom's Nuclear Deterrent*, Cm 6994, December 2006

2 Cm 6994, Foreword, p 5

4. This inquiry is the third in a series of inquiries which the Committee has conducted into the future of the UK's strategic nuclear deterrent in this Parliament. Our current report should be read in the context of our earlier reports on the future of the UK's strategic nuclear deterrent. The conclusions and recommendations of these reports are printed in Annex 1 to this report.³

5. Our first report, published in July 2006, focused on the strategic context and timetable for decision-making.⁴ We considered the threats which the UK's nuclear deterrent was intended to combat and how these threats might evolve over the lifetime of a potential Trident successor. We examined the independence of the UK's nuclear deterrent and the extent to which possession of nuclear weapons was relevant to the UK's international influence and status. We sought to define more clearly the likely decision-making timetable. And we called on the Government to fulfil its commitment to facilitate an open and comprehensive debate in Parliament, and the country at large, on the future of the nuclear deterrent.

6. Our second report, published in December 2006, analysed the manufacturing and skills base issues that would need to be addressed if a decision was made to retain and renew the UK's nuclear deterrent.⁵ We examined the industrial infrastructure required to design and manufacture a new generation of nuclear submarines, the challenges involved in maintaining a specialist workforce, and the impact of the Government's *Defence Industrial Strategy* for the UK's submarine industrial base, including the issues of industrial restructuring and the need for an affordable submarine programme. We also examined the Government's expenditure at the Atomic Weapons Establishment. And we considered the skills required by the Ministry of Defence (MoD) to manage the delivery of any potential Trident successor.

7. In the current inquiry, we took oral evidence at Westminster from campaigning organisations, commentators and academics, international legal experts and the Secretary of State for Defence and MoD officials. We received a very large body of written submissions from a wide range of experts, think tanks, religious organisations and members of the public. We are grateful to all those who provided oral and written evidence to our inquiry. We also appreciate the assistance provided by our specialist advisers, particularly Rear Admiral Richard Cheadle and Professor Michael Clarke.

3 Annex 1

4 Defence Committee, Eighth Report of Session 2005–06, *The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context*, HC 986

5 Defence Committee, Fourth Report of Session 2006–07, *The Future of the UK's Strategic Nuclear Deterrent: the Manufacturing and Skills Base*, HC 59

2 The UK's nuclear deterrent

Table 1: The components of the UK's current nuclear deterrent

Platform	4 Vanguard-class nuclear-powered ballistic missile submarines, built in the UK
Missile	Each submarine is capable of carrying up to 16 Trident D5 submarine-launched intercontinental ballistic missiles, sourced from the US
Warhead	Each missile is capable of carrying 12 nuclear warheads, manufactured in the UK, but since 1998 the number of warheads per missile has been limited to 3 warheads, and 48 warheads in total per submarine
Shore Infrastructure	The Vanguard submarines are based at HM Naval Base Clyde at Faslane Nuclear warheads are fitted to the missiles at the Royal Naval Armaments Depot Coulport (part of HM Naval Base Clyde)
Warhead production and maintenance	The nuclear warheads are manufactured by the Atomic Weapons Establishment at Aldermaston and Burghfield, in Berkshire
Industrial base	The Vanguard submarines were designed and built by BAE Systems Submarines at Barrow-in-Furness, in Cumbria Refit and maintenance is carried out by Devonport Management Limited at Devonport in Plymouth The submarines' Nuclear Steam Raising Plants, including the nuclear reactors, are built by Rolls-Royce at Raynesway in Derbyshire There is an extensive supply chain

Components of the UK's nuclear deterrent

8. The UK's strategic nuclear deterrent is based upon the Trident weapons system. It is the UK's third-generation nuclear deterrent. It was developed during the final decade of the Cold War, and was introduced into service over a six-year period beginning in December 1994. It is the UK's sole nuclear weapons system: the UK disposed of its land-based Lance system, and air-launched WE 177 free-fall nuclear bombs in the 1990s.

9. The deterrent has three technical components:

- the Vanguard-class nuclear-powered ballistic missile submarine (SSBN), of which the UK has four, HMS *Vanguard*, *Victorious*, *Vigilant* and *Vengeance*, designed and built in

the UK by Vickers Shipbuilding and Engineering Ltd. (VSEL), now BAE Systems, in Barrow-in-Furness, Cumbria.

- the Trident D5 submarine-launched intercontinental ballistic missile, manufactured in the USA by Lockheed Martin. Under the Polaris Sales Agreement (modified for Trident), the UK has title to 58 missiles, of which it has now used 8 in tests. Aside from those currently deployed, the missiles are held in a communal pool at the US Strategic Weapons facility at King's Bay, Georgia, USA.
- the nuclear warhead, designed and manufactured in the UK at the Atomic Weapons Establishment, Aldermaston and Burghfield in Berkshire. Each missile is capable of carrying 12 warheads, but since the 1998 Strategic Defence Review, the number of warheads per missile has been limited to 3 warheads (and 48 warheads in total per submarine).

10. The submarine fleet is supported by an extensive onshore infrastructure. This is described in detail in our second report.⁶

Operating posture of the UK's nuclear deterrent

11. The 1998 *Strategic Defence Review* (SDR) stated that the UK would continue to maintain continuous-at-sea deterrent (CASD) patrols. This meant that one of the UK's four Vanguard-class submarines would be on patrol at any give time. The SDR stated that the purpose of CASD was "to avoid misunderstanding or escalation if a Trident submarine were to sail during a period of crisis".⁷ By keeping one submarine on patrol at all times, the UK avoids the risk of sending incorrect or misleading signals to a potential adversary at times of heightened alert. In our first report on the future of the UK's strategic nuclear deterrent, we suggested that if the MoD believed the UK should retain the continuous-at-sea deterrent cycle, it must either extend the life of the Vanguard-class submarine or procure a new platform to be in service by around 2020. The issue of maintaining continuous-at-sea deterrence is at the heart of the debate over the timing of decisions on the future of the UK's nuclear deterrent.

12. According to the MoD, a four boat fleet is normally required to guarantee one boat on patrol at all times, because one boat is either preparing to enter refit, in refit, or leaving refit and preparing to re-enter service, one is in maintenance between patrols, and one is either on its way to take up patrol or returning from patrol. By the time *Vanguard* goes out-of-service the last refit will have been completed, and so it will only be when *Victorious* goes out-of-service in 2024 that the MoD says the continuous-at-sea regime could not be sustained.

6 HC (2006–07) 59, paras 12–21

7 Cm 3999, p 19

3 The timing of decisions

Table 2: A decision on renewing the deterrent needs to be made now: arguments for and against

For	Against
The UK's Trident submarines are designed to operate for 25 years. A five-year life extension may be possible, but extending the lives of the boats beyond 30 years will not be practical or cost-effective.	
	The United States is planning to extend the life of its Trident submarines to 45 years. The UK may be able to conduct a similar life extension programme, allowing decisions to be deferred.
It is not possible for the UK to conduct a US-style life extension programme. US submarines are designed and operated differently. The US has 14 Trident submarines whereas the UK only has 4 boats, so the UK has no redundancy in the system to guarantee one boat on patrol at all times.	
It will take around 17 years to procure a new generation of Trident submarines. A new submarine is required by 2024 if the UK is to maintain continuous deterrent patrols. Decisions are required in 2007.	
	The UK's current Trident submarines only took 14 years to design, build and commission. There is no reason why it should take longer this time around. Decisions are not required now and could be deferred for a number of years.
The Vanguard-class boats were designed, built and commissioned in 14 years from the decision to acquire the Trident system, but this did not include the time taken to do initial concept work. This time around, the concept work has not yet started. Also, safety and regulatory standards have been raised over the last 25 years.	
	There is some evidence that initial design and concept work has already begun.
There have been significant changes in the UK's submarine industrial base since the last Trident submarines were built resulting in a reduction in submarine-building capacity. Procurement for a new boat will take longer than for the Vanguard-class boat.	

For	Against
	If the UK decided to build a new submarine based on the design of existing boats, the procurement time would be reduced. Decisions could be delayed.
Designing submarines is complex. Even if the design of a new submarine was based on the UK's existing boats, the substantial and time-consuming redesign work would be necessary.	
Decisions are needed now otherwise the UK's submarine industrial base will not survive. If a gap in production between submarines develops, the UK will lose essential skills which will not be possible to replace. The UK will then no longer be able to produce or support any kind of nuclear-powered submarines, or the cost will become prohibitive.	
	Although there would be an impact upon local communities, other industries can be encouraged to invest in the affected regions.
Decisions on whether to participate in US plans to extend the life of its Trident D5 missiles are required in 2007.	
	The Government has provided no evidence to support this claim. It appears that the Government has already decided to participate in this programme in advance of the Parliamentary debate on the future of the UK's nuclear deterrent.

13. In our first report on the future of the United Kingdom's strategic nuclear deterrent, published in June 2006, we considered the likely timetable for decision-making on the deterrent and concluded that the key driver in the decision-making process was the limited life of the Vanguard-class submarine. The other elements of the Trident system—the Trident D5 missile and the nuclear warhead—did not appear to be decisive factors in defining that timetable. Decisions on those elements were not required imminently.⁸

14. In the White Paper, the Government states that “the timetable for decision-making is driven by our assessment of the life of the elements of the existing Trident deterrent system and the time it might take to replace them”.⁹ The submarine platform, it concludes, is the decisive factor in determining that timetable:

if we are to maintain unbroken deterrent capability [a nuclear-armed submarine at sea at all times] at the end of the life of the Vanguard-class submarines, we need to take decisions now on whether to replace those submarines.¹⁰

8 HC 986 (2005–06), para 126, p 32

9 Cm 6994, para 1.2, p 9

10 Cm 6994, para 1.11, p 11

15. The White Paper also states that “decisions...are required by 2007” on whether the UK participates in US Government plans to extend the life of its Trident D5 missile.¹¹ But it confirms that decisions on the UK’s nuclear warhead are not required at this stage as the existing design “is expected to last into the 2020s”.¹²

16. In this part of the report, we examine the Government’s assertion that a decision on the future of the UK’s nuclear deterrent is needed now. This has been the subject of considerable debate.

The Government’s assessment of the timing of decisions

The life of the Vanguard-class submarine

17. The White Paper states that the Vanguard-class submarine was built for “an original design life of 25 years”. It says the Government has “undertaken detailed work to assess the scope for extending the life of those submarines”.¹³ But it notes that

our ability to achieve this is limited because some major components on the submarines—including the steam generators, other elements of the nuclear propulsion system and some non-nuclear support systems—were only designed for a 25-year life.¹⁴

The Government concludes that “by revalidating those components, it should be possible to extend the life of the submarines by around five years” to a maximum of 30 years.¹⁵

18. In response to our request for clarification on the out-of-service dates for each boat in the Vanguard-class fleet—with and without a life extension—and for an explanation of how these dates were reached, the MoD provided the following information.

Table 3: Expected out-of-service dates for Vanguard-class SSBNs

	Commencement of Sea Trials/Reactor went critical	Out of Service Date (no life extension)	Out of Service date (with life extension)
HMS Vanguard	1992	2017	2022
HMS Victorious	1994	2019	2024
HMS Vigilant	1996	2021	2026
HMS Vengeance	1999	2024	2029

Source: MoD

19. The MoD states that “these dates are based on the date that the reactors on the four submarines first went critical”.¹⁶ It says that the dates reflect “the original design life of the

11 Cm 6994, para 1.9, p 11

12 Cm 6994, para 1.10 p 11

13 Cm 6994, para 1.3, p. 9

14 *Ibid.*

15 *Ibid.*

submarines...of at least 25 years” and “our assessment of the maximum additional in-service life that we believe it is currently prudent to assume can be achieved through a life extension programme”.¹⁷ According to the MoD, this assessment was based upon its “experience of operating the Vanguard-class submarines, experience with other classes of submarines, the results of discussions with our internal experts, and the views of industry”.¹⁸

20. The Government maintains that beyond the point at which the second boat, HMS *Victorious*, is withdrawn from service, “continuous deterrent patrols could no longer be assured...if no replacement were in place by then”.¹⁹ It argues that a successor submarine would need to enter service in 2024 in order to maintain continuous-at-sea deterrence.²⁰

21. The White Paper states that extending the life of the Vanguard-class submarines beyond 30 years would be a substantial technical undertaking with considerable risk and cost implications. It maintains that

Any further extension of the life of the submarine would mean that the key components described previously would need to be replaced or refurbished, and this would require a major refit of the submarines. This would not extend the lives of the submarines much further and would not therefore be cost effective.²¹

It also warns that “past experience with UK submarine programmes suggest that even a 5-year life extension will involve some risk,” with boats experiencing “a significant loss of availability and increase in support costs towards the end of their lives”.²² On this basis, the White Paper concludes that

while we believe it should be possible to extend the life of the Vanguard-class into the 2020s, we believe that it would be highly imprudent now to plan on the basis that it will be possible to extend them further.²³

Further information about the risk as well as the cost implications of a five-year life extension of the Vanguard-class submarines are considered in Chapter 6.²⁴

The submarine procurement timeframe

22. The White Paper maintains that the Government “considered carefully how long it might take to design, manufacture and deploy replacement submarines” and concludes that a “reasonable estimate” would be “around 17 years from the initiation of detailed

16 Ev 123

17 *Ibid.*

18 *Ibid.*

19 Cm 6994, para 1.3, p 10

20 For the MoD's explanation of why continuous-at-sea deterrence ends when the second boat is withdrawn from service, see Chapter 2, para 12

21 Cm 6994, para 1.4, p 10

22 Cm 6994, para 1.5, p 10

23 Cm 6994, para 1.5, p 10

24 See paras 114–115

concept work to achieve the first operational patrol”.²⁵ The Government says a Vanguard successor is required in-service by 2024 if the UK is to maintain continuous deterrent patrols. On that basis, a 17-year procurement timeframe means that “detailed concept work on renewal of our deterrent needs to start in 2007 if we are to avoid a gap in deterrence at the end of the life of the Vanguard-class submarine”.²⁶ The White Paper says that the 17-year procurement estimate “reflects the judgment of industry and is consistent with US and French experiences”.²⁷

23. In our first report on the UK's strategic nuclear deterrent we concluded that a life extension of the Vanguard-class submarine “would allow the UK to postpone decisions on whether to replace Trident until around 2010,” based on the assumption the “procurement of a Trident replacement would take approximately 14 years”—the same length of time it had taken to procure the original Trident system.²⁸

24. The White Paper acknowledges that procurement of the Vanguard-class submarine did indeed take “some 14 years from the decision to purchase Trident in 1980 to the system being deployed operationally in 1994”. But it maintains that “in the preceding decade a good deal of initial concept work had already taken place,” which reduced the time which was required after the decision was taken to purchase Trident.²⁹ The Government says that concept work for a Vanguard successor has not yet started and so a longer procurement timeframe is required.

25. The White Paper also states that a new SSBN is likely to take longer to design and manufacture than the Vanguard-class because of changes in the capacity of the UK's submarine industrial base, which is considerably smaller now than in 1980. It maintains that the procurement timetable must ensure that a production gap does not develop between the end of the Astute-class SSN build programme and the beginning of construction on the new SSBN, otherwise design skills would be lost.³⁰

26. The implications of a gap in production between the Astute-class SSN and any potential Vanguard successor, and the associated risk of losing key skills in the UK's submarine industrial base, were issues we considered in our second report on the future of the UK's strategic nuclear deterrent. We concluded that the UK submarine industry draws on a uniquely skilled and specialist workforce and that retaining those skills would be essential if the UK wanted to continue to design and build nuclear submarines. We stated that the skills base was now at a critical level and that any further erosion of the workforce may have significant implications for the future of the submarine programme. We also noted that the gap between the Vanguard and Astute programmes had had a debilitating effect on the UK's submarine industry and that if the Government wanted the UK to continue to design and build nuclear-powered submarines, it would be essential to maintain a regular rhythm of production. **Decisions on the future of the UK's nuclear**

25 Cm 6994, para 1.7, p 10

26 *Ibid.*

27 *Ibid.*

28 HC 986 (2005–06), para 110, p 29

29 Cm 6994, para 1.6, p 10

30 *Ibid.*

deterrent should be taken on the strategic needs of the country, not on industrial factors. However, whilst industrial considerations should not affect the substance of decisions, they will necessarily affect the timing of those decisions. It is not unreasonable for the Government to take these factors into account.

Views on the White Paper's timing assumptions

The life of the Vanguard-class submarine and the procurement timeframe

27. The assumptions about both the life of the Vanguard-class submarine and the procurement timetable contained in the White Paper are contested. Some commentators suggest that the Vanguard-class submarine could be maintained in-service for far longer than the 30 years anticipated by the MoD. They suggest that since the United States plans to extend the lives of some of its Ohio-class Trident submarines to 45 years, the UK could do likewise with its Vanguard-class Trident boats, allowing decisions on the future of the UK's nuclear deterrent to be postponed for several years.

28. Professor Richard Garwin, an American physicist with extensive experience of the US nuclear weapons programme, told us that the decision to replace the Vanguard-class submarines was “highly premature”.³¹ In written evidence to our inquiry, he and his colleagues argue that decisions on the future of the UK's strategic nuclear deterrent do not need to be taken imminently since it is “likely that the Vanguard-class submarines can safely and economically be operated for 40–45 years rather than 30”.³² The American Ohio-class SSBNs, they argue, are older and are worked harder than the UK's Vanguard-class SSBNs. The UK's boats, they argue, “are still relatively young” and “improved management of their water chemistry could drastically extend the steam generator lives”.³³ They suggest that the 25-year design life, cited by the MoD, actually represents a “minimum design life” for the Vanguard-class submarine.³⁴

29. This argument is also made by the British American Security Information Council (BASIC), which suggests that, by adopting “a more conservative base life expectancy” for the Vanguard-class submarine, the Government brought forward the decision-making timetable. According to BASIC, the decisions set out in the White Paper are “premature and can be delayed for a further 8–10 years”.³⁵ Similarly, the Oxford Research Group argues that the Government's life expectancy for the Vanguard-class is “surprising” given that “a less intensive deployment regime,” introduced by the 1998 *Strategic Defence Review*, “might be expected to increase longevity”.³⁶

30. Dr Eric Grove, a defence policy analyst and naval expert at the University of Salford, argues that although the White Paper generally “presents a good case for retention of an SSBN-based deterrent,” he is “far from convinced” that an American-style life extension

31 Q 136 [Garwin]

32 Ev 93

33 *Ibid.*

34 *Ibid.*

35 Ev 97–98

36 Ev 146

programme would be “such a difficult option” for the Vanguard-class submarine. He suggests that any attempt to use “past experience” with previous generations of UK submarines to draw lessons for the life extension of the Vanguard-class is “questionable”. Dr Grove also argues that “even if the White Paper’s arguments are indeed sound, one might question the policy of building SSBNs for a life span much shorter than that expected by our closest ally for its similar assets”.³⁷ Similarly, the Scottish Campaign for Nuclear Disarmament says that the relevance of the White Paper’s conclusions about reliability and availability, it implies, are open to question.³⁸

31. We asked Professor Garwin how he would respond to the manufacturing and skills base implications of a decision to prolong the life of the Vanguard-class submarines to around 45 years. He told us that “the question of the skills base and the manufacturing plant...is a big problem”. However, he considered it possible to build nuclear-powered submarines at the rhythm of one every four years, rather than every two years as suggested by industry and the MoD, while maintaining an adequate skills base. In evidence to our second-stage inquiry on the future of the UK’s strategic nuclear deterrent, the MoD argued that a 22-month drumbeat for submarine construction is required and that a longer interval would endanger the UK’s manufacturing and skills base.³⁹

32. Critics of the White Paper also question the 17-year timeframe for the procurement of a successor SSBN. The Oxford Research Group argues that concept work on a Vanguard successor has already begun. The organisation cites a written answer of 30 June 2004 in which the then Secretary of State for Defence stated that concept studies on options for platforms to carry the Trident missile in the longer term had been undertaken between May 2002 and May 2003 at a cost of around £560,000.⁴⁰

33. Other commentators, however, support the White Paper’s conclusions. Witnesses from the Royal United Services Institute (RUSI) argued that there is no contradiction on the life expectancy of the Vanguard-class submarine between the White Paper and earlier Government documents. The 30-year life mentioned before the White Paper, they say, “consists of a standard 25-year service life, plus an option for a life extension of up to five years”. They acknowledge that “what appears to be new in the White Paper is the inclusion of two years of sea trials in the life of the submarines”, but suggest that “this is understandable, as the life should indeed be measured from when the hull and the reactor first began operating”.⁴¹

34. The RUSI witnesses accept that it may be technically feasible to extend the life of the Vanguard-class submarine beyond 30 years, but they argue that “past experience has shown that defects and costs rise sharply following refit of older submarines”. And they maintain that this “could lead to the last years of the class being spent fighting unreliability

37 Ev 168–169

38 Ev 87–89

39 Ev 92–96

40 HC Deb, 30 June 2004, col 358W and Ev 147

41 Ev 113

and increasing costs, while struggling to maintain a credible deterrent".⁴² Dr Lee Willett, of RUSI, told us that

there is nothing technically impossible about doing this, but the risks and costs do increase considerably while availability actually declines, so in the end you get very little return in terms of life extension.⁴³

These risks and costs, he argued, "grow sharply towards the end of life and through the extended life cycle in particular".⁴⁴

35. Dr Willett challenges Professor Garwin's suggestion that the UK could extend the life of its Vanguard-class submarines as long as that of the US Ohio-class boats. According to Dr Willett, the US boats are designed for a longer life, they have more regular and thorough maintenance, and they are subject to a different safety regime. Dr Andrew Dorman, of King's College London, agrees that "there are a number of weaknesses in [the] argument" that if the US has extended the lives of its boats so can the UK. Direct comparisons, he insists, are not possible since the boats are "built to different designs" with "differing safety requirements based on differing reactor authorising bodies" and "have been operated differently". Moreover, Dr Dorman maintains that the fact that the Americans have a greater number of SSBNs means that "if a fault does begin to emerge in one or two boats they will still be able to maintain their deterrent". By contrast, "the much smaller size of the British force means that there is little built in redundancy and such risks cannot be taken". He argues that "this was clear at the end of the lives of the Polaris fleet which struggled to continue in service whilst the Vanguard-class was built". Dr Dorman, therefore, concludes that "the government line is...plausible given available information".⁴⁵

The Government's response

36. In evidence to us, the Secretary of State for Defence confirmed that the Government plans to embark on a five-year life extension of the UK's fleet of Vanguard-class submarines. Mr Browne stated that although he believed it to be "imprudent, indeed risky, to plan any greater life extension...it does not mean that we have fixed the actual date for each submarine for when it leaves service". Instead, the scheduled out-of-service date "forms the basis upon which we plan the programme to replace them with the new class of submarine".⁴⁶

37. The MoD's memorandum of 1 February also outlines which components of the submarine are "critical" in limiting the service life of the submarines. It states that

Life extension much beyond 5 years is likely to require replacement of some of the systems critical to submarine operations, such as external hydraulic systems, elements of the control systems (plane and rudder), sonar systems, electrical systems (including main battery) and refurbishment or replacement of elements of the

42 Ev 113

43 Q 141

44 *Ibid.*

45 Ev 181–183

46 Q 322

nuclear propulsion system... Extension to both component safety justifications and the whole reactor plant safety justification would also be required (and could not be assured). Other systems would need careful assessment and replacement of the turbo generators, secondary propulsion gear and assemblies, deterrent missile hydraulics, hatches and mechanisms, might be required. There would also be increasing risks with the reliability of other major systems, including potentially the main engine, gearbox shafting and propulsor, all of which could require replacement.⁴⁷

According to the MoD, the replacement of these major components “would involve some hull penetrations” and “would require extended additional maintenance periods”. The consequence would be a “loss of boat availability and significant cost”. However, the MoD’s view was that this “would not enable significantly increased life” of the submarines.⁴⁸ The MoD says it does “not at this stage completely rule out further life extension of the Vanguard-class,” but its judgement was that “on current evidence it is highly likely to represent poor value for money”. It also notes that there is “serious concern” as to whether further life extension will be “technically feasible”.⁴⁹ Ultimately, it argues that

given the severe uncertainties associated with life extension beyond the 30 year point, it would be grossly irresponsible not to start concept and assessment work in time to ensure we can field replacement submarines when the Vanguard-class reaches the 30-year point.⁵⁰

38. The Secretary of State for Defence told us that “this is...an issue about maintaining [a] key national capability...and the level of risk we are willing to take with that capability”. The threat of losing boat availability, and thus of compromising the continuous-at-sea deterrent posture, Mr Browne told us, was “at the heart of our decision-making process”. In his judgement, the kind of life extension suggested by Professor Garwin “would entail too much risk to our national security” and “would be poor value for money”.⁵¹

39. Mr Browne also told us that comparisons with the US Ohio-class boats were “not particularly useful or indeed relevant”.⁵² They were planned for a different life, were a different design and were built and maintained specifically for a longer life. Rear Admiral Andrew Mathews, Director General Nuclear at the MoD, told us that “Ohio started off with a more modern design”. The United States, he argued, “made a decision about up-front investment to generate that life by using a different material from that which we do” which “puts them at a different sort of place in terms of trade-offs through life”. According to Rear Admiral Mathews, the MoD was “driven quite hard in terms of unit production cost at the outset, so we set ourselves a design time-line and built a submarine to meet

47 Ev 123

48 *Ibid.*

49 Ev 124

50 *Ibid.*

51 Q 316

52 Q 314

that". The Americans, by contrast, "built some fat into their design" and therefore "have the ability to take some risks with their programme".⁵³

40. One key difference between the US and UK submarine deterrent programmes is that the UK seeks to operate a continuous-at-sea deterrent with just four boats whereas the United States is "generating two or three hulls from 14". According to Rear Admiral Mathews, this gave the US "a considerable amount of flexibility about how they operate their submarines, what decisions they can make through life and the balance of risk they can take". He argued that generating "one from four is much tougher". It was not the case, he told us, that the UK's SSBNs were at sea for less time than American SSBNs. In fact, he maintained that the UK's boats were "comparable with the US Ohio-class" in terms of their operational availability.⁵⁴

41. Rear Admiral Mathews also stated that, from experience, the availability of nuclear submarines "reduces through life". He told us that in the first 20 years "it typically reduces by about five to seven % across that period". However, he stated that "once we have gone beyond 20 years, the three classes which we have got operating records for...show that we lose availability of around ten to 15 percent over the next ten years, which is in addition to that five to seven percent". This was "a significant drop in availability" which "falls off fairly sharply". Rear Admiral Mathews told us that the Swiftsure SSN had "not been good in terms of availability" during "those last difficult years". Similarly, in the early 1990s with the Resolution-class SSBN, he stated that "we were really struggling to maintain one boat out at sea" and commented that "I do not think it would be conceivable that we would be successfully maintaining the continuous-at-sea deterrence with that class of submarine now". He concluded that "we know from experience that, in getting towards 30 years, four boats becomes very tough in terms of generating one" and, on that basis, "we do not believe that the risk equation supports taking the Vanguard-class beyond 30 years".⁵⁵

42. In evidence, Rear Admiral Mathews told us that a 17-year procurement timetable "is the time we believe is the minimum needed" to design and build a new ballistic missile submarine.⁵⁶ According to Admiral Mathews, it would take

about two years to get through our concept stage...about seven years to design, seven years to build, and then the final bit is taking it on sea trials, testing it, proving it, training the crew, putting the missiles in, test-firing the missile and putting it on operational patrol: total duration 17 years.⁵⁷

43. The White Paper states that decisions are required now on the future of the UK's strategic nuclear deterrent. It says that the life of the current deterrent platform, the Vanguard-class ballistic missile submarine, was designed for a service life of 25 years, which could be extended to 30 years with a life extension programme, albeit not without some risk. It maintains that procurement of a new submarine will take around

53 Q 319

54 Q 318

55 *Ibid.*

56 Q 405

57 Q 398

17 years. On this basis decisions are required in 2007. Some witnesses to our inquiry challenged the Government's timetable. On life extension, the evidence we received from critics suggested the Vanguard-class, like the US Ohio-class Trident submarine, could be maintained in service for up to 45 years. The Government has told us that to plan for life extension beyond 30 years would be unwise, given the 25 year design life of the Vanguard-class, the operational demands placed upon it in order to maintain continuous deterrent patrols, the experience of the declining reliability and availability of previous submarines beyond the 25-year point, and the design and construction differences between the Vanguard and the Ohio-class submarines.

44. A procurement timetable of 17 years is three years longer than for the existing Vanguard-class submarine. The Government says that the additional time is required because of changes in the capacity of the UK's submarine industrial base and because initial concept and development work on the Vanguard-class was already underway when the Government of the day announced its decision to acquire the Trident system. The Government says that no such work has yet begun on a Vanguard successor and that Parliament is being consulted at a much earlier stage than on previous occasions.

45. The challenge to the Government's estimate of 17 years is partly based on the suggestion that work has started on "concept options for platforms", whereas the government timetable commences with the "detailed concept work". We take it that these two things are different and accept that the 14-year period which we commented on in our previous inquiry commenced from a more advanced stage in the procurement cycle (years rather than months away) after a period of detailed concept work had been carried out.

The timing of decisions on the Trident II D5 missile

46. The White Paper states that decisions on the future of the Trident II D5 missile are also required now. It says that the United States Government "plans to extend the life of the Trident II D5 missile to around 2042 to match the life of their Ohio-class submarines". It says that this "will involve the manufacture of a number of new missiles and the modernisation of the existing missiles". The Government states that this "work will focus entirely on replacing components of the system" and that "there will be no enhancement of the capability of the missile in terms of its payload, range or accuracy". The White Paper states that

Unless we participate in that life extension programme, it will not be possible to retain our existing Trident D5 missiles in service much beyond 2020, except at much greater cost and technical risk. Decisions on whether or not we should participate are required by 2007.⁵⁸

47. In an exchange of letters between the Prime Minister and the US President on 7 December 2007, Mr Blair stated that

we have decided that we will replace the Vanguard submarines with another class of submarines in the 2020s, and would like these submarines to continue to carry the

58 Cm 6994 para 1.9, p 11

Trident II D5 missiles...Accordingly, we wish to participate in the planned life extension programme for the Trident II D5 missile, which we understand is intended to extend the life of the missiles into the 2040s.⁵⁹

48. The Prime Minister also sought an assurance that “we can, if we so choose, maintain a nuclear delivery system, with US assistance, for at least the remainder of the life of our successor submarine force”. He also stated that “the United Kingdom wishes to ensure that any successor to the D5 system is compatible with, or is capable of being made compatible with, the launch system for the D5 missile, which we will in the meantime be installing into our submarines”. Consequently, the Prime Minister stated that

there would be merit in the United Kingdom having the opportunity to participate, at an early stage, in any programme to replace the D5 missile, to match the potential out of service date of our new submarines.⁶⁰

49. The reply from the US President stated that the United States “continues to attach great importance to the maintenance of an operationally independent nuclear deterrent capability by the United Kingdom”. It also said that

the United States fully supports and welcomes the intention of the United Kingdom to participate in the life-extension program for the Trident II D5 missile. We will work to ensure that the necessary components of the overall system are made available to the United Kingdom to support life-extended D5 missiles...For the longer term...I would invite the United Kingdom to participate, at an early state, in any program to replace the D5 missiles or to discuss a further life extension—for your purposes—of the D5 missile to match the potential out-of-service date of your new submarines. In this respect, any successor to the D5 system should be compatible with, or be capable of being made compatible with, the launch system for the D5 missile, which you will be installing into your new submarines. The United States will also ensure...that the United Kingdom has the option to sustain an effective nuclear delivery system for at least the life of your successor submarine force as was done with the Polaris system.⁶¹

50. Neither the White Paper nor the exchange of letters between the Prime Minister and the US President in December 2006 explain adequately why decisions on UK participation in the Trident D5 missile life extension are required by 2007. The Government should clarify why decisions on the missile are required now.

59 Annex 2

60 Annex 2

61 Annex 2

4 The scale of the UK's nuclear deterrent

Table 4: Reductions in the UK's nuclear deterrent to a minimum credible deterrent

For	Against
The size of the UK's nuclear deterrent is small in comparison with that of other nuclear weapon states. The UK has only one weapons system, whereas the US, France, Russia and China each have three different systems, deployable by land, air and sea.	
	The UK's nuclear forces may be small in an international context but they still have sufficient explosive power to cause horrific destruction on an unimaginable scale. The destructive power of the UK's nuclear weapons has increased with each new generation of weapons.
The 1998 Strategic Defence Review made substantial reductions to the size of the UK's nuclear deterrent, abandoning the air-based free-fall nuclear bombs and cutting the number of operationally available warheads from around 300 to under 200.	
	The SDR did not go far enough. It rationalised the UK's nuclear forces and abandoned obsolete weapons, rather than a comprehensive disarmament measure.
The White Paper announces further reductions in the UK's nuclear warhead stockpile, from up to 200 warheads to up to 160 warheads. The UK's nuclear arsenal now accounts for less than 1% of the global inventory of nuclear weapons.	
	The reductions announced in the White Paper are welcome, but they will have no impact on the number of <i>deployed</i> warheads. Since each submarine will still sail with up to 48 nuclear warheads on board, the measures announced in the White Paper will have no practical effect.
	The reductions announced in the White Paper are contrived. They are rationalisation measures taken for logistical reasons. They are not meaningful disarmament measures.
The UK operates a "minimum" nuclear deterrent.	
	It is not clear how the Government determines what constitutes a minimum nuclear deterrent. Unless the Government states how it calculates this, the public will be unable to judge that claim.

For	Against
Other nuclear weapon states take a different view on what constitutes a minimum deterrent. The UK consistently engages others in the international community with a view to minimising weapon numbers and seeing through its international commitments collectively.	

The Government's policy on nuclear weapons

51. The Government states that its “overarching policy on nuclear weapons remains as set out in the December 2003 Defence White Paper,” *Delivering Security in a Changing World*.⁶² This states that

We are committed to working towards a safer world in which there is no requirement for nuclear weapons and continue to play a full role in international efforts to strengthen arms control and prevent the proliferation of chemical, biological and nuclear weapons. However, the continuing risk from the proliferation of nuclear weapons, and the certainty that a number of other countries will retain substantial nuclear arsenals, mean that our minimum nuclear deterrent capability, currently represented by Trident, is likely to remain a necessary element of our security.⁶³

52. The current White Paper states that “the UK will retain only the minimum amount of destructive power required to achieve its deterrent objectives”.⁶⁴ **The White Paper does not propose any fundamental change to the UK's nuclear weapons policy.**

Reductions announced in the scale of the UK's nuclear deterrent

53. The White Paper announces changes to the scale of the UK's nuclear deterrent. In particular, it announces reductions in the number of operationally available warheads, from “the present position of fewer than 200 to fewer than 160,” as well as a “corresponding 20% reduction in the size of our overall warhead stockpile”.⁶⁵ The UK's current holding of Trident D5 missile has been reduced to 50.⁶⁶

54. These measures are additional to the significant reductions in the scale of the UK's nuclear deterrent announced in the 1998 Strategic Defence Review (SDR): a one third reduction in the number of operationally available warheads, from 300 to 200, and a reduction of the number of warheads deployed on each Vanguard submarine from 96 to 48.⁶⁷ At the time, the Government stated that these changes were intended “to reduce the scale and readiness of our nuclear forces to ensure they are the minimum necessary to

62 Cm 6041

63 Cm 6041, para 3.11

64 Cm 6994, para 3.4, p 17

65 Cm 6994, para 2.3, p 12

66 Cm 6994, para 2.5

67 Cm 3999, p 18

achieve our deterrent objectives”.⁶⁸ In turn, the reductions announced in the SDR were in addition to the disarmament measures taken between 1991 and 1998, which included the withdrawal of the Lance system, the US tactical nuclear warheads mounted on heavy artillery and the RAF's sub-strategic air-launched nuclear weapons (the WE 177 free-fall nuclear bombs).

55. The Government states that the further reductions announced in the White Paper

will mean that, since coming to power in 1997, we will have reduced the upper limit on the number of operationally available UK nuclear warheads by nearly a half. Since the end of the Cold War, the UK will have reduced the overall explosive power of its nuclear arsenal by around 75%. The UK's nuclear deterrent now accounts for less than 1% of the global inventory of nuclear weapons, and our stockpile is the smallest of those owned by the five nuclear weapon states recognised under the Nuclear Non-Proliferation Treaty.⁶⁹

56. The UK has abandoned the concept of a nuclear triad, where weapons are deployed by air, land and sea, whereas the United States, France, Russia and China all have powerful systems in all three areas, and Israel, Pakistan and India are all believed to be actively seeking to develop a full nuclear triad. **The UK's nuclear arsenal is small in comparison to that of other established nuclear powers. The UK has made very significant reductions in the scale of its nuclear arsenal since the end of the Cold War.**

Significance of the reductions

57. Some witnesses to our inquiry have questioned the significance of the reductions in the UK's nuclear weapons stockpile announced in the White Paper. The Scottish CND, for example, argues that “the White Paper does not propose any reduction in the number of warheads deployed at sea” with the result that “the reduction will be achieved by scrapping warheads that are currently held in reserve, but operationally available”. It claims that since the “practical step towards disarmament” of the 1998 Strategic Defence Review was “the removal of 36 warheads from submarines,” the White Paper enables the Government to “make one reduction but claim the credit for it twice”.⁷⁰ Similarly, Paul Ingram, of BASIC, regards the warhead reductions to be “almost irrelevant because we will still have 48 warheads out on patrol at any time”.⁷¹ According to Mr Ingram, the decisions in the White Paper mean that the Government is “planning to have pretty much a status quo into the indefinite future”.⁷² Greenpeace, too, maintains that “the potential arsenal carried by a Vanguard submarine on patrol remains unchanged despite any wider stockpile changes proposed in the White Paper”. It argues that “whilst physical numbers might have changed” since the end of the Cold War, “the actual capability of Britain's nuclear weapons stockpile has increased”.⁷³

68 Cm 6994, para 2.3

69 Cm 6994, para 2.4

70 Ev 87

71 Q 196

72 *Ibid.*

73 Ev 184

58. Although broadly supportive of the White Paper, Dr Jeremy Stocker, of the International Institute for Strategic Studies (IISS), questioned the operational significance of the reduction in warhead numbers. He argues that the White Paper offered “no operational justification...for the 20% reduction in operationally available warheads”. He suggests that the measure might have “more to do with diplomatic and domestic political gestures than the requirements of a “minimum” deterrent, the minimum size of which has been repeatedly reduced since the end of the Cold War”.⁷⁴

59. Other commentators suggest that logistical factors, rather than a commitment to disarmament, lie behind the reduction in warhead numbers. For example, Bruce Kent, of CND, told us that the reductions in warhead numbers, though “certainly...welcome,” more likely reflect “good housekeeping,” the Government reasoning that “there is no point spending fortunes on thousands of violent weapons when you can do it with 50 or five”.⁷⁵ Similarly, Di McDonald, of the Nuclear Information Service, suggested that “all the reductions that there have been so far have been for logistical reasons”. She argues that the reductions to date “have not been disarmament measures, they have been measures to remove old weapons that have become obsolete and they have been measures of efficiency”. She maintains that “there was never any stage that we reached the original 512 capability number of warheads for Trident because it was actually impossible in the way that Aldermaston is configured”.⁷⁶ Dr Rebecca Johnson, Executive Director of the Acronym Institute for Disarmament Diplomacy, meanwhile, argues that that while the 20% reduction “looks good,” the new ceiling of 160 warheads “may...be little more than a political bid to make a virtue out of necessity”. Dr Johnson told us that this argument is based upon calculations which have been made of “the frequency and size of the nuclear warhead convoys between Aldermaston and Coulport” which “suggest that Britain may not have manufactured more than 160–170 warheads for the current Trident system”. Dr Johnson argues that, by proposing only minor reductions, the White Paper effectively “proposes business as usual”.⁷⁷

60. We asked the Secretary of State for Defence how he would respond to these criticisms. He argued that the cuts announced in the White Paper meant that “we will be dismantling around 40 warheads”. In his judgement, this represented “quite a significant reduction in the number of warheads that we presently have”. He maintained that “people should not minimise that, nor should they minimise the fact that we have in the time we have had stewardship...of this deterrent halved the number of warheads”.⁷⁸ Mr Browne denied that any reduction had already taken place and argued that the proposed cuts were the result of a review of the UK's capability requirements. He stated that

This is the first time we have changed the size of our stockpile since the decisions we announced in the *Strategic Defence Review* in 1998 and it is driven by analysis, a very hard analysis, of the capability that we believe we require...this process was a difficult

74 Ev 110

75 Q 75

76 Q 76

77 Ev 198

78 Q 348

and challenging process and we went through it with a view to ensuring that we did have the minimum deterrent which has always been our policy.⁷⁹

61. We asked the Secretary of State what constituted a *minimum* nuclear deterrent. He told us that it was “the capability that we judge is necessary to provide an effective deterrent posture”. A “proper deterrent,” he argued, “needs to be not just minimum but credible and operationally independent”. It meant that the UK needed to be able “to influence a potential enemy anywhere in the world” and affect “the decision-making process of any potential future aggressors”.⁸⁰

62. Mr Browne maintained that it was “instructive that we have, as one of a small number of nuclear weapon states, one percent of the nuclear warhead capability in the world”. He suggested that it was “clear that other countries take a different view if they are seeking to achieve a minimalist approach”. And he argued that “we want...to engage others with a view to minimising” their nuclear arsenals.⁸¹ He concluded that “we are committed to maintaining the minimum nuclear deterrent but that minimum has to offer a credible threat to any potential aggressors”.⁸²

63. We welcome the reduction in warhead numbers announced in the White Paper and recognise that this follows the significant reductions previously announced in the 1998 Strategic Defence Review. We welcome this arms reduction measure, but it is unclear whether this has significance as a non-proliferation measure. Since the White Paper proposes no changes to the number of warheads deployed on UK submarines, it is unclear that this reduction has any operational significance.

64. The White Paper states that the UK is committed to maintaining a “minimum” nuclear deterrent. The Secretary of State told us that the Government had conducted a very hard analysis of the nuclear capabilities required by the UK with a view to ensuring that they were at a minimum necessary level, but we are uncertain how the Government determines what constitutes a “minimum” deterrent. The Government should say how it calculates the scale of a minimum deterrent.

79 Q 350

80 Q 346

81 Q 347

82 *Ibid.*

5 Nuclear deterrence in the 21st Century

Table 5: The UK still needs nuclear weapons to ensure its security: arguments for and against

For	Against
The UK needs nuclear weapons as an insurance against an uncertain future. It is impossible to calculate what threats may emerge over the next 20 to 50 years, the lifetime of any successor to the UK's current Trident system.	
	Even the Government acknowledges there is no immediate nuclear threat in the post-Cold War world. The argument that a nuclear deterrent is required to defend against unknown future threats suggests that all states would be wise to possess nuclear weapons.
It is possible that, over the next 20 to 50 years, a major nuclear threat to the UK might re-emerge. It is impossible to rule out a major shift in the international security situation in this timeframe which puts the UK under threat.	
	The threat analysis in the White Paper is weak. The threats analysed in the White Paper are not the most likely or dangerous threats the UK faces. For example, a nuclear deterrent cannot guard against the threat of climate change.
It is possible that new nuclear states will emerge over the next 20 to 50 years which may pose a threat to the UK. The UK's nuclear deterrent provides an assurance that it cannot be subjected to future nuclear blackmail or a threat to UK security.	
	Yes, but there is no evidence that the UK will be a target of any state which might acquire nuclear weapons.
There are limits to the extent to which intelligence can give prior warning of possible changes of intent by an existing or new nuclear weapon state. The lead-times and added cost of reconstituting any deterrent of the current capability may be greater than the speed of such a change.	
Nuclear weapons might have a deterrent effect against states sponsoring terrorism. The UK's nuclear deterrent may deter any state considering transferring nuclear weapons to terrorists.	
	It is implausible that terrorists, or even states supporting them, would be deterred by the remote threat of nuclear attack by the UK.

For	Against
The principles of nuclear deterrence hold good, despite the changes in the global environment. In terms of their destructive power, nuclear weapons pose a uniquely terrible threat and consequently have a capability to deter acts of aggression that is of a completely different scale from any other form of deterrence.	
	The nature of deterrence has changed fundamentally since the Cold War. The White Paper fails to give a convincing account of the role of deterrence in the current strategic context.
Nuclear weapons have helped preserve peace and stability	
	There is no evidence that nuclear weapons have played a critical part in ensuring peace and stability.
The UK needs to be vague about the circumstances in which it would use nuclear weapons, to keep our enemies guessing.	
	We need to know the broad kinds of circumstances in which the UK might use its nuclear weapons, if we are to judge if we should have them.
The UK would only use its nuclear weapons in extreme circumstances, in self-defence, and in defence of its vital interests.	
	Terms such as extreme circumstances, self-interest and vital interests are meaningless without definition.

The Government's approach to nuclear deterrence

65. The White Paper states that “the fundamental principles relevant to nuclear deterrence have not changed since the end of the Cold War, and are unlikely to change in future”.⁸³ It maintains that because nuclear weapons “pose a uniquely terrible threat,” they “have a capability to deter acts of aggression that is of a completely different scale to any other form of deterrence”. On that basis, it concludes that “nuclear weapons remain a necessary element of the capability we need to deter threats from others possessing nuclear weapons”.⁸⁴

66. The White Paper goes on to describe “five enduring principles” which, it says, “underpin the UK’s approach to nuclear deterrence.” These include:

- a focus on “preventing nuclear attack”;

83 Cm 6994, para. 3.3, p 17

84 *Ibid.*

- a commitment to a “minimum” deterrent;
- the maintenance of deliberate ambiguity about the use of nuclear weapons;
- a commitment to the nuclear defence of the UK's NATO allies; and,
- the maintenance of the UK as “an independent centre of decision-making” which “enhances the overall deterrent effect of allied nuclear forces”.⁸⁵

The context of nuclear deterrence

67. Some witnesses to our inquiry have questioned the Government's understanding of nuclear deterrence. Nick Ritchie, of the University of Bradford, argues that the Government's contention that the fundamental principles of nuclear deterrence have not changed since the end of the Cold War is “an assertion, a point of view”. He maintains that nuclear deterrence is a “contested concept” and that “the “principles” of nuclear deterrence are not objective truths” but rather “theoretical concepts”. He says that “the Government's assertion is not necessarily wrong, but it does not provide any evidence for its case”.⁸⁶

68. Dr Stephen Pullinger, of the International Security Information Service, for example, challenges the White Paper's statement that the fundamental principles of nuclear deterrence have not changed since the end of the Cold War. He argues that although “the fundamental principles may not have changed...this should not be interpreted to mean that the Cold War deterrence model can be transposed to each and every other future scenario in which nuclear weapons are a factor”.⁸⁷ Dr Pullinger argues that the context within which nuclear deterrence now operates is very different from that of the Cold War. On that basis, he questions whether the UK's nuclear weapons can any longer play a useful and credible role.

69. Dr Jeremy Stocker, of the IISS, agrees and states that “absent an overwhelming threat such as the Soviet Union, the credibility of a nuclear response to limited aggression must be in doubt”.⁸⁸ In evidence to us, Dr Stocker maintained that, ultimately, “deterrence and particularly its nuclear dimension is as relevant as it was in the Cold War”. But he argued that “the nature of that deterrence has changed fundamentally...for the UK probably more than anybody else, with the possible exception of France”. He suggested

The context within which we might have to conduct deterrence in the future, other than in the scenario of a resurgence of a hostile Russia, has changed completely and all of the kind of assumptions and policies that we worked out during the Cold War and learned quite painfully and over a protracted period of time, most of those assumptions no longer apply.

85 Cm 6994, para. 3.4, pp 17–18

86 Ev 141

87 Ev 101

88 Ev 109

Dr Stocker concluded that “deterrence is as salient as it ever was, but it is a very, very different kind of deterrence.”⁸⁹ The White Paper, he suggested, “does not deal with some fundamental challenges to deterrence in the “second nuclear age”—the post-Cold War age in which nuclear proliferation has taken hold. In evidence to us, Dr Stocker argued that “the White Paper really says very little about deterrence”. He suggests that “in order to argue the Government’s case...the Government probably does have to do considerably more in spelling out a deterrence policy as well as a policy for the deterrent, which is actually what the White Paper is all about”.⁹⁰ In his written memorandum, he notes that “no comprehensive review of post-Cold War deterrence needs has been conducted, certainly not in public” and he suggests that “now may be as good a time as any” for that review.⁹¹

70. Sian Jones, of the Aldermaston Womens’ Peace Campaign, argued that the “security agenda has changed” since the end of the Cold War and that nuclear deterrence was an “outmoded concept”.⁹² Dr Rebecca Johnson also calls for a review of nuclear deterrence and argues that the White Paper “fail[s] to justify its premise that our nuclear weapons aided peace and international security and deterred acts of aggression against the UK”. She maintains that “too much of our future security is at stake to rely on cold war myths and voodoo mantras about deterrence”. And she suggests that “the Government needs to provide and examine evidence from the real world” to support its contention that nuclear weapons are effective in deterring aggression. Dr Johnson concludes that “even if nuclear weapons did play a role in deterring war among the major powers, relying on them in the manifestly different conditions the UK now faces reveals a naïve and complacent stretch of faith”. She, therefore, calls upon Parliament to “insist on seeing a deeper analysis of nuclear and non-nuclear deterrence”.⁹³

71. RUSI witnesses too see a need for a more comprehensive analysis of the meaning and role of nuclear deterrence. In evidence to us, they state that

the debates around the White Paper would benefit from an assessment of what deterrence is, how it is achieved, what are the implications of deterrence theory and practice of the changed strategic environment, and what are the circumstances in which nuclear deterrence might be relevant.⁹⁴

72. In a similar vein, the Church of England questions “whether post-Cold War, deterrence will work”. And it asks “can those states and non-state actors that threaten UK security actually be deterred from undertaking acts of aggression by either new or existing approaches to nuclear deterrence”. According to the Church of England, “this needs to be much more fully argued than in the current White Paper”.⁹⁵

89 Q 172

90 Q 173

91 Ev 109

92 Q 17

93 Ev 192

94 Ev 114

95 Ev 176

73. We asked the Secretary of State for Defence whether there was a case for reassessing the role of nuclear deterrence in light of the changed international circumstances of the post-Cold War world. Mr Browne told us that the relevance of nuclear deterrence did not end with the passing of the Cold War. The nuclear weapons, he argued, remained relevant and stated that “I fundamentally do not believe that deterrence is an outmoded concept,” despite the changes which had occurred in the international system since the Cold War. In fact, he maintained that it was the continually changing nature of the threat that warranted the UK’s continued possession of nuclear weapons, as “history tells us that countries’ intentions...can change very, very quickly”.⁹⁶ He argued that “deterrence is not that sophisticated a concept” and suggested that the problem was that “we have over sophisticated it because it has always been associated with nuclear weapons”.⁹⁷

74. The White Paper states that the concept of deterrence has not changed since the end of the Cold War and it outlines the underlying principles which shape the UK’s current approach to nuclear deterrence. Some witnesses to our inquiry questioned the continuing relevance of nuclear deterrence while others argued that it remained as relevant as it ever was during the Cold War. The Government should do more to explain what the concept of deterrence means in today’s strategic environment.

Circumstances of use

75. The White Paper states that “we deliberately maintain ambiguity about precisely when, how and at what scale we would contemplate use of our nuclear deterrent”. It maintains that the Government “will not simplify the calculations of a potential aggressor by defining more precisely the circumstances in which we might consider the use of our nuclear capabilities”. On that basis, it states that “we will not rule in or out the first use of our nuclear weapons”.⁹⁸ The White Paper states that the UK would use nuclear weapons in response to threats to its “vital interests” and in defence of its NATO allies.⁹⁹

76. Witnesses from RUSI argue that maintaining ambiguity about the circumstances in which the UK might use nuclear weapons is understandable and enhances the deterrent effect. In their memorandum to us, the RUSI witnesses maintained that

In the Cold War, British deterrence policy was based on the certainty of response...Today, with more numerous and more diverse potential threats, this uncertainty in threat is offset by strategic ambiguity and uncertainty in Britain’s response: no potential adversary could be absolutely certain that Britain *would not* respond, an uncertainty which increases significantly the complexity of an adversary’s decision-making.¹⁰⁰

77. Some witnesses to our inquiry, however, challenged the Government’s deliberate ambiguity. Professor William Walker, of the University of St Andrew’s, argues that

96 Q 353

97 *Ibid.*

98 Cm 6994, para 3.4, p 18

99 *Ibid.*

100 Ev 114

although it is understandable why the Government avoided naming specific states as future threats, the White Paper “should nevertheless have provided clearer indication of the kinds of future circumstances that would compel the UK to threaten nuclear attack in its own defence”.¹⁰¹ Similarly, in evidence to us, Dr Stephen Pullinger argued that “there has been too much ambiguity about the circumstances” of use of nuclear weapons. He maintains that “the language we are using...is giving an awful lot of leeway to the circumstances in which we would use nuclear weapons”.¹⁰²

78. The Church of England states in its memorandum to us that “given the grave ethical issues involved with any use or threat of use of nuclear weapons, it is legitimate to ask in a democracy...in what sorts of circumstances their use might be justified and proportionate”. It maintains that “to assess the validity of the deterrence argument...there must be some indication of the circumstances in which the weapons *might* be used”. According to the Church of England, this would not require the Government to disclose secret targeting information or precise circumstances of use. Instead, it states that “all it would require is for the Government to indicate what is its overall strategy, including the parameters for the weapons’ use and any limits within which any targeting would be set”.¹⁰³ It states that the French, for example, outline their strategy for targeting an aggressor’s political, economic and military power centres, and not its civilian centres. It concludes that “it is disappointing that a similar shift in strategy and a move towards greater public transparency is not reflected in the White Paper”.¹⁰⁴

79. When discussing the legality of threats to use nuclear weapons, Professor Haines told us that one of the problems is

you can talk about as many hypothetical situations as you like; what we will eventually be faced with will be something quite different, and if you base everything on your range of hypothetical situations that you are teasing out you will probably get it wrong.¹⁰⁵

80. We asked the Secretary of State for Defence whether he could clarify the circumstances in which the UK would consider using its nuclear deterrent. He stated that the UK “would only consider using nuclear weapons in self defence” and “only...in extreme circumstances”. He insisted that “it is, and always has been, part of our deterrence posture that we retain an ambiguity about precisely when, how and at scale we would contemplate using our nuclear weapons”. “Keeping the enemy guessing,” he insisted, was “all part of deterrence”.¹⁰⁶ For the same reason, Mr Browne declined to define what the White Paper meant by the UK’s “vital interests,” saying that “if we had wanted to put [a definition] into the public domain, we would have put one in...the White Paper”.¹⁰⁷

101 Ev 165

102 Q 182

103 Ev 177

104 *Ibid.*

105 Q 287

106 Q 355

107 *Ibid.*

81. The Government has stated that the UK will use its nuclear weapons only in “self-defence”, in “extreme circumstances”, and in defence of the UK’s “vital interests”, but has not defined these terms. It argues that it is important to maintain ambiguity about the exact circumstances in which the UK might use its nuclear weapons. Although we understand the need for ambiguity, the Government should be clearer that this ambiguity does not lead to a lowering of the nuclear threshold.

A sub-strategic role

82. The 1998 Strategic Defence Review stated that in order to be a credible deterrent, “Trident must...be capable of fulfilling [a] “sub-strategic” role”. In our first report on the future of the UK’s strategic nuclear deterrent, we characterised a sub-strategic strike as one which would involve the launch of one or a limited number of missiles against an adversary as a means of conveying a political message, warning or demonstration of resolve. But we noted that a sub-strategic role should not be confused with a tactical role and that Trident was not designed or intended to fulfil a tactical role on the battlefield.¹⁰⁸

83. The White Paper makes no reference to sub-strategic deterrence. This omission is noted in several submissions to our inquiry. Professor Paul Rogers, of the University of Bradford, for example, argues that “given that the Government seeks a public discussion on the replacement of Trident prior to the vote in Parliament, it is perhaps unfortunate that this core aspect of the UK nuclear posture gets so little attention”.¹⁰⁹

84. The White Paper does emphasise the importance of lower yield nuclear warheads in making deterrence against smaller nuclear threats more credible. It states that “the ability to vary the numbers of missiles and warheads which might be employed, coupled with continued availability of a lower yield from our warhead, can make our nuclear forces a more credible deterrent”.¹¹⁰

85. In evidence to us, Dr Pullinger argues that “there is a danger...that the deployment of lower yield warheads...will lower the nuclear threshold and increase the likelihood of nuclear use to achieve more limited, war-fighting objectives”. In this sense, he notes, “the sub-strategic function becomes a tactical one”.¹¹¹

86. We asked the Secretary of State whether the Government was still committed to a sub-strategic role for Trident. He told us that the UK’s nuclear weapons “are not intended, nor are they designed, for military use during conflict”. He stated that “we have deliberately chosen to stop using the term “sub-strategic Trident”. In the past, “it was applied to a limited use of our weapons”.¹¹²

87. The Government says it no longer uses the term “sub-strategic” in discussing the UK’s nuclear weapons. However, the White Paper refers to varying the yield of the UK’s nuclear warheads. We call upon the Government to clarify how a reduced yield differs

108 HC (2005–06) 986, para 41, pp 12–13

109 Ev 113

110 Cm 6994, para. 4.9, p 23

111 Ev 105

112 Q 358

from a sub-strategic role. The Government should also state why a sub-strategic role was thought necessary in 1998 but is no longer necessary now.

The UK's nuclear deterrent and NATO nuclear forces

88. The White Paper states that “the UK’s nuclear deterrent supports collective security through NATO for the Euro-Atlantic area”. And it maintains that “nuclear deterrence plays an important part in NATO’s overall defensive strategy” and that “the UK’s nuclear forces make a substantial contribution” to that strategy.¹¹³ In exchange of letters between the UK and the United States, on 7 December 2006, the Prime Minister states that

as has been the case in the past with the Polaris force, and is currently the case with out Trident force, we intend that a future UK deterrent submarine force equipped with Trident, and any successor to Trident, will be assigned to the North Atlantic Treaty Organisation: and expect where the United Kingdom Government may decide that supreme national interests are at stake, this successor force will be used for the purposes of international defence of the Atlantic Alliance in all circumstances.¹¹⁴

89. In evidence to our inquiry, Professor Rogers states that despite the end of the Cold War, the UK’s nuclear weapons “remain committed to NATO” and notes that “NATO nuclear planning still involves a policy of first use” of nuclear weapons.¹¹⁵ RUSI told us that “Britain’s nuclear deterrent remains an important element of the European contribution to NATO, with its sub-strategic policy a central element of NATO’s deterrent strategy”. But it states that “NATO’s doctrine of sub-strategic deterrence remains largely under-developed since the end of the Cold War”. It argues that “the Government will need to clarify the precise role of sub-strategic Trident in the NATO context”.¹¹⁶ The need for further clarity about the role of UK nuclear weapons in a NATO context is also raised by Abolition 2000, which asks “whether the declared NATO policy of potential first use...is consistent with UK policy and UK responsibilities in international law”.¹¹⁷ Similarly, Scottish CND suggests that “the role of nuclear forces in NATO today is by no means clear”.¹¹⁸

90. The Government states that the UK’s nuclear deterrent will continue to be assigned to NATO. NATO nuclear doctrine, however, explicitly involves a policy of not ruling out first use of nuclear weapons and a policy of sub-strategic deterrence. We call upon the Government to clarify, in time for the debate and vote in the House of Commons, how the UK’s nuclear forces are integrated into the nuclear defence of NATO and what the implications of the Alliance’s first use and sub-strategic policies are for the UK’s nuclear deterrent.

113 Cm 6994, para 3.4, p 18

114 Exchange of letters between the Prime Minister and the US President, 7 December 2006

115 Ev 130

116 Ev 117

117 Ev 132

118 Ev 87

The Government's rationale for retaining a nuclear deterrent

An insurance against an uncertain future

91. The White Paper states that the central argument for retaining the deterrent is an insurance “against an uncertain future”. The White Paper states that “there are limits to the extent to which intelligence can inform us about medium to long-term changes in the nuclear capabilities of others, or give prior warning of a possible change in intent by an existing nuclear weapon State”. It maintains that “we must...be realistic about our ability precisely to predict the nature of any future threats to our vital interests over the extended timescales associated with decisions about the renewal of our nuclear deterrent”.¹¹⁹ Looking ahead to the period 2020 to 2050, the time in which any future deterrent system would operate, the White Paper highlights “some trends that give rise to significant causes for concern”. It identifies nuclear proliferation as a particular concern which, it says, “potentially could lead to increasing levels of international instability and risk of interstate conflict”. Although the White Paper acknowledges that the UK does not face a current nuclear threat, it argues that there is “the possibility that, at some stage in the future, nuclear capabilities and hostile intent will become dangerously aligned”.¹²⁰ The Government foresees three specific possibilities: the re-emergence of a major nuclear threat; the emergence of new nuclear weapon states; and the possibility of state-sponsored terrorism.¹²¹

92. Witnesses to our inquiry offered widely differing views on the rationale offered by the Government for retaining a nuclear deterrent. RUSI, for example, agrees with the Government that “the future strategic environment remains unknown and unknowable”. It argues that

The rationale for maintaining the nuclear deterrent is based on the existence of nuclear arsenals in at least eight other states, the fact that nuclear technologies, know-how and desires are proliferating, the implicit assumption that more states are likely to acquire nuclear weapons in the future, the risks of rogue states and terrorist organizations acquiring nuclear and other weapon of mass destruction capabilities, and the calculation that nuclear aggression realistically can only be deterred by the possibility of nuclear retaliation.¹²²

93. Professor William Walker, of St Andrew's University states that the White Paper contains “general descriptions of possible developments in the international arena which cannot be discounted”. However, he argues that the document is “extremely vague” and that “little effort is made to explain how and why they pose particular threats *to the UK*, and why—if the threats do exist today—they are sufficiently tangible and probable to merit paying such a heavy insurance premium”.¹²³

119 Cm 6994, para 3.5, p 18

120 Cm 6994, para 3.8, p 19

121 Cm 6994, paras 3.5–3.12, pp 18–19

122 Ev 114

123 Ev 165

94. The Nuclear Information Service argued that “to equate Trident with an insurance policy is a simile that falls at the slightest examination”. It argues that “insurance is recommended for everybody, not just the few” and that “to pursue the insurance analogy would be to accept that every country was entitled to it”.¹²⁴ Similarly, CND suggest that “the White Paper outlines an appalling string of possibilities” and argues that the logic of its insurance argument risks “reinforcing the notion that building more weapons of mass destruction provides security.” It concludes that “through its short-sighted actions, the Government is contributing to nuclear escalation and eventual nuclear war”.¹²⁵

95. Greenpeace argues that the Government’s assessment of future threats is flawed. It argues that “needed now are not new rationales for possessing nuclear weapons but increased diplomatic effort and initiatives to rid the world of nuclear weapons”. According to Greenpeace, the Government focuses on the wrong threats. It states that “we fail to see how nuclear weapons will halt the impact of climate change, ensure adequate birth control for the world’s poor or make any nation economically richer and not poorer”. And it argues that the UK’s continued possession of nuclear weapons risks perpetuating and heightening the threat of nuclear proliferation for “as long as there are nuclear materials and technology available and...nuclear weapons are regarded as being essential to the security of a few nations, there will remain a risk of further proliferation of nuclear weapons”.¹²⁶

96. Dr Andrew Dorman, of King’s College London, maintains that “the Government’s case although repackaged remains the same as that confronting the Attlee Government in 1946,” that “in an uncertain world, the United Kingdom needs to have the ultimate insurance policy that a nuclear deterrent is seen to bring”.¹²⁷ He suggests that “the deterrence argument was easier to make when there was an obvious potential foe in the form of the Soviet Union”. He argues that “when, as the White Paper suggests, it involves non-state actors, such as al-Qaeda, it is far harder to justify”.¹²⁸

State-sponsored terrorism

97. The White Paper envisages a role for the UK’s nuclear deterrent in deterring state-sponsored terrorism. It states that “while our nuclear deterrent is not designed to deter non-state actors, it should influence the decision-making of any state that might consider transferring nuclear weapons or nuclear technology to terrorists”.¹²⁹ It also states that

we make no distinction between the means by which a state might choose to deliver a nuclear warhead, whether, for example, by missile or sponsored terrorists. Any state that we can hold responsible for assisting a nuclear attack on our vital interests can expect that this would lead to a proportionate response.¹³⁰

124 Q 123

125 Ev 80

126 Ev 186

127 Ev 182

128 *Ibid.*

129 Cm 6994, para 3.11, p 19

130 *Ibid.*

The White Paper also says that

A key element of our ability to exercise effective deterrence in such circumstances is our capability precisely to determine the source of material employed in any nuclear device. We will retain and strengthen the world leading forensic capability at the Atomic Weapons Establishment, Aldermaston in this area.¹³¹

98. Some witnesses to our inquiry expressed scepticism about the relevance of the UK's nuclear deterrent in deterring state-sponsored terrorism. Dr Rebecca Johnson argues that “the nuclear threat in these cases would be far less likely to deter than existing collective political, diplomatic and economic tools, and any nuclear use could profoundly compromise Britain's security and international standing in the longer-term”. She suggests that extremist groups would not be deterred by nuclear weapons and that, in fact, “their game plan could include provoking a nuclear or similarly disproportionate retaliation in order to turn moral outrage against the retaliator and recruit more people to their causes”.¹³² Professor John Baylis argues that nuclear deterrence is “not likely...[to] work against non-state terrorist groups”. However, he suggests that “in circumstances where it is clear that the terrorists are operating from a particular territory, then deterrence aimed at the government of that state might work but this invariably will not be the case”.¹³³

99. We asked the Secretary of State how the UK's nuclear deterrent would be relevant in deterring state-sponsored terrorism. Mr Browne told us that “we might face at some time in the future a rogue state which has [a nuclear] capability and may want to use terrorists as proxies as a way of launching weapons against us”. This, he maintains, is what the White Paper seeks to convey. He stated that “we are not saying that we would deploy this as a deterrent or as an answer to what people would generally consider to be the terrorist threat”. The White Paper, Mr Browne insisted, defined a specific type of terrorist threat and asserted its relevance in that context. The Government, he said, did not regard the nuclear deterrent as an effective deterrent against terrorists themselves, but rather against states sponsoring terrorism.¹³⁴

100. The Government acknowledges that there is no current nuclear threat to the UK but argues that nuclear weapons are needed as an insurance policy against an uncertain future. Some of our witnesses pointed to nuclear proliferation and noted that nuclear aggression could only be deterred by the possibility of nuclear retaliation. Others—including some who accepted the need for the deterrent—felt that the Government's analysis of the threat was vague, flawed and otherwise lacked logic, and many particularly expressed scepticism about the efficacy of the deterrent in countering state-sponsored terrorism.

131 Cm 6994, para 3.12, p 19

132 Ev 192

133 Ev 125

134 Q 362

6 International legal and treaty aspects

Table 6: The Government's proposals are consistent with international law and the UK's treaty obligations: arguments for and against

For	Against
Retaining the nuclear deterrent is fully consistent with the UK's international legal obligations. The Non-Proliferation Treaty recognises the UK's status as a nuclear weapons state and does not call for immediate and unilateral disarmament.	
	Retaining a nuclear deterrent is in breach of Article VI of the Non-Proliferation Treaty which obliges the UK, and the other nuclear weapon states, to negotiate in good faith towards disarmament.
Article VI has to be read as a whole—the requirement is to pursue negotiations in good faith, towards general and complete disarmament as well as nuclear disarmament. The UK has made significant steps towards nuclear disarmament (number of nuclear warheads reduced from 300 to 200 since 1998, number of Trident D5 missiles reduced to 50) and now plans to reduce its stockpile of nuclear warheads to fewer than 160.	
	But there is no plan to reduce the number of warheads on each submarine, so this has no operational significance.
The UK has also made significant diplomatic efforts to encourage non-proliferation, which are outlined in detail in an annex to the White Paper.	
	Renewal of the nuclear deterrent will make it harder to persuade other States that it would be wrong to acquire nuclear weapons – and might even encourage nuclear proliferation.
Simply acquiring a new platform (the submarine) is certainly not against the NPT.	
	Acquiring a new submarine may not be illegal, but the decision to extend the life of the Trident missiles is more doubtful.
	Extending deterrence theory to state-sponsored terrorism is dangerous. It might breach the NPT and lower the nuclear threshold
The decision on the future of the deterrent is essentially a political and not a legal one.	

101. In this part of the report, we consider the challenges made to the legality of the Government's proposals to retain and renew the UK's nuclear deterrent and the arguments that the proposals are damaging to international efforts to stem nuclear proliferation.

The legality of the White Paper's proposals

The Government's position

102. In the White Paper, the Government states that the "the UK's retention of a nuclear deterrent is fully consistent with our international legal obligations". It states that the Nuclear Non-Proliferation Treaty (NPT) "recognises the UK's status (along with that of the US, France, Russia and China) as a nuclear weapons State". It states that the NPT "remains the principal source of international legal obligation relating to the possession of nuclear weapons". It concludes that "we are fully compliant with all our NPT obligations, including those under Article I (prevention of further proliferation of nuclear weapon technology) and Article VI (disarmament)".¹³⁵

103. The White Paper states that the NPT does not insist upon immediate and unilateral disarmament by the UK and "does not establish any timetable for nuclear disarmament, nor for the general and complete disarmament which provides the context for total nuclear disarmament. Nor does it prohibit maintenance or updating of existing capabilities". It states that the Government "will continue to press for multilateral negotiations towards mutual, balanced and verifiable reductions in nuclear weapons".¹³⁶

104. The White Paper also says that, in 1996, "the International Court of Justice delivered an Advisory Opinion which confirmed that the use, or threat of use, of nuclear weapons is subject to the laws of armed conflict" and maintains that the Court "rejected the argument that such use would be unlawful". The White Paper provides an assurance that "we would only consider using nuclear weapons in self-defence (including the defence of our NATO allies), and even then only in extreme circumstances". But it notes that "the legality of any such use would depend upon the circumstances and the application of the general rules of international law, including those regulating the use of force and the conduct of hostilities".¹³⁷

Challenges to the Government's position

105. Some witnesses to our inquiry have challenged the legality of the proposals contained in the White Paper. The CND, for example, argues that the Government "misrepresents both Britain's obligations under the nuclear Non-Proliferation Treaty and, and the position of the International Court of Justice on the use, or threat of use, of nuclear weapons". CND suggests the White Paper's description of the UK as a "recognised" nuclear weapon state is not only "misleading," but is "part of an ongoing attempt to reinterpret the NPT to suggest that nuclear weapons states are somehow legally entitled by that Treaty to possess nuclear weapons". CND maintains that the NPT provided no such legal entitlement to nuclear

135 Cm 6994, para 2.9, p 14

136 Cm 6994, para 2.10, p 14

137 Cm 6994, para 2.11, p 14

weapons; its reference to “recognised” nuclear weapons states, was merely a statement of fact about which countries possessed nuclear weapons at the time of the negotiation of the Treaty.¹³⁸ According to CND, the International Court of Justice (ICJ) did not reject the argument that the threat or use of nuclear weapons would be unlawful, as the White Paper suggests. It cites the verdict of the Court, which stated that “the threat or use of nuclear weapons would be generally contrary to the rules of international law applicable in armed conflict and in particular the principles and rules of humanitarian law”.¹³⁹ CND also maintains that the ICJ “gave “no opinion” on whether the use of nuclear weapons might be legal in a situation of extreme self defence where the existence of the state was threatened”.¹⁴⁰ This argument is also made by Abolition 2000, which suggests that the ICJ “indicated that immediate [disarmament] negotiations were...called for” but that “the UK is not currently involved in any such negotiations”.¹⁴¹

106. Dr Rebecca Johnson, like CND and Abolition 2000, argues that “the replacement of Trident would constitute a breach of Article VI of the NPT”. And she maintains that this would constitute a “material breach” of the Treaty as a whole. Dr Johnson suggests that while reductions in the scale of the UK’s nuclear deterrent since the end of the Cold War are welcome, “the Article VI obligation is not just to reduce the nuclear arsenals, but to eliminate them”. The decisions contained in the White Paper, she argues, constitute “an overall increase in capability and longevity” of the UK’s nuclear deterrent” and that this is inconsistent with the legal obligations imposed by the NPT. Dr Johnson also contends that the Government cannot base its decisions on the failure of other countries to honour the Treaty; “other governments’ failures to take their treaty obligations seriously cannot constitute a justification for the present government to make the same mistakes”.¹⁴²

107. Professor William Walker states that the White Paper’s claim that the UK’s retention of a nuclear deterrent is fully consistent with its international legal obligations is “contestable”. He argues that “the right to hold nuclear weapons,” implied in the NPT, “is neither permanent nor unconditional”. He states that “replacing Trident is not easily reconciled with that obligation”.¹⁴³

108. The British Pugwash Group makes a similar argument. It maintains that the NPT “gives us specific responsibilities under Article VI to negotiate in good faith towards a nuclear weapon free world” and that “renewing Trident, even with the fudge of a possible reduction in warhead numbers, is hardly consistent with this responsibility”.¹⁴⁴

109. As part of our inquiry, we took oral evidence from four of the UK’s leading international legal experts: Professor Christopher Greenwood QC of the London School of Economics, Professor Nick Grief of the University of Bournemouth, Professor Steven Haines of Royal Holloway College, University of London, and Professor Philippe Sands

138 Ev 81

139 Ev 82

140 *Ibid.*

141 Ev 131

142 Ev 196

143 Ev 166

144 Ev 129

QC of University College London. We asked them for their opinion on what role legal issues should play in decisions over the future of the UK's nuclear deterrent, whether the decisions contained in the White Paper were legal or illegal and how the UK's obligations under the Non-Proliferation Treaty were relevant to the discussions on the future of the deterrent.

110. In evidence to our inquiry, Professor Grief told us that “even to maintain the deterrent raises issues under Article VI of the Non-Proliferation Treaty”. The Treaty, he maintained, places obligations upon the UK “to negotiate in good faith towards nuclear disarmament”. Professor Grief told us that “I do not see sufficient evidence in the White Paper of movement on the part of the Government in the direction of nuclear disarmament and, therefore, in the direction of fulfilling the obligations of Article VI”.¹⁴⁵ The requirement to negotiate “in good faith,” argued Professor Grief, meant “not negotiating from an entrenched position, negotiating sincerely towards the objective that is enshrined in the Treaty, namely nuclear disarmament, and doing nothing which would be likely to render fulfilment of that obligation remote or impossible”.¹⁴⁶ Professor Grief also maintained that the use and threat of use of nuclear weapons by the UK was illegal under international humanitarian law.

111. Professor Sands told us that he was concerned at “the apparent extension of deterrence theory into areas related to terrorism,” which, he argued, “does raise...issues in relation to the Treaty on Non-Proliferation of Nuclear Weapons”.¹⁴⁷ By extending the theory of deterrence in this way, Professor Sands maintained, “you open a door to the argument of illegality” and “you send out a signal to others who may also want to adopt a different approach to their obligations under the [Non-Proliferation] Treaty”.¹⁴⁸ According to Professor Sands, if the international community is to enforce the NPT effectively, and to challenge credibly those who contravene it, “we need to be absolutely certain that we are fully meeting our own obligations”.¹⁴⁹

112. Both Professor Haines and Professor Greenwood, however, argued that the Government's plans to retain and renew the UK's nuclear deterrent were legal. Professor Haines told us that “I do not believe there is any problem with the proposal in the White Paper of a legal nature...the proposal is both appropriate and expected given the history of Trident”.¹⁵⁰ And he stated that “the issue of whether we should go down the route that the Government is suggesting is entirely a policy decision”. He argued that “there is nothing in the NPT that says we have to give [nuclear weapons] up in a unilateral sense”.¹⁵¹ He argues that

Possession of nuclear weapons is not contrary to international law, although nuclear weapon states are under an obligation to move towards disarmament...the British

145 Qq 219, 221

146 Q 236

147 Q 209

148 Q 210

149 Q 216

150 Q 209

151 Q 233

strategic nuclear deterrent capability is lawful; it is fully in accordance with international law and does not represent a breach of that law in any way. There has never been a persuasive argument deployed to establish illegality.¹⁵²

113. Professor Greenwood agreed. He maintained that “legal aspects should not be decisive” and that the decisions facing the country were of a political rather than a legal nature.¹⁵³ In his judgement, “in terms of international law there is no obstacle whatever to the Government doing what it has proposed to do”. He told us, “I do not believe that either the Non-Proliferation Treaty or the laws of armed conflict would preclude updating Trident in the way that is suggested”.¹⁵⁴ Like Professor Haines, Professor Greenwood maintained that the NPT imposed no obligation upon the UK to disarm unilaterally.¹⁵⁵

114. The Government states that the retention and renewal of the UK's nuclear deterrent is fully consistent with its international legal obligations. Some witnesses to our inquiry challenged the Government's position and suggested that the proposals in the White Paper may constitute a breach of the Nuclear Non-Proliferation Treaty and may be illegal under the UN Charter and international humanitarian law. The Government rejects this suggestion. None of the witnesses to our inquiry, however, believed that a decision to replace the Vanguard-class submarines would, in itself, be illegal, though some argued that the long-term retention of a nuclear capability, including the decision to extend the life of the Trident D5 missile, was inconsistent with the UK's obligations to pursue negotiations in good faith to achieve nuclear disarmament.

115. Witnesses to our inquiry accepted that, ultimately, decisions on the future of the future of the UK's nuclear deterrent were political and that, in the absence of consensus, legal concerns were unlikely to be decisive.

The NPT and nuclear proliferation

116. Some of the witnesses to our inquiry argued against the Government's proposal to retain and renew the nuclear deterrent on the grounds that it would be damaging to international negotiations to prevent the proliferation of nuclear weapons and to the UK's credibility in those negotiations.

117. In the White Paper, the Government reiterates the pledge made in the 2003 Defence White Paper that

we are committed to working towards a safer world in which there is no requirement for nuclear weapons and continue to play a full role in international efforts to strengthen arms control and prevent the spread proliferation of chemical, biological and nuclear weapons.

152 Steven Haines, “Is Britain's continued possession and threatened use of nuclear weapons illegal?”, *The Future of Britain's Nuclear Weapons: Experts reframe the debate*, Oxford Research Group, March 2006, p 56

153 Q 210

154 Q 209

155 Q 237

The current White Paper recounts the UK's efforts to promote nuclear disarmament and non-proliferation through the NPT, the Conference on Disarmament and the UN Disarmament Commission. And it states that “we stand by our unequivocal undertaking to accomplish the total elimination of nuclear weapons”.¹⁵⁶ Reference is made to the Norwegian 7 Country Initiative, which aims to foster fresh thinking on how we can take forward the three pillars of the NPT—access to nuclear technology for exclusively peaceful purposes, non-proliferation and disarmament.¹⁵⁷

118. In evidence to us, the Secretary of State for Defence maintained that the UK had “a good record in living up to our international obligations in this regard”. He told us that

we continue to support and we have made progress in 13 practical steps towards the implementation of Article VI agreed in 2000; we have ratified the Comprehensive Nuclear Test Ban Treaty; we have increased our transparency by publishing historical accounting records of our defence fissile material holdings; we have pursued a widely welcomed programme to develop expertise in methods and technologies that could be used to verify nuclear disarmament on which we have produced a series of working papers, culminating in a presentation to the 2005 NPT Review Conference.¹⁵⁸

119. Mr Browne also stated that

our priority remains to press for negotiations in the Conference on Disarmament of the Fissile Material Cut-Off Treaty; we welcome the draft text which the United States tabled last year; we hope that all concerned are able to accept the very broad mandate proposed and agree to open negotiations towards a treaty without delay, and we are also actively engaged in the global initiative to combat nuclear terrorism, where we will be playing a key and active role in shaping and contributing to the forward-looking programme of this important new development.¹⁵⁹

120. We asked what impact the White Paper would have on the UK's non-proliferation efforts. Ms Mariot Leslie, Director, Strategic Threats at the Foreign and Commonwealth Office, told us that “we found a gratifying degree of understanding for the Government's decision on the part in particular of our NATO allies but also a large number of other countries”. According to Ms Leslie, at the Conference on Disarmament “a number of countries went out of their way to congratulate the Government on the degree of transparency it had gone in for in the White Paper,” which, she said, was one of the 13 practical steps agreed to by the 2000 NPT Review Conference.¹⁶⁰

121. Some witnesses to our inquiry, however, suggested that the Government's justification of the retention and renewal of the UK's nuclear deterrent as an insurance against an uncertain future was an argument that could be used by other states in defending their attempts to acquire nuclear weapons. CND, for example, argues that “Trident

¹⁵⁶ Cm 6994, p 13 (Box 2.1)

¹⁵⁷ Cm 6994, p 33

¹⁵⁸ Q386

¹⁵⁹ *Ibid.*

¹⁶⁰ Q 392

replacement...will encourage nuclear proliferation". It states that "it is vital that sincere initiatives are taken, by the nuclear weapons states, towards disarmament, otherwise non-nuclear weapons states may conclude that there is no reason for them to stick to their side of the NPT bargain".¹⁶¹ Similarly, Scottish CND maintains that "every nation in the world could use the arguments suggested [in the White Paper] to show why they needed the bomb," and that "if each country only considers itself then nuclear proliferation will accelerate". It argues that "we should be working with others to prevent... this apocalyptic future".¹⁶²

122. A similar argument is put forward by Dr Stephen Pullinger, who maintains that

Essentially there is a tension in policy between extolling the value of nuclear weapons for Britain's security while seeking to deny such capability to others. The danger is that by affording nuclear forces a high importance within national defence and security strategies we undermine our efforts to persuade other states that they can do without such forces themselves.¹⁶³

According to Dr Pullinger, this "double standard argument...goes to the heart of the link between nuclear weapon possession and non-proliferation". In his opinion, it "prompts the fundamental question as to whether it is possible to tackle proliferation effectively, while still insisting that nuclear weapons are necessary for Britain's security, but not for others". He concludes that "the entire non-proliferation regime is creaking under the strain" of this double standard and argues that "unless we address its underlying problems it may disintegrate with dire consequences for all of us".¹⁶⁴

123. David Broucher, a former head of the UK delegation to the UN Disarmament Conference and now a Research Fellow at the University of Southampton, maintains that, in absolute terms, the UK's decision on whether to retain and renew its nuclear deterrent will not encourage proliferation, but that its propaganda effect may undermine the international consensus needed to prevent the spread of nuclear weapons. He argues that

It seems most unlikely that would-be proliferators would be influenced definitively either way by the UK's decision. Strategic weapon policies emerge over decades for a wide variety of reasons and are not susceptible to short-term change based on the calculation of one other country...On the other hand, the UK's decision will undoubtedly be used as a political defence by would be proliferators, and the resulting propaganda will have some influence with uncommitted countries whose support we need to retain if we are to uphold the efficacy of non-proliferation regimes.¹⁶⁵

In the longer term the danger is that the UK's decision will be taken as one of a number of factors indicating that nuclear weapons are now a permanent feature of the international security environment...which could combine with other factors

161 Ev 81

162 Ev 88

163 Ev 107

164 Ev 108

165 Ev 139

that are already eroding confidence in the Non-proliferation Treaty and contribute to a seismic shift in international security postures.¹⁶⁶

124. According to Mr Broucher, progress towards bilateral and multilateral disarmament has “stalled, and even gone into reverse”. He argues that “the UK has ceased, for whatever reason, to advocate multilateral nuclear disarmament with any conviction” and he suggests that, in the absence of any enthusiasm amongst the other nuclear weapon states, the disarmament process “risks stagnating,” a trend which he fears “will not easily be reversed”.¹⁶⁷ As a possible remedy, Mr Broucher argues that future international agreements should, if necessary, rely on remote verification to ensure compliance, such as that pioneered by the UK Atomic Weapons Establishment, rather than insist upon on-site inspections, which have hitherto impeded negotiations. He also suggests that further consideration should be given to the idea of “security assurances” as a means of discouraging further nuclear proliferation.¹⁶⁸

125. In a similar vein, Professor Michael MccGwire argues that in any discussion over the future of the UK's nuclear deterrent, consideration should be given to the “opportunity costs” of retention and renewal—“things Britain could do and achieve (if it were not a nuclear weapon state)”. He maintains that, at present, the Non-Proliferation Treaty is “increasingly in jeopardy”. The nuclear weapon states, he suggests, “are not observing their side of the bargain,” and stand accused of employing “double standards,” maintaining their own nuclear arsenals whilst denying nuclear weapons to others. According to Professor MccGwire, “the NPT is increasingly seen as part of a larger Western conspiracy” and is “failing the crucial test of being seen as “fair””.¹⁶⁹

126. The White Paper states that the Government is committed to nuclear non-proliferation and to the ultimate goal of nuclear disarmament. It cites a variety of ways in which the Government has sought to achieve these objectives. Some witnesses to our inquiry, however, have argued that the White Paper gives insufficient attention to the implications of the Government's decisions for non-proliferation efforts. Some argued that the Government's proposals may actually encourage nuclear proliferation and undermine the authority of the Non-Proliferation Treaty. Others have argued that whether the UK opts for or against retaining its nuclear deterrent, the decision will have a negligible impact on global proliferation.

127. The reductions in warhead numbers announced by the White Paper are significant disarmament measures, but, in themselves, they do not amount to a non-proliferation strategy. There is a need for a much stronger narrative on the forward commitment of the Government to achieve nuclear non-proliferation. The Government should not assume that current activities such as those mentioned in respect of the Norwegian 7 Country Initiative have a wide currency. The Government should explain how it will use its position at the Security Council, as the only nuclear weapon state with a single platform and 1% of the global arsenal, to give new momentum to what are widely

166 Ev 140

167 *Ibid.*

168 *Ibid.*

169 Ev 200

perceived as stalled non-proliferation treaty discussions. Without a stronger narrative, the UK's decision to retain and renew its nuclear deterrent might be seized upon by would-be proliferators to justify their own efforts to acquire nuclear weapons, though it remains the case that any non-nuclear state which is a signatory to the NPT is in clear breach of its undertakings if it seeks to acquire nuclear weapons.

7 Deterrent options and costs

Deterrent options

Table 7: The Government's assessment of deterrent options

Option	The White Paper's assessment
Air-based system equipped with cruise missiles	Vulnerable to pre-emptive attacks
	Increasing readiness would be visible and potentially escalatory in times of crisis
	Need to procure a new aircraft
	Need to procure a new missile
	Need to develop a new operating base
	The most costly option of all
Land (silo)-based system	Vulnerable to pre-emptive attack; immobile and impossible to conceal
	Need to acquire new land covering several hundred square kilometres – impractical in the UK
	Need for an expensive command and control system
	Costs are twice those of a submarine option
Ship-based system equipped with Trident ballistic missiles	Vulnerable to pre-emptive attack; easier to detect and track than a submarine
	Less capable than a submarine-based option
	Need to develop on-shore infrastructure
	Similar in cost to a submarine-based option
Submarine-based system equipped with Trident ballistic missiles	An SSBN is undetectable
	It is the most cost-effective platform
	It can be deployed covertly and have a deterrent effect anywhere in the world
	The UK already has a functioning submarine construction and support infrastructure
Submarine-based system equipped with cruise missiles	Need for a much greater number of submarine hulls, including SSNs
	Need to develop a new cruise missile
	Lack of range and greater vulnerability

The Government's proposals

128. In the White Paper, the Government states that “before arriving at decisions, we undertook a thorough review of the widest possible range of options to replace the Vanguard-class submarines”. It says that it “used a detailed assessment process to narrow the range of options under consideration”. The White Paper considers “four generic options”: a large aircraft equipped with cruise missiles; silo-based ballistic missiles; a surface ship equipped with Trident missiles; and, a submarine equipped with Trident missiles.¹⁷⁰

129. It rejects the large aircraft option “primarily because of vulnerability to pre-emptive attacks and because of the costs involved in procuring new large aircraft and the supporting refuelling tankers, providing new infrastructure, and designing and procuring a new cruise missile”. The White Paper says that an air-based option was “the most expensive and by some distance the least capable option”.¹⁷¹ It rejects a silo-based system on the grounds that it would be a credible deterrent “only against states with a limited nuclear capability” and because of “the significant additional costs compared to a submarine-based system capable of deterring all credible threats”. It concludes that a land-based option “presented some major practical difficulties, especially in terms of vulnerability” and it argued that “the through life costs were around twice those for a submarine option”.¹⁷² The White Paper rejects a ship-based system because it “would be less capable, more vulnerable and no less expensive than a submarine-based solution”.¹⁷³ It also rejects the option of a cruise missile delivery system on the grounds that developing a new missile “would cost far more than retaining the Trident D5 missile” and because “in capability terms, cruise missiles are much less effective than a ballistic missile”.¹⁷⁴

130. The White Paper concludes that “from a capability perspective...a submarine-based system offers the most practical and effective means of meeting our future nuclear deterrent requirements”. It stated that it was also the most cost-effective solution.¹⁷⁵ It concludes that “in terms of cost and capability, retaining the Trident D5 missile is by far the best approach”.¹⁷⁶

Response to the Government's choice of options

131. None of the witnesses to our inquiry was surprised the Government had decided to opt for a renewal of the submarine-based deterrent. Few of them considered the SSBN option was the wrong one. But, of course, a great many of them argued that the Government was wrong to renew the nuclear deterrent at all, and a few thought the Government's justification for its choice was inadequate.

170 Cm 6994, para B.1, p 34

171 Cm 6994, para B.8, p 35

172 Cm 6994, para B.12, p 37

173 Cm 6994, para 5.3, pp 24–25

174 Cm 6994, para 5.4, p 25

175 Cm 6994, para B.16, p 39

176 Cm 6994, para 5.4, p 25

132. Dr Jeremy Stocker, of the IISS, told us that the decision was “a no-brainer” and that it was “very difficult to fault the logic of the White Paper”.¹⁷⁷ He argued that “a pretty comprehensive study has been done, based on realistic assumptions and the conclusions are correct”.¹⁷⁸

133. RUSI witnesses too endorse the Government's decision. In written evidence to our inquiry, they state that “the fundamental principle for an effective deterrent is a survivable platform and weapon system which can deliver the desired effect and the place and time of choice, holding at risk anything which a potential adversary may value”. They conclude that “only a submarine-based system deployed in CASD cycle can deliver this guarantee” and that “none of the other options addressed in the White Paper would provide the requisite strategic capability, nor would they be more affordable”.¹⁷⁹ Professor John Baylis, of the University of Swansea, agrees and states that “surviving pre-emptive actions remains a critical part of contemporary deterrence and consequently there do not appear to be strong arguments to diverge from this formula”.¹⁸⁰

134. Some witnesses to our inquiry challenged aspects of the Government's assessment. Dr Andrew Dorman, of King's College London, argues that the White Paper fails to explore the possibility of having a submarine fleet equipped with nuclear-armed cruise missiles. He questions the Government's assumption that the UK would need to develop a new missile and sees no reason why the Tomahawk cruise missiles carried on the UK's SSN fleet could not be adapted to carry a nuclear warhead in place of their conventional warhead.¹⁸¹ Although he is supportive of the Government's assessment of the options, this omission is also noted by Jeremy Stocker. Submarine-launched cruise missiles, he suggests, would be “the most credible or attractive alternative” to the Trident force. However, on balance, he accepts the Government's argument that cruise missiles lack the range and invulnerability offered by Trident ballistic missiles.¹⁸²

135. In its memorandum of 1 February 2007, the MoD states that the White Paper “represented a high level summary of a great deal of work, much of which is necessarily highly classified”. On the issue of cruise missiles versus ballistic missiles, it argues that “in both cost and capability terms, retaining the Trident D5 missile is by far the best approach”. It suggests that “a much larger number of cruise missiles, compared to Trident D5 missiles, would be required to meet our minimum deterrence requirements”. And it says that “moving to a deterrent based on submarine-launched cruise missiles could well lead to a requirement for additional submarine hulls”.¹⁸³

136. Dr Dorman also criticises the Government's assessment of an air-based nuclear deterrent. He suggests that “the civilian airliner option makes a number of assumptions that seem designed to inflate the cost”. In particular, he asks

177 Q 199

178 *Ibid.*

179 Ev 114

180 Ev 126

181 Ev 182

182 Ev 110

183 Ev 122

why would a new air base need to be built?...why does the cruise missile have to be a new one?...why does the platform have to be a new civilian airliner?...why has the range requirement risen so sharply compared to the existing Trident force or its predecessors...[and] what compensatory savings would result from the Royal Navy shifting away from nuclear powered submarines?¹⁸⁴

With such questions unanswered, Dr Dorman concludes that “there is a good deal of smoke and mirrors in these options and their associated costings”.¹⁸⁵

137. The Secretary of State told us that only a submarine-based deterrent was sufficiently invulnerable to pre-emptive attack. He said that although many experts had long predicted that the oceans would become transparent, this has not come to pass. The White Paper states that

We have assessed carefully the potential for future developments in anti-submarine warfare to compromise [the submarine's] position. We believe it is unlikely there will be any radical technological breakthrough which might diminish materially the current advantages of a submarine over potential antisubmarine systems...we judge that a submarine will remain by far the least vulnerable of all the platform options considered.¹⁸⁶

Mr Browne told us that “none of our submarines have ever been detected” and that the threat of detection “has been identified for some time now and has not become a reality”. Given that all other options were far more vulnerable to pre-emptive attack, Mr Browne said the submarine “is still the best option”.¹⁸⁷

138. While many of our witnesses disagreed with the Government's decision to renew the nuclear deterrent, few challenged its choice of a submarine-based ballistic missile over other deterrent options. However, some have found the analysis of the options in the White Paper not to have explored fully the option of a nuclear-powered submarine carrying cruise missiles, noted as being the best alternative option. The Government should set out in more detail what were the comparative advantages of cost, range, operation and invulnerability associated with cruise and D5 missiles which led them to conclude in favour of the D5 missile. We believe the Government should offer further details of its assessment of deterrent options.

184 Ev 183

185 *Ibid.*

186 Cm 6994, para B.14, p.38

187 Q 357

Costs and funding

Table 8: The costs of renewing the deterrent

Cost item	The Government's cost estimate
Vanguard-class 5 year life extension	"hundreds of millions"
Overall procurement costs	£15-20 billion
Of which: submarines	£11-14 billion
Warhead refurbishment/replacement	£ 2-3 billion
Submarine infrastructure	£ 2-3 billion
In-Service costs (capital and running costs)	£1.5 billion a year
Decommissioning costs	
Nuclear submarines (both SSNs and SSBNs)	£837 million
Shore infrastructure	[unclear – MoD total nuclear liabilities accounted for at £9.75 billion]
Trident D5 missile life extension programme	£250 million
New missile	[unknown – Trident D5 cost £1.5 billion]

139. The costs of renewing the UK's strategic nuclear deterrent reflect the costs of: extending the life of the current Vanguard-class submarine; designing and manufacturing a replacement SSBN; participating in the US Trident D5 missile life extension programme; participating in a future Trident D5 replacement programme; and, refurbishing or replacing the UK's nuclear warheads. There will also be costs associated with the maintenance of onshore infrastructure and of decommissioning retired submarines and warheads as well as the personnel costs of operating the system and its supporting infrastructure.

140. The White Paper estimates that "once the new fleet of SSBNs comes into service, we expect that the in-service costs of the UK's nuclear deterrent, which will include AWE's costs, will be similar to today (around 5-6% of the defence budget)".¹⁸⁸ It also pledges that "the investment required to maintain our deterrent will not come at the expense of the conventional capabilities our armed forces need".¹⁸⁹

188 Cm 6994, para 5.14, p 27

189 *Ibid.*

The cost of extending the life of the Vanguard-class submarine

141. The White Paper does not offer any details on the projected cost of extending the life of the Vanguard-class submarine. It merely states that any attempt to extend the life beyond 30 years “would not...be cost effective”.¹⁹⁰

142. We asked the Secretary of State for Defence how much it would cost to conduct a five-year life extension of the Vanguard-class submarine. In response, Tom McKane, Director General Strategic Requirements at the MoD, told us that “detailed costings of that life extension will be generated as we get closer to the point where work actually has to be done on the boats”.¹⁹¹ However, he stated that “the work that we have done shows that we are probably talking in round terms of hundreds of millions for the five years for the four boats”. Mr McKane told us that with life extension beyond 30 years “you then start talking in terms of billions”.¹⁹²

Procurement costs

143. The White Paper states that the Government’s “initial estimate is that the procurement costs will be in the range of £15–20 billion (at 2006/07 prices) for a four-boat solution”. This is made up of “some £11–14 billion for the submarines; £2–3 billion for the possible future refurbishment or replacement of the warhead; and £2–3 billion for infrastructure over the life of the submarines”. It also states that the “comparable cost for the Trident system was some £14.5 billion at today’s prices,” which, the White Paper argues, is “also comparable to the procurement costs of major weapons systems such as Typhoon aircraft”.¹⁹³ The White Paper emphasises that these costs are estimates and that they “will need to be refined as work on the concept and assessment phases is taken forward with industry”. And it says that “more accurate cost estimates will be available by the time we come to place a contract for the detailed design of the submarines in the period 2012 to 2014”.¹⁹⁴

144. Some witnesses to our inquiry questioned the cost estimates put forward by the Government. Dr Jeremy Stocker, for example, says that while “the sums entailed are relatively trivial” in relation to overall public expenditure, “the cost of the new submarines seems very high”. He argues that the current fleet of Vanguard-class submarines cost “a little under £6 billion” at 2004/05 prices. The figure of £14.5 billion cited in the White Paper, he argues, was for the cost of the entire Trident programme, the missiles, warheads and the submarines together. This would appear to be in line with the 1998 Strategic Defence Review, which estimated “the total cost of acquiring the Trident system to be about £12.5 billion”.¹⁹⁵

190 Cm 6994, para 1.4, p 10

191 Q 323

192 Q 325

193 Cm 6994, para 5.11, p 26

194 *Ibid.*

195 Cm 3999, para 74, p 20

145. Dr Stocker suggests that the costs projected in the White Paper “may reflect experience with the Astute programme and the fact that with a smaller overall submarine force individual units cost more”. But he notes that “there is...a determination in the MoD not to underestimate costs as any later over-runs would be at the expense of the rest of the equipment programme”.¹⁹⁶

146. We asked the Secretary of State for Defence whether he could offer further clarification on the costs of procuring a new SSBN. Mr Browne told us that the cost estimates in the White Paper “are the best estimates we can give...these are honest assessments”. He accepted that as the costs become clearer “we will have an obligation...to keep Parliament and others informed about that development”.¹⁹⁷ But he maintained that “as a country, we have a very good track record of building these SSBNs and in fact the current class of submarines came in on time and under budget”.¹⁹⁸ Mr McKane noted that the estimates “have been done carefully to ensure that they do include a range...and that the range contains contingency”.¹⁹⁹

147. The White Paper states that “the investment required to maintain our deterrent will not come at the expense of the conventional capabilities our armed forces need”. It says that “decisions on the level of our investments in nuclear and conventional capability will be taken in the Comprehensive Spending Review, the results of which will be announced next year”.²⁰⁰ In evidence, the Secretary of State told us that “this investment will be maintained not at the expense of the conventional capabilities of our Armed Forces...I cannot give any clearer reassurance than that.”²⁰¹

148. We welcome the Government’s assurance that funding for the nuclear deterrent will not come at the expense of the conventional capabilities required by the UK’s Armed Forces. However, the Government has not said how it would guarantee this, when expenditure on the deterrent is included in the defence budget. We call on the Government to specify in more detail how it will fulfil this assurance. It is important that additional funding is provided not only for the initial procurement costs, but also with any additional costs of maintaining the system in-service.

In-service costs of the nuclear deterrent programme

149. The White Paper states that “once the new fleet of SSBNs comes into service, we expect that the in-service costs of the UK’s nuclear deterrent, which will include AWE’s costs, will be similar to today (around 5–6% of the defence budget)”.²⁰²

150. Some witnesses to our inquiry suggested that that these costs were higher than the UK’s current expenditure on the deterrent: they stated that the 1998 *Strategic Defence*

196 Ev 110

197 Q 331

198 Q 332

199 *Ibid.*

200 Cm 6994, para 5.15, p 27

201 Q 329

202 Cm 6994, para 5.14, p 27

Review envisaged the costs of the deterrent to be only around 3% of the defence budget. RUSI argues that the White Paper's reference to the future running costs of the nuclear deterrent "is in contrast to previous statements, which have detailed a running cost of between 2 and 4% since 1997".²⁰³

151. The SDR stated that

we estimate that the running cost of the Trident submarine force will average some £280M a year over its life time. The annual cost of our warhead and fissile material programme is some £400M a year. About one third is directly related to Trident, almost a third is related to costs arising from previous nuclear weapons and the remainder is infrastructure costs.²⁰⁴

The SDR said that "these are very substantial costs but need to be seen in perspective. The annual cost (including the continuing costs from earlier programmes) is little more than 3% of the defence budget. This is not a disproportionate investment in a capability of such vital importance to our national security".²⁰⁵

152. In its memorandum of 19 February 2007, the MoD states that "the annual expenditure on capital and running costs of the Trident nuclear deterrent, including the costs of the Atomic Weapons Establishment (AWE), is expected to be between 5 and 5.5 % of the defence budget". It says that this estimate "was based on the planned near cash defence budget of £28,700 million in 2006/7" and that actual "annual expenditure would be around £1,500 million".²⁰⁶

153. It is important that Parliament be aware of the full costs of retaining and renewing the UK's nuclear deterrent before it is asked to agree to the Government's proposals. These costs include not only the acquisition costs for a new fleet of SSBNs, but also the costs of life extension, the costs of the missile and warhead programmes, the projected infrastructure costs, and the personnel costs of operating and maintaining the deterrent. The Government says that the overall procurement and infrastructure costs are £15–20 billion and that the annual running costs will be £1.5 billion at 2006–07 prices.

154. The MoD proposes to embark on a life extension programme for the current Vanguard-class SSBNs, but has not offered a clear estimate of the costs involved in that programme. The MoD should make it clear when it will be in a position to give more accurate estimates and what work needs to be done to achieve this.

Costs of decision not to replace Trident submarines

155. The House of Commons should be aware that, even if it were to vote against retaining the deterrent, certain costs would be involved. These would include costs, such as onshore infrastructure, industrial costs, and regional assistance to the areas

203 Ev 116

204 Cm 3999, para 74, p 20

205 *Ibid.*

206 Ev 206

affected by industrial closures. The costs of investing in regions affected by any decision not to go ahead with renewal of the present deterrent should be estimated and included together with other costs so that those who argue there is an opportunity cost to other public expenditure can see what the full costs of such a negative decision are.

Decommissioning costs

156. We asked the MoD for an estimate of the likely decommissioning costs of the Vanguard-class SSBN in the event that a decision to abandon the nuclear deterrent was taken.

157. In its memorandum to us of 19 February, the MoD told us that “it is not possible to provide a precise estimate of the costs that would be incurred in decommissioning the four Vanguard-class submarines in [such] hypothetical circumstances”. However, it stated that

the MoD has made provision in its forward plans for the decommissioning of the Vanguard-class submarines, and other in-service submarines, when they reach the end of their planned operating lives. These plans, together with provision for the berthing and decommissioning of our of service submarines, are reflected in the £9,753,827,000 undiscounted nuclear liabilities, stated in the MOD Annual Report and Accounts for 2005–06 (HC 1394). £837 million is included for the decommissioning of submarines, up to and including Vanguard-class.²⁰⁷

158. In its response to our second-stage report on the future of the UK's nuclear deterrent, the MoD said that its “strategy for de-commissioning nuclear-powered submarines is currently under review in light of the revised project proposals for de-fuelling facilities and the 2006 report of the Committee on Radioactive Waste Management”.²⁰⁸ It also stated that “financial provision for the de-commissioning of past and current SSNs and SSBNs is included in the MoD Accounts” and “amounts to some £1.75 billion of undiscounted costs, including propulsion plant disposal”.²⁰⁹

159. The MoD's memorandum of 19 February 2007 describes the process by which submarines are decommissioned. It states that

under current arrangements, when nuclear powered submarines are withdrawn from service they are defuelled as soon as is practicable and stored afloat. A longer term solution to submarine dismantling and disposal with interim storage on land of the arising intermediate level radioactive waste is being sought. If the Vanguard-class submarines were to be withdrawn from service now, the main difficulty would be provision of suitable lay-up berths until they could enter the proposed submarine dismantling facility.²¹⁰

160. **The MoD states that it is not possible to provide precise estimates of the costs of decommissioning the Vanguard-class submarine. However, it says that £827 million is**

207 Ev 205

208 HC (2006–07) 304, para 18, p 8

209 *Ibid.*

210 Ev 205

included in the MoD annual accounts for the decommissioning of nuclear-powered submarines. Whether or not the UK decides to replace the Vanguard-class submarine with a new SSBN, the costs of decommissioning the Vanguard-class will still be incurred. This must be taken into account when considering the costs of retaining and renewing the nuclear deterrent. Equally, procurement of a new SSBN will, in time, mean that the MoD will incur ongoing decommissioning costs associated with the deterrent.

The cost of the Trident D5 life extension and replacement programmes

161. The White Paper states that the Government has “decided to participate in the Trident D5 life extension programme, at a cost of some £250 million”. It says that this “is very significantly less than it would cost to acquire an alternative delivery system”.²¹¹ It also states that the Government “will continue to participate in the joint UK/US support arrangements for the D5 missile at the facilities at King’s Bay, Georgia” which, it says, “represents excellent value for money”.²¹²

162. The Government says that the cost of UK participation in US plans to extend the life of the Trident D5 missile will be around £250 million. We call upon the Government to state whether any further expenditure will be needed to acquire the life-extended missiles over and above the initial buy-in costs to the life extension programme.

Industrial aspects

163. The White Paper considers the industrial aspects of the decision to procure a new generation of ballistic missile submarines. It argues that “designing and building new SSBNs, and integrating them with other elements of the overall system, will be a significant technical challenge for the Ministry of Defence and industry.” It states that the construction of these boats “represents in engineering terms, one of the most complex and technically demanding systems in existence” which requires a “specialist subset of skills within the maritime industry”.²¹³

164. The Government argues that “lessons have been learned” from the delays and cost overruns experiences in the Astute-class SSN programme. But it accepts that “more change is needed for industry to be able to deliver a new programme on time and at an acceptable cost”.²¹⁴ The White Paper states that “it would be our intention to build the new SSBNs in the UK”. This would be “for reasons of nation sovereignty, nuclear regulation, operational effectiveness and safety, and maintenance of key skills”. But it argues that “this is dependent on proposals from industry that provide the right capability at the right time and offer value for money”. It maintains that “progress towards industrial consolidation and a sustainable industrial base will be an important ingredient” and states that “final

211 Cm 6994, para 5.10, p 26

212 *Ibid.*

213 Cm 6994, para 6.1, p 28

214 Cm 6994, para 6.2, p 29

decisions will be taken in the lead up to the placing of a contract for the detailed design of the submarines”.²¹⁵

165. The White Paper anticipates “a much greater collaborative effort between the MoD and industry than has been the case in the recent past”.²¹⁶ And it says that “a key to successful procurement in the UK would be to work closely with industry right down the supply chain to put in place sustainable collaborative arrangements that run through the life of the platform”. According to the White Paper, “this is important for driving down the whole life costs of the programme”.²¹⁷

166. Our second report on the future of the UK's strategic nuclear deterrent examined the manufacturing and skills base issues that would need to be considered in any decision to renew the submarine-based deterrent. We noted that building and maintaining a new generation of nuclear submarine would require a uniquely skilled and specialist workforce, and a dedicated manufacturing and support infrastructure. And we recognised the difficulties involved in sustaining them and that continuity of work was needed in order to sustain the UK's capability to design, manufacture and maintain nuclear-powered submarines.²¹⁸

167. We argued that affordability had to be a fundamental consideration in any new submarine programme. And we stated that if the Government decided to procure a successor to the Vanguard-class boat, industry had to collaborate more effectively to drive down costs throughout the supply chain. We said that the MoD had to provide industry with clarity and consistency about the operational requirements and specification for a new submarine and that it was essential that lessons had been learned from the Astute-class programme. We noted that the MoD had to develop the capacity to manage a programme of the likely scale of a Vanguard successor and that any shortfalls in its preparedness had to be addressed as a matter of priority.

168. In its response to our report, the MoD states that “promoting greater industrial collaboration is a key priority for the MoD”. And it says that it is “looking to industry to deliver an indigenous industrial base that is affordable for the procurement of submarines and which sustains crucial capabilities”. It recognises that “proper attention should be given to through-life costs at the initial design stage for the new submarines” and states that “the bringing together of the Department's submarine acquisition and support teams from across the Defence Procurement Agency (DPA) and the Defence Logistics Organisation (DLO) under the Director General Nuclear in April 2006 has created a clearer focus on through-life support and costs”. The MoD also suggests that it has “learned a number of lessons from experience with the Astute programme” and it says that it “intends to agree prices for any future submarine orders at an earlier stage than has been possible on Astute hulls 2 and 3”.²¹⁹ The MoD also states that it is “clear that to execute a programme of this size and complexity it is essential that the necessary skills are available in-house and in

215 Cm 6994, para 6.3, p 29

216 Cm 6994, para 6.4, p 29

217 Cm 6994, para 6.5, p 29

218 HC (2006–07) 59

219 HC (2006–07) 304, para 19, p 8

industry”. Accordingly, the MoD says that it has “embarked on a major programme of work to address skills requirements and shortages”.²²⁰

169. The Government states that greater industrial collaboration and affordability are essential components in any new submarine programme and that it needs to address its own shortage of skills in managing a programme of the scale of a Vanguard successor. The MoD must ensure it has the skills necessary to delivery any future submarine programme to time and on budget. In the event of Parliament voting in support of the renewal of Trident, industry and the MoD must work together to drive down and control costs in order to deliver an affordable submarine programme.

Future decisions

Three or four submarines?

170. The White Paper refers to the possibility of reducing the number of ballistic missile submarines from four boats to three. It states that

We are not yet in a position to make a firm judgement about how many submarines we require in future because we do not yet understand comprehensively the likely operational availability of the replacement SSBNs. We will investigate fully whether there is scope to make sufficiently radical changes to the design of the new SSBNs, and their operating, manning, training and support arrangements, to enable us to maintain continuous deterrent patrols with a fleet of only three submarines. A final decision on the number of submarines that will be procured will be made when we know more about their detailed design.²²¹

171. RUSI witnesses suggest that this is “the critical question to address” as far as deterrent options are concerned.²²² Although they accept that operating continuous-at-sea deterrence with three boats may prove to be feasible, and that technological developments “may help improve submarine availability,” they warn that “a reduction to three submarines may not deliver proportionate cost savings while increasing the level of risk”. Four boats, by contrast, “provide sufficient redundancy in the system for something as critical as the national nuclear deterrent, should something unforeseen occur to one of the submarines”.²²³ RUSI witnesses also note that a decision to reduce the flotilla to three boats would also impact upon the UK’s requirement for SSNs to protect the deterrent, which “may increase arguments to reduce the number of SSNs further”.²²⁴

172. Dr Jeremy Stocker, meanwhile, accepts that relying on three, rather than four, boats to provide continuous-at-sea deterrence “would generate a modest cost-saving and also provide a further disarmament gesture”. However, he argues that “there must be some

220 HC (2006–07)304, para 24, p 10

221 Cm 6994, para 5.0, p 26

222 Ev 113

223 Ev 114

224 *Ibid.*

operational risk and a danger of undermining the whole credibility of the deterrent by repeated pruning at the margins".²²⁵

The submarine design

173. As noted above, the White Paper maintains that the design and manufacture of a new SSBN is likely to take around 17 years. It states that the Government has now "started to consider some of the fundamental design issues" for a replacement SSBN and has concluded that the new boat, like the Vanguard-class, will need to be nuclear-powered. It also states that "we envisage that the design of the new SSBN will maximise the degree of commonality with other in-service submarines where this can be done in a cost-effective manner". However, it notes that "some changes to the Vanguard-class will be required".²²⁶

174. Dr Stocker suggests, there would appear to be three broad design options for a Vanguard successor: "an updated Vanguard; a "stretched" Astute; or a wholly new design". But he argues that "the White Paper is a little vague on this". According to Dr Stocker, an updated Vanguard "would clearly not take that period of time". While maximising commonality of design with the Astute-class would be possible, Dr Stocker argues that "the Astute-class has the same PWR-2 reactor as the Vanguard which was designed in the late 1970s and early 1980s" and that "building another class with the same propulsion system would mean having a 1980s reactor design still in service in the 2050s".

175. It is probable that a new generation of SSBNs could be designed to deliver a higher level of reliability and availability, and it is possible that this could allow continuous at sea deterrence to be ensured with only three boats. But it is also possible that the cost-savings would be small, and outweighed by the increased risk. The Government should clarify when a decision will need to be made on the number of boats in the new SSBN fleet, and what is the likely level of savings from doing without a fourth boat.

A replacement missile

176. The Government says that the Trident D5 life extension programme, in which it has decided to participate, will ensure that the Trident D5 missile is maintained in service until the early 2040s. Beyond this date, it says a new missile is likely to be required.

177. The White Paper states that the costs of a D5 replacement would be incurred from the "from the 2030s". Whilst it suggests that "any estimate of cost would be highly speculative," it states that the equivalent cost for the Trident D5 missile was some £1.5 billion at today's prices".²²⁷

178. The White Paper states that the Government has received assurances from the United States that "in the event that they decide to develop a successor to the Trident D5 missile, the UK will have the option of participating in such a programme". It says that it has "also

225 Ev 111

226 Cm 6994, para 5.6, p 25

227 Cm 6994, para 5.11, p 26

received assurance that any successor to the D5 should be compatible, or can be made compatible, with the launch system to be installed in our new SSBNs”.²²⁸

179. The Government states that it is not yet possible to judge the potential costs of procuring a successor to the Trident D5 missile. Given that the Government intends to spend some £11-14 billion on new ballistic missile submarines, it is essential that any successor missile is fully compatible with the UK's future SSBN.

180. We note the exchange of letters between the Prime Minister and the US President, dated 7 December 2006—printed in Annex 2 to this report—to effect collaboration in the life extension programme for the Trident D5 missile delivery system. Given this exchange of letters took place three days after the publication of the White Paper and before debate in Parliament about the replacement of submarine platforms to carry such missiles beyond the life of the current Vanguard-class submarines, we look to the Government to explain the effects, financial and otherwise, of this exchange of letters agreeing the extension of this part of the Strategic Nuclear Deterrent system.

A future warhead

181. The White Paper states that “the current warhead design is likely to last into the 2020s, although we do not yet have sufficient information to judge precisely how long we can retain it in-service”. It says that “decisions on whether and how we may need to refurbish or replace this warhead are likely to be necessary in the next Parliament”. It states that the Government “will undertake a detailed review of the existing warhead stockpile and analyse the range of replacement options that might be available”. It suggests that “this will include a number of activities to be undertaken with the United States under the 1958 UK-US Agreement for Cooperation on the Uses of Atomic Energy for Mutual Defence Purposes”.²²⁹

182. The Government says that decisions on a new warhead will be required in the next Parliament. We call upon the Government to state whether the cooperation it envisages with the United States will include participation in the US Reliable Replacement Warhead Programme and why the UK could not re-manufacture warheads to the existing design.

Timeline for future decisions

183. On the basis of the statements in the White Paper and the evidence we received, below we suggest our understanding of the likely timeframe for future decisions.

228 Cm 6994, para 7.6, p 31

229 Cm 6994, para 7.4, pp 30–31

Table 9: Suggested timeline for future decisions

Date	Decision
2007	Decision in principle to preview new SSBNs and extend life of D5 missile
2007–2009	Initial concept and design work for a new submarine
c 2009–13 (“next Parliament”)	Decision on replacement of warhead
2009–2016	Detailed design work on new submarine
2012–14	Contract to be placed for detailed design of new submarine
2016	Contract to be placed for build of first new SSBN
2016–2023	Build programme for first new SSBN
2022	HMS Vanguard out of service (with 5 year life extension)
2024	HMS Victorious out of service (with 5 year life extension)
2024	First new SSBN in service
2026	HMS Vigilant out of service (with 5 year life extension) Second new SSBN in service
2029	HMS Vengeance out of service (with 5 year life extension) Third new SSBN in service
2020s	Decision on Trident D5 missile successor
2030–32	Fourth new SSBN (if required) in service
2030s	Development of new ballistic missile
early 2040s	Life-extended D5 missile out of service
2050s	New SSBNs out of service

184. It would be helpful if the Government could confirm whether the timetable we suggest is accurate or in what respects it is wrong.

185. If the White Paper's proposals to retain and renew the UK's strategic nuclear deterrent are endorsed, it is essential that the Government keep Parliament informed of the progress of the submarine, missile and warhead programmes. We expect Parliament to be consulted at each significant stage of the programmes before major procurement decisions are made.

Conclusion

186. The Government deserves to be commended for exposing its proposal to renew the strategic nuclear deterrent to public debate and decision in Parliament, which previous Governments have not done. We look to the Government to inform the House of Commons of any errors of fact or interpretation in this report, before the debate in March. And we hope that the Government, and the MoD in particular, will learn for the future that greater transparency is to its own, as well as to the public, advantage.

Conclusions and recommendations

1. Our intention is to encourage and inform the public debate on the future of the nuclear deterrent by exploring the key issues and questions which should be addressed in that debate. We do not express a view on the merits of retaining and renewing the UK's nuclear deterrent. Endorsing or rejecting the Government's proposals will be for the House of Commons, as a whole, to decide. (Paragraph 3)
2. Decisions on the future of the UK's nuclear deterrent should be taken on the strategic needs of the country, not on industrial factors. However, whilst industrial considerations should not affect the substance of decisions, they will necessarily affect the timing of those decisions. It is not unreasonable for the Government to take these factors into account. (Paragraph 26)
3. One key difference between the US and UK submarine deterrent programmes is that the UK seeks to operate a continuous-at-sea deterrent with just four boats whereas the United States is "generating two or three hulls from 14". (Paragraph 40)
4. The White Paper states that decisions are required now on the future of the UK's strategic nuclear deterrent. It says that the life of the current deterrent platform, the Vanguard-class ballistic missile submarine, was designed for a service life of 25 years, which could be extended to 30 years with a life extension programme, albeit not without some risk. It maintains that procurement of a new submarine will take around 17 years. On this basis decisions are required in 2007. Some witnesses to our inquiry challenged the Government's timetable. On life extension, the evidence we received from critics suggested the Vanguard-class, like the US Ohio-class Trident submarine, could be maintained in service for up to 45 years. The Government has told us that to plan for life extension beyond 30 years would be unwise, given the 25 year design life of the Vanguard-class, the operational demands placed upon it in order to maintain continuous deterrent patrols, the experience of the declining reliability and availability of previous submarines beyond the 25-year point, and the design and construction differences between the Vanguard and the Ohio-class submarines. (Paragraph 43)
5. A procurement timetable of 17 years is three years longer than for the existing Vanguard-class submarine. The Government says that the additional time is required because of changes in the capacity of the UK's submarine industrial base and because initial concept and development work on the Vanguard-class was already underway when the Government of the day announced its decision to acquire the Trident system. The Government says that no such work has yet begun on a Vanguard successor and that Parliament is being consulted at a much earlier stage than on previous occasions. (Paragraph 44)
6. The challenge to the Government's estimate of 17 years is partly based on the suggestion that work has started on "concept options for platforms", whereas the government timetable commences with the "detailed concept work". We take it that these two things are different and accept that the 14-year period which we commented on in our previous inquiry commenced from a more advanced stage in

the procurement cycle (years rather than months away) after a period of detailed concept work had been carried out. (Paragraph 45)

7. Neither the White Paper nor the exchange of letters between the Prime Minister and the US President in December 2006 explain adequately why decisions on UK participation in the Trident D5 missile life extension are required by 2007. The Government should clarify why decisions on the missile are required now. (Paragraph 50)
8. The White Paper does not propose any fundamental change to the UK's nuclear weapons policy. (Paragraph 52)
9. The UK's nuclear arsenal is small in comparison to that of other established nuclear powers. The UK has made very significant reductions in the scale of its nuclear arsenal since the end of the Cold War. (Paragraph 56)
10. We welcome the reduction in warhead numbers announced in the White Paper and recognise that this follows the significant reductions previously announced in the 1998 Strategic Defence Review. We welcome this arms reduction measure, but it is unclear whether this has significance as a non-proliferation measure. Since the White Paper proposes no changes to the number of warheads deployed on UK submarines, it is unclear that this reduction has any operational significance. (Paragraph 63)
11. The White Paper states that the UK is committed to maintaining a "minimum" nuclear deterrent. The Secretary of State told us that the Government had conducted a very hard analysis of the nuclear capabilities required by the UK with a view to ensuring that they were at a minimum necessary level, but we are uncertain how the Government determines what constitutes a "minimum" deterrent. The Government should say how it calculates the scale of a minimum deterrent. (Paragraph 64)
12. The White Paper states that the concept of deterrence has not changed since the end of the Cold War and it outlines the underlying principles which shape the UK's current approach to nuclear deterrence. Some witnesses to our inquiry questioned the continuing relevance of nuclear deterrence while others argued that it remained as relevant as it ever was during the Cold War. The Government should do more to explain what the concept of deterrence means in today's strategic environment. (Paragraph 74)
13. The Government has stated that the UK will use its nuclear weapons only in "self-defence", in "extreme circumstances", and in defence of the UK's "vital interests", but has not defined these terms. It argues that it is important to maintain ambiguity about the exact circumstances in which the UK might use its nuclear weapons. Although we understand the need for ambiguity, the Government should be clearer that this ambiguity does not lead to a lowering of the nuclear threshold. (Paragraph 81)
14. The Government says it no longer uses the term "sub-strategic" in discussing the UK's nuclear weapons. However, the White Paper refers to varying the yield of the UK's nuclear warheads. We call upon the Government to clarify how a reduced yield differs from a sub-strategic role. The Government should also state why a sub-

strategic role was thought necessary in 1998 but is no longer necessary now. (Paragraph 87)

15. The Government states that the UK's nuclear deterrent will continue to be assigned to NATO. NATO nuclear doctrine, however, explicitly involves a policy of not ruling out first use of nuclear weapons and a policy of sub-strategic deterrence. We call upon the Government to clarify, in time for the debate and vote in the House of Commons, how the UK's nuclear forces are integrated into the nuclear defence of NATO and what the implications of the Alliance's first use and sub-strategic policies are for the UK's nuclear deterrent. (Paragraph 90)
16. The Government acknowledges that there is no current nuclear threat to the UK but argues that nuclear weapons are needed as an insurance policy against an uncertain future. Some of our witnesses pointed to nuclear proliferation and noted that nuclear aggression could only be deterred by the possibility of nuclear retaliation. Others—including some who accepted the need for the deterrent—felt that the Government's analysis of the threat was vague, flawed and otherwise lacked logic, and many particularly expressed scepticism about the efficacy of the deterrent in countering state-sponsored terrorism. (Paragraph 100)
17. The Government states that the retention and renewal of the UK's nuclear deterrent is fully consistent with its international legal obligations. Some witnesses to our inquiry challenged the Government's position and suggested that the proposals in the White Paper may constitute a breach of the Nuclear Non-Proliferation Treaty and may be illegal under the UN Charter and international humanitarian law. The Government rejects this suggestion. None of the witnesses to our inquiry, however, believed that a decision to replace the Vanguard-class submarines would, in itself, be illegal, though some argued that the long-term retention of a nuclear capability, including the decision to extend the life of the Trident D5 missile, was inconsistent with the UK's obligations to pursue negotiations in good faith to achieve nuclear disarmament. (Paragraph 114)
18. Witnesses to our inquiry accepted that, ultimately, decisions on the future of the future of the UK's nuclear deterrent were political and that, in the absence of consensus, legal concerns were unlikely to be decisive. (Paragraph 115)
19. The White Paper states that the Government is committed to nuclear non-proliferation and to the ultimate goal of nuclear disarmament. It cites a variety of ways in which the Government has sought to achieve these objectives. Some witnesses to our inquiry, however, have argued that the White Paper gives insufficient attention to the implications of the Government's decisions for non-proliferation efforts. Some argued that the Government's proposals may actually encourage nuclear proliferation and undermine the authority of the Non-Proliferation Treaty. Others have argued that whether the UK opts for or against retaining its nuclear deterrent, the decision will have a negligible impact on global proliferation. (Paragraph 126)
20. The reductions in warhead numbers announced by the White Paper are significant disarmament measures, but, in themselves, they do not amount to a non-

proliferation strategy. There is a need for a much stronger narrative on the forward commitment of the Government to achieve nuclear non-proliferation. The Government should not assume that current activities such as those mentioned in respect of the Norwegian 7 Country Initiative have a wide currency. The Government should explain how it will use its position at the Security Council, as the only nuclear weapon state with a single platform and 1% of the global arsenal, to give new momentum to what are widely perceived as stalled non-proliferation treaty discussions. Without a stronger narrative, the UK's decision to retain and renew its nuclear deterrent might be seized upon by would-be proliferators to justify their own efforts to acquire nuclear weapons, though it remains the case that any non-nuclear state which is a signatory to the NPT is in clear breach of its undertakings if it seeks to acquire nuclear weapons. (Paragraph 127)

21. None of the witnesses to our inquiry was surprised the Government had decided to opt for a renewal of the submarine-based deterrent. Few of them considered the SSBN option was the wrong one. But, of course, a great many of them argued that the Government was wrong to renew the nuclear deterrent at all, and a few thought the Government's justification for its choice was inadequate. (Paragraph 131)
22. While many of our witnesses disagreed with the Government's decision to renew the nuclear deterrent, few challenged its choice of a submarine-based ballistic missile over other deterrent options. However, some have found the analysis of the options in the White Paper not to have explored fully the option of a nuclear-powered submarine carrying cruise missiles, noted as being the best alternative option. The Government should set out in more detail what were the comparative advantages of cost, range, operation and invulnerability associated with cruise and D5 missiles which led them to conclude in favour of the D5 missile. We believe the Government should offer further details of its assessment of deterrent options. (Paragraph 138)
23. We welcome the Government's assurance that funding for the nuclear deterrent will not come at the expense of the conventional capabilities required by the UK's Armed Forces. However, the Government has not said how it would guarantee this, when expenditure on the deterrent is included in the defence budget. We call on the Government to specify in more detail how it will fulfil this assurance. It is important that additional funding is provided not only for the initial procurement costs, but also with any additional costs of maintaining the system in-service. (Paragraph 148)
24. It is important that Parliament be aware of the full costs of retaining and renewing the UK's nuclear deterrent before it is asked to agree to the Government's proposals. These costs include not only the acquisition costs for a new fleet of SSBNs, but also the costs of life extension, the costs of the missile and warhead programmes, the projected infrastructure costs, and the personnel costs of operating and maintaining the deterrent. The Government says that the overall procurement and infrastructure costs are £15–20 billion and that the annual running costs will be £1.5 billion at 2006–07 prices. (Paragraph 153)
25. The MoD proposes to embark on a life extension programme for the current Vanguard-class SSBNs, but has not offered a clear estimate of the costs involved in that programme. The MoD should make it clear when it will be in a position to give

more accurate estimates and what work needs to be done to achieve this. (Paragraph 154)

26. The House of Commons should be aware that, even if it were to vote against retaining the deterrent, certain costs would be involved. These would include costs, such as onshore infrastructure, industrial costs, and regional assistance to the areas affected by industrial closures. The costs of investing in regions affected by any decision not to go ahead with renewal of the present deterrent should be estimated and included together with other costs so that those who argue there is an opportunity cost to other public expenditure can see what the full costs of such a negative decision are. (Paragraph 155)
27. The MoD states that it is not possible to provide precise estimates of the costs of decommissioning the Vanguard-class submarine. However, it says that £827 million is included in the MoD annual accounts for the decommissioning of nuclear-powered submarines. Whether or not the UK decides to replace the Vanguard-class submarine with a new SSBN, the costs of decommissioning the Vanguard-class will still be incurred. This must be taken into account when considering the costs of retaining and renewing the nuclear deterrent. Equally, procurement of a new SSBN will, in time, mean that the MoD will incur ongoing decommissioning costs associated with the deterrent. (Paragraph 160)
28. The Government says that the cost of UK participation in US plans to extend the life of the Trident D5 missile will be around £250 million. We call upon the Government to state whether any further expenditure will be needed to acquire the life-extended missiles over and above the initial buy-in costs to the life extension programme. (Paragraph 162)
29. The Government states that greater industrial collaboration and affordability are essential components in any new submarine programme and that it needs to address its own shortage of skills in managing a programme of the scale of a Vanguard successor. The MoD must ensure it has the skills necessary to delivery any future submarine programme to time and on budget. In the event of Parliament voting in support of the renewal of Trident, industry and the MoD must work together to drive down and control costs in order to deliver an affordable submarine programme. (Paragraph 169)
30. It is probable that a new generation of SSBNs could be designed to deliver a higher level of reliability and availability, and it is possible that this could allow continuous at sea deterrence to be ensured with only three boats. But it is also possible that the cost-savings would be small, and outweighed by the increased risk. The Government should clarify when a decision will need to be made on the number of boats in the new SSBN fleet, and what is the likely level of savings from doing without a fourth boat. (Paragraph 175)
31. The Government states that it is not yet possible to judge the potential costs of procuring a successor to the Trident D5 missile. Given that the Government intends to spend some £11-14 billion on new ballistic missile submarines, it is essential that any successor missile is fully compatible with the UK's future SSBN. (Paragraph 179)

32. We note the exchange of letters between the Prime Minister and the US President, dated 7 December 2006—printed in Annex 2 to this report—to effect collaboration in the life extension programme for the Trident D5 missile delivery system. Given this exchange of letters took place three days after the publication of the White Paper and before debate in Parliament about the replacement of submarine platforms to carry such missiles beyond the life of the current Vanguard-class submarines, we look to the Government to explain the effects, financial and otherwise, of this exchange of letters agreeing the extension of this part of the Strategic Nuclear Deterrent system. (Paragraph 180)
33. The Government says that decisions on a new warhead will be required in the next Parliament. We call upon the Government to state whether the cooperation it envisages with the United States will include participation in the US Reliable Replacement Warhead Programme and why the UK could not re-manufacture warheads to the existing design. (Paragraph 182)
34. It would be helpful if the Government could confirm whether the timetable we suggest is accurate or in what respects it is wrong. (Paragraph 184)
35. If the White Paper's proposals to retain and renew the UK's strategic nuclear deterrent are endorsed, it is essential that the Government keep Parliament informed of the progress of the submarine, missile and warhead programmes. We expect Parliament to be consulted at each significant stage of the programmes before major procurement decisions are made. (Paragraph 185)
36. The Government deserves to be commended for exposing its proposal to renew the strategic nuclear deterrent to public debate and decision in Parliament, which previous Governments have not done. We look to the Government to inform the House of Commons of any errors of fact or interpretation in this report, before the debate in March. And we hope that the Government, and the MoD in particular, will learn for the future that greater transparency is to its own, as well as to the public, advantage. (Paragraph 186)

List of Abbreviations

AWE	Atomic Weapons Establishment, Aldermaston, Berkshire
BASIC	British American Security Information Council
CASD	Continuous-at-Sea Deterrent cycle
CND	Campaign for Nuclear Disarmament
DML	Devonport Management Ltd
HMS	Her Majesty's Ship
ICJ	International Court of Justice
IISS	International Institute of Strategic Studies
MoD	Ministry of Defence
NATO	North Atlantic Treaty Organisation
NPT	Non-Proliferation Treaty
QC	Queen's Counsel
RUSI	Royal United Services Institute
SDR	Strategic Defence Review
SLBM	Submarine-Launched Ballistic Missile
SLEP	Service Life Extension Programme
SSN	Sub-Surface Nuclear (Nuclear-powered, conventionally-armed attack submarine)
SSBN	Sub-Surface Ballistic Nuclear (Nuclear-powered, ballistic missile submarine)
VSEL	Vickers Shipbuilding and Engineering Ltd

Annex 1: Conclusions of the Committee's earlier Reports on the Future of the UK's Strategic Nuclear Deterrent

Summary to the Eighth Report of Session 2005–06: The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context

Decisions on the future of the UK's strategic nuclear deterrent are likely to be required during the course of the current Parliament. The Government has promised a free and open debate on the issue before any decisions are taken. To date, it has offered no explanation of the nature of the decisions that are required. Nor has it sought to clarify the timetable within which those decisions would need to be taken and implemented. This report seeks to encourage and inform the public debate by examining the strategic context and timetable for decision-making.

Decisions on the future of the nuclear deterrent will be taken, for the first time, outside the international political and military context of the Cold War. The ending of that conflict transformed our security environment and changed our security needs.

The UK will need to examine whether nuclear deterrence remains relevant in the current strategic environment. We must take into account the nature of the threats currently facing our country and examine how those threats could evolve over the lifetime of any potential Trident successor. And we must consider whether, and in what ways, retention of a strategic nuclear deterrent capability might assist the UK in addressing those threats.

Before any decisions on the future of that deterrent are made, it will be important to address the extent to which the possession of nuclear weapons enhances the UK's international influence and status and whether such a reason adds significantly to the justification for retention of a strategic nuclear capability.

It will also be essential to decide what level of dependence upon the United States the UK is willing to accept in any possible Trident successor. We must consider the potential policy implications of any technical dependencies upon the US and the differing concepts of independence adopted by the UK and France.

We welcome the Government's promise of a full and open debate in Parliament, and in the country at large, on the future of the UK's strategic nuclear deterrent. But the Ministry of Defence has refused to participate in our inquiry. We are surprised and disappointed by this refusal.

A genuine and meaningful debate is only possible with the active participation of the Ministry of Defence (MoD). The public should know what decisions will be required, when they must be taken and implemented, and what factors are driving consideration of the issue now. We call upon the MoD to engage fully in our forthcoming inquiries into the future of the UK's strategic nuclear deterrent. We hope the MoD will make a substantive response to this report and that it will address openly the issues we have raised.

Conclusions and recommendations to the Eighth Report of Session 2005–06: The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context

1. We welcome the Government's promise of a full and open debate in Parliament, and in the country at large, on the future of the UK's strategic nuclear deterrent. We are surprised and disappointed that the Ministry of Defence has refused to participate in our inquiry. We believe that a genuine and meaningful debate is only possible with the active participation of the MoD. We call upon the MoD to engage fully in our forthcoming inquiries into the future of the UK's strategic nuclear deterrent. We hope the MoD will make a substantive response to this report and that it will address openly the issues we have raised. (Paragraph 12)
2. The UK's strategic nuclear arsenal is small in comparison with the other established nuclear powers. (Paragraph 45)
3. In considering the future of the strategic nuclear deterrent, the UK will need to examine whether the concept of nuclear deterrence remains useful in the current strategic environment and in the context of the existing and emerging threats to the security of the country. We will have to consider whether those states and non-state actors posing such threats can, in reality, be deterred from instigating acts of aggression by either existing or new approaches to nuclear deterrence. We will also have to consider how the UK's nuclear capability should be adjusted to meet new strategic realities. Trident was developed during the final decade of the Cold War, and was designed to counter the threat posed by the size and technical capabilities of the Soviet strategic nuclear arsenal: we need to consider whether the form of the UK's current nuclear deterrent is best suited to today's and tomorrow's strategic challenges. (Paragraph 55)
4. We believe that it is essential that, before making any decisions on the future of the strategic nuclear deterrent, the MoD should explain its understanding of the purpose and continuing relevance of nuclear deterrence now and over the lifetime of any potential Trident successor system. (Paragraph 56)
5. Before any decisions on the future of the deterrent are made, it will be important to consider whether the possession of nuclear weapons enhances the UK's international influence and status and whether this contributes to the justification for retention of a strategic nuclear capability. (Paragraph 57)
6. It is clear that there is a difference of views and no clear consensus that international influence is, of itself, a reason to retain the strategic nuclear deterrent. We recommend that the MoD make clear whether the Government believes the possession of a nuclear deterrent is an important contributor to the UK's international influence. (Paragraph 65)
7. The public debate over the future of the UK's strategic nuclear deterrent should address:
 - the independence of the UK's current system; and

- the operational and diplomatic impact of any potential dependency on the United States of any future UK nuclear deterrent. (Paragraph 66)
8. It is important to distinguish between two different types of independence: independence of acquisition and independence of operation. We heard that independence of acquisition is what the French have opted for at a significantly higher cost to the defence budget. Independence of operation is an alternative concept of independence and it is this which the UK has opted for at a lower price. (Paragraph 80)
 9. We call upon the MoD to clarify the technical dependencies of the UK's Trident system upon the United States and to respond to the argument that the UK's nuclear deterrent is not truly independent. In weighing the importance of maintaining independence, attention needs to be paid to the differing concepts of independence adopted by the UK and France. (Paragraph 84)
 10. The public debate about the future of the UK's strategic nuclear deterrent must take into account:
 - the nature of the threats facing the UK;
 - how those threats could evolve over the lifetime of any potential Trident successor system; and
 - in what ways retention of a strategic nuclear deterrent might assist the UK in addressing those threats. (Paragraph 85)
 11. The most pressing threat currently facing the UK is that of international terrorism. Witnesses to our inquiry overwhelmingly argued that the strategic nuclear deterrent could serve no useful or practical purpose in countering this kind of threat. (Paragraph 88)
 12. Witnesses to our inquiry did not believe that the UK currently faced a direct or impending military threat from any of the established nuclear weapons states, including Russia, China, India, Pakistan, Israel, North Korea, or, of course, from France or the United States. (Paragraph 95)
 13. There are difficulties inherent in anticipating future threats to the security of the UK. It is not possible to predict accurately the nature of the future strategic international environment and to identify with any certainty the threats the UK is likely to face. (Paragraph 96)
 14. We call upon the MoD to consider publicly the threats the UK faces today and how those threats may evolve in the future. Such a threat assessment will shape any decision on the future of the UK's strategic nuclear deterrent. We accept that future threats are unknowable, but, clearly, a world in which nuclear proliferation had taken hold would create deep uncertainties in international relations. For this reason, the UK may wish to retain a strategic nuclear capability as a guard against the unknown. If the MoD believes in the value of the nuclear deterrent as an insurance policy, rather than in response to any specific threat, we believe it is important to say clearly that is the reason for needing the deterrent. (Paragraph 103)

15. The Government has stated that decisions on the future of the UK's strategic nuclear deterrent will be required during the course of the current Parliament. To date, it has offered no explanation of the nature of those decisions. If there is to be a meaningful debate on the future of the UK's strategic nuclear deterrent, the public should know what decisions will be required, when they must be taken and implemented, and what factors are driving consideration of the issue now. (Paragraph 104)
16. A fundamental political decision needs to be made on whether or not the UK should retain a strategic nuclear deterrent. There is no clear point at which this decision has to be made and there is a risk that – by taking a series of decisions to keep options open – we could find that we have in practice taken the decision to keep the deterrent. Conversely, if we do not keep those options open, we could find we are left without a deterrent. In our view, the UK should make a clear decision on whether to retain the strategic nuclear deterrent. It is important that a decision of this magnitude is not taken by default. It should be made only after a full public debate. It must not be made by the Government in secret. (Paragraph 106)
17. A service life extension programme would allow the UK to postpone decisions on whether to replace Trident until around 2010, on the basis that a service life extension programme would add an additional five years to the existing system and that procurement of a Trident replacement would take approximately 14 years. By this time, it is possible that the strategic environment might be clearer. But it is likely to be an expensive process. Such an expensive option should not be used only as a means of deferring a decision on the future of the UK's strategic nuclear deterrent. (Paragraph 110)
18. It is important that the Government continue to invest in the UK infrastructure and skills base until a decision on whether to retain or abolish the nuclear deterrent is made. Unless this investment is forthcoming, the Government is likely to find that its options will be constrained and that certain choices for the future of the UK's nuclear deterrent will no longer be available. (Paragraph 115)
19. Given the new investment at Aldermaston, and the widespread expectation that a new warhead will not be required until well into the 2020s, the timelines for manufacturing a replacement warhead is not a key driver of the current debate. (Paragraph 121)
20. Since the Trident II D5 missile will be in service in the United States until 2042, this component of the system is not a key driver of the current debate. (Paragraph 124)
21. The platform is generally regarded as the crucial factor driving the current debate on the future of the UK's strategic nuclear deterrent. (Paragraph 126)
22. If the MoD believes that the UK should retain the Continuous-at-Sea Deterrent cycle, it must either extend the life of the Vanguard-class submarine or procure a new platform to be in service by 2020. In the light of the reduced threat we currently face, an alternative possibility would be to retain a deterrent, but not continuously at sea. (Paragraph 130)

23. We believe that the maintenance of onshore infrastructure and the domestic UK skills base is an issue of paramount importance in considering the future of the UK's nuclear deterrent. We have decided that this will be the focus of the next in our series of inquiries into the future of the strategic nuclear deterrent. In that inquiry we will also address the linkage between the Government's Defence Industrial Strategy and the decision on retention, replacement, or abolition of the UK's Trident system. (Paragraph 138)

Summary to the Fourth Report of Session 2006–07: The Future of the UK's Strategic Nuclear Deterrent: the Manufacturing and Skills Base

In its White Paper on the future of the UK's nuclear deterrent, the Government recommends the retention and renewal of the submarine-based Trident weapons system. This will require the procurement of a new generation of nuclear-powered Trident submarines to replace the existing, but ageing, fleet of Vanguard-class SSBNs.

This report does not assess the White Paper. That will be the focus of our next inquiry. In this report, we highlight the manufacturing and skills base issues which will need to be addressed if a decision is made to renew the submarine-based deterrent. The Government should respond to this report before the debate on the White Paper in March.

Building and maintaining a new generation of nuclear submarines will require a uniquely skilled and specialised workforce, and a dedicated manufacturing and support infrastructure. These already exist within the UK. But maintaining them is a key challenge. Once lost, the skills base may prove impossible or prohibitively expensive to recreate. Continuity of work on new boats is needed in order to sustain the UK's capability to design, manufacture and maintain nuclear-powered submarines.

Even if the Government's proposal to procure a replacement for the Vanguard-class submarine is rejected, the UK will need to maintain infrastructure and a skilled workforce to support the Royal Navy's conventionally-armed nuclear submarines and to carry out the decommissioning of nuclear submarines and nuclear warheads.

Affordability must be a fundamental consideration in any new submarine programme. If the UK goes ahead with procuring a successor to the Vanguard-class submarine, industry must collaborate more effectively to drive down costs. This will be important at all levels in the supply chain.

In turn, the Ministry of Defence must provide industry with clarity and consistency about operational requirements and specifications. It is vital that lessons are drawn from the problems experienced with the Astute-class programme.

Developing a Vanguard successor would be a huge undertaking. The Ministry of Defence will need the capacity to manage such a programme effectively. Any shortfalls in its preparedness must be addressed as a matter of priority.

Sustaining the skills base at the Atomic Weapons Establishment will also be important if the UK decides to retain its nuclear deterrent. The current investment in skills and infrastructure is understandable and justifiable. But the level of that investment, in advance of decisions in principle on the future of the deterrent, is a source of concern and the

Government should clarify to what extent this is a result of the requirements of the regulator. Large-scale investment should follow, and not precede, policy decisions of such paramount importance to the nation.

Conclusions and recommendations to the Fourth Report of Session 2006–07: The Future of the UK's Strategic Nuclear Deterrent: the Manufacturing and Skills Base

1. This report does not seek to assess the findings and conclusions of the Government's White Paper. That will be the focus of our next inquiry. (Paragraph 6)
2. Any decisions on the future of the UK's deterrent should be taken on the strategic defence needs of the country. Our intention in making this report is to ensure that the House of Commons, and the public, are aware of the manufacturing and skills base issues which will need to be addressed if a decision is made to renew the submarine-based deterrent. We recommend that the Government respond to this report in good time for publication before the debate in the House of Commons on the White Paper in March 2007. (Paragraph 7)
3. The Ministry of Defence believes that the UK should retain onshore a sovereign capability in the design, construction, operation, maintenance and decommissioning of nuclear-powered submarines. It is important that the public understand clearly the reasons for this. We call upon the MoD to provide, in its response to this report, a fuller explanation of the need for this sovereign capability. (Paragraph 31)
4. Witnesses to our inquiry maintain that the UK's current manufacturing and skills base is already at the minimum level necessary to sustain a viable onshore submarine industry. (Paragraph 39)
5. Witnesses to our inquiry agreed that the complexity and uniqueness of a nuclear submarine, and of the environment in which it operated, called for special skills, facilities and oversight not supported by any other shipbuilding programme. (Paragraph 42)
6. We share our witnesses' concern about the shortage of science and engineering graduates, project managers and skilled and experienced technical staff, but this raises questions which go far beyond the scope of this report. (Paragraph 45)
7. The UK submarine industry draws on a uniquely skilled and specialist workforce. Retaining that skills base will be essential if the UK decides it wants to continue to design, build and maintain nuclear-powered submarines. The skills base is now at a critical level. Any further erosion of the workforce may have significant implications for the future of the submarine programme. Sustaining skills in this sector is only possible with regular and continuous submarine work. (Paragraph 46)
8. Even if the decision is taken not to procure a Vanguard successor, a specialist skills base will have to be retained in order to build SSNs and maintain and finally decommission the UK's existing fleet of nuclear-powered submarines. Some indication of the order of costs would be helpful in considering arguments about

affordability and we ask that the MoD provide some information about this in their response to this report. (Paragraph 47)

9. The submarine construction supply chain is fragile and is particularly susceptible to gaps in the programme. Extended gaps are likely to result in an erosion of the UK's submarine manufacturing and skills base. There is also a risk that single source suppliers will abandon the supply chain in pursuit of more regular and assured work. If the UK intends to build a successor to the Vanguard-class, or maintain an SSN capability beyond the current Astute order book, the supply chain will have to be sustained. To achieve this, the MoD must give clear direction and certainty about the future submarine programme in order to encourage industry to invest. We call upon the MoD to provide, in its response to this report, an assessment of whether, how and at what cost the submarine supply chain could be maintained for the construction of future SSNs in the absence of a positive decision on a Vanguard successor. (Paragraph 54)
10. Without a new SSBN it is possible that there would be insufficient demand for nuclear submarines to sustain the industry. It is important to recognise that there is an interrelationship between SSN and SSBN construction. (Paragraph 61)
11. It is clear that the gap between the Vanguard and Astute submarine programmes had a serious and debilitating impact on the UK's submarine industry and put at risk the future of the UK's submarine fleet. If the Government wants the UK to continue to design and build nuclear-powered submarines, it will be essential to maintain a regular rhythm of submarine construction. Reducing the frequency of construction below 22 months would be risky. Without a regular build "drumbeat", the UK skills base will erode and it may prove impossible or prohibitively expensive to recreate. (Paragraph 64)
12. It is important that the MoD and industry agree promptly on a price for future Astute-class orders. Clarity and certainty about the future submarine programme is necessary if industry is to continue to invest in the manufacturing skills base. The MoD must also demonstrate that it has learned the lessons from the Astute programme, and implemented a much tighter contractual relationship with BAE Systems, before it commits expenditure to a new SSBN build programme. (Paragraph 65)
13. The Government will need to consider carefully whether the potential long-term benefits of designing a completely new submarine, in which through-life affordability is built in from the start, could outweigh the cost-benefits of maximising commonality of design with existing submarines. And it will need to judge whether efforts to maximise commonality with existing submarines would be enough to sustain the specialist submarine design base in the UK. (Paragraph 67)
14. Using a well-tried reactor in the new submarines would minimise design-related risk, but in the longer term there might be benefit in both safety and design costs in investing in a new generation of reactor technology. (Paragraph 68)
15. We recommend that the MoD make clear in its response to this report the timetable for the procurement of the new submarines it proposes. This should indicate by

when it will need to decide whether to opt for radical redesign or commonality of design for the submarine platform and for the nuclear reactor, and when it will need to decide between a three- or four-boat package. (Paragraph 69)

16. A decision to abandon the construction of nuclear submarines would have a profound impact upon local communities, particularly at Barrow. Nevertheless, we believe that employment factors should not be decisive in the debate on the future of the deterrent. (Paragraph 75)
17. If there were no successor to the Vanguard-class submarine, there would be an ongoing need to retain onshore a capability to support and, ultimately, to decommission the current SSBN and SSN fleet. We call upon the MoD to state in its response to this report how much it would cost to sustain that capability. (Paragraph 76)
18. It is essential that the Naval Base Review take into account the implications for the future of the submarine industry. (Paragraph 97)
19. Affordability must be a fundamental consideration in any new submarine programme. The Government is right to emphasise that orders for a Vanguard successor will be contingent on industry driving down and reducing costs and ensuring value for money throughout the submarine programme. Industry must deliver on this requirement. (Paragraph 98)
20. We are concerned that insufficient attention has been given to the costs of through-life support. While we understand that DML is not a supplier to the Astute programme, it seems odd and regrettable that the company responsible for through-life support on the UK's nuclear-powered submarines has had so little input into the design of the class. If the affordability of the submarine programme is to improve, it is essential that through-life costs are taken into consideration at the initial design phase. Far greater emphasis must be placed on this consideration before the design of any Vanguard successor submarine begins. (Paragraph 99)
21. If the UK goes ahead with procuring a successor to the Vanguard-class submarine, it is essential that industry collaborates far more extensively than it has done to date to drive down and control costs in the manner envisaged by the Defence Industrial Strategy. Promoting greater industrial collaboration should be a key priority for the MoD. In turn, the MoD must provide industry with clarity and consistency about operational requirements and specifications. It is vital that lessons are drawn from the problems experienced with the Astute-class programme. (Paragraph 105)
22. Developing a Vanguard successor would be a huge undertaking. It is essential the MoD has the capacity to manage such a programme effectively. Any shortfall in preparedness must be addressed as a matter of priority. The MoD's shortage of systems engineers and project managers—skills essential at the start of a programme of this kind—is a cause of serious concern. If the decision is made to renew the deterrent, it is essential the MoD commit sufficient resources to the programme from the beginning. It will be desirable to bring in skills from industry. We recommend that the MoD state, in its response to this report, how it intends to address its skills shortages. (Paragraph 115)

23. We recommend that in advance of any debate in the House of Commons on the future of the deterrent, the MoD clarifies what additional investment the Government intends to make at the AWE as a result of the recommendations contained in the White Paper. (Paragraph 130)
24. The MoD and the AWE must apply the lessons from the A91 episode in managing the new infrastructure investment at Aldermaston. (Paragraph 131)
25. Many observers have seen the investment programme at Aldermaston as a sign that the Government had already decided in principle to retain and renew the UK's nuclear deterrent. We accept Ministers' assurances that this was not the case. We accept too that investment in buildings and infrastructure at AWE was becoming time-critical, which might suggest that the decision on the future of the deterrent should have been taken in the last Parliament. But we are less convinced that investment in the new Orion Laser, the supercomputer and hydrodynamic facilities could not have waited for a decision in principle on the future of the UK's nuclear deterrent. If the investment was made to respond to requirements of regulators, the Government should state this in its response to this report. Large-scale investment should follow, and not precede, policy decisions of such paramount importance to the nation. (Paragraph 146)
26. The widespread suspicion about the work of the AWE and the Government's investment there is partly a consequence of the secrecy which surrounds its work. We fully accept the need to maintain secrecy about some aspects of its work, but there is a case for greater openness, not least to ensure that the public is aware of the positive contribution the AWE makes to the verification of the Comprehensive Test Ban Treaty. (Paragraph 147)

Annex 2: Exchange of letters between the Prime Minister and the President of the United States of America

Letter from the Rt Hon Tony Blair MP, Prime Minister, to the Honorable George W Bush, President of the United States of America

The United Kingdom Government attaches great importance to the maintenance of its independent nuclear deterrent capability, both as a means of ensuring the security of the United Kingdom and our vital interests, and as an important element of our contribution and commitment to the North Atlantic Alliance.

We have therefore to set in train the steps necessary to maintain our current submarine-based nuclear deterrent system, replacing those elements—in particular the submarines—that will reach the end of their planned life by the 2020s.

Following the agreement reached in an exchange of letters between the United Kingdom and the United States Governments in 1982 under the framework of the 1963 Polaris Sales Agreement, our current Vanguard class submarines have carried the Trident II D5 missile since they began to enter service in 1994. We have decided that we will replace the Vanguard submarines with another class of submarines in the 2020s, and would like these submarines to continue to carry Trident II D5 missiles.

Accordingly, we wish to participate in the planned life extension programme for the Trident II D5 missile, which we understand is intended to extend the life of the missiles into the 2040s. We also seek assurance that, in support of those missiles, the United States will provide us, under the framework of the Polaris Sales Agreement, as amended for Trident, with sufficient equipment and supporting services to equip a force of new SSBNs. I propose that, as in the past, these matters be taken forward by the executive agencies of the two Governments to ensure mutually satisfactory solutions.

For the longer term, we need to be assured that we can, if we so choose, maintain a nuclear delivery system, with US assistance, for at least the remainder of the life of our successor submarine force. In this respect, the United Kingdom wishes to ensure that any successor to the D5 system is compatible with, or is capable of being made compatible with, the launch system for the D5 missile, which we will in the meantime be installing into our new submarines. We believe that there would be merit in the United Kingdom having the opportunity to participate, at an early stage, in any programme to replace the D5 missiles, or to discuss a further life extension—for UK purposes—of the D5 missile, to match the potential out of service date of our new submarines. I propose that, as in the past, close coordination should be maintained between the executive agencies of our two Governments in order to ensure the compatibility of equipment.

We wish also to maintain our cooperation under the 1958 Agreement for Cooperation on the Uses of Atomic energy for Mutual Defence Purposes (“Mutual Defence Agreement”). In addition, I believe that this programme has the potential to open up new opportunities for future cooperation and collaboration on other aspects of future submarine platforms,

and we would wish our respective experts carefully to consider where this might be of mutual benefit.

As has been the case in the past with the Polaris force, and is currently the case with our Trident force, we intend that a future UK deterrent submarine force equipped with Trident, and any subsequent successor to Trident, will be assigned to the North Atlantic Treaty Organisation: and except where the United Kingdom Government may decide that supreme national interests are at stake, this successor force will be used for the purposes of international defence of the Atlantic Alliance in all circumstances.

7 December 2006

Letter from the Honorable George W Bush, President of the United States of America to the Rt Hon Tony Blair MP, Prime Minister

Thank you for your letter regarding modernizing your independent nuclear deterrent. The United States Government continues to attach great importance to the maintenance of an operationally independent nuclear deterrent capability by the United Kingdom and values the deep and long-standing cooperation between our two countries in this area.

The United States Government accordingly welcomes the steps outlined in your letter to maintain and modernize the UK's capability in this area for the longer term. We also attach importance to, and welcome, your intention to continue to assign this force to NATO.

The 1958 Agreement for Cooperation on the Uses of Atomic Energy for Mutual Defence Purposes ("Mutual Defense Agreement") and the 1963 Polaris Sales Agreement have provided a strong, enduring basis for cooperation between our two countries. We believe that these two agreements, the terms of which are not affected by this exchange of letters, will continue to provide a solid basis for ensuring mutually satisfactory cooperation in those areas where you have requested assurances. I can reaffirm the US commitment to support the missile system and associated equipment deployed by the United Kingdom under the terms of these agreements.

In this context, the United States fully supports and welcomes the intention of the United Kingdom to participate in the life-extension program for the Trident II D5 missile. We will work to ensure that the necessary components of the overall system are made available to the United Kingdom to support life-extended D5 missiles, under the framework of the Polaris Sales Agreement and the 1982 Exchange of Letters. I fully agree with your suggestion that, as in the past, these matters be taken forward by the executive agencies of our two governments to ensure mutually satisfactory solutions.

For the longer term, in accordance with your proposal and under the framework of the Polaris Sales Agreement and the 1982 Exchange of Letters, I would invite the United Kingdom to participate, at an early state, in any program to replace the D5 missiles or to discuss a further life extension—for your purposes—of the D5 missile to match the potential out-of-service date of your new submarines. In this respect, any successor to the D5 system should be compatible with, or be capable of being made compatible with, the launch system for the D5 missile, which you will be installing into your new submarines. The United States will also ensure under the framework of the Polaris Sales Agreement and the 1982 Exchange of Letters that the United Kingdom has the option to sustain an

effective nuclear delivery system for at least the life of your successor submarine force as was done with the Polaris system. Again, I agree with you that, as in the past, close coordination should be maintained between the executive agencies of our two governments in order to ensure compatibility of equipment.

I agree that we should maintain our cooperation under the 1958 Agreement for Cooperation on the Uses of Atomic Energy for Mutual Defense Purposes ("Mutual Defense Agreement"). I also concur in your proposal that our two countries should also explore the scope for cooperation and collaboration on other aspects of future submarine platforms. We recognize the importance of this potential collaboration and will work to ensure that further cooperation in this area can be deepened accordingly.

7 December 2006

Formal minutes

Tuesday 27 February 2007

Members present:

Mr James Arbuthnot, in the Chair

Mr David S Borrow

Mr David Crausby

Linda Gilroy

Mr David Hamilton

Mr Mike Hancock

Mr Dai Havard

Mr Adam Holloway

Mr Bernard Jenkin

Mr Brian Jenkins

Robert Key

The Future of the UK's Strategic Nuclear Deterrent: the White Paper

The Committee considered this matter.

Draft Report (The Future of the UK's Strategic Nuclear Deterrent: the White Paper), proposed by the Chairman, brought up and read.

Ordered, That the Chairman's draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 186 and Tables 1 to 9 agreed to.

Annexes (Summary, List of Abbreviations, conclusions of the Committee's earlier Reports on the Future of the UK's Strategic Nuclear Deterrent, and the exchange of letters between the Prime Minister and the President of the United States of America) agreed to.

Resolved, That the Report be the Ninth Report of the Committee to the House.

Several papers were ordered to be appended to the Minutes of Evidence.

Ordered, That the Appendices to the Minutes of Evidence taken before the Committee be reported to the House.

Several papers were ordered to be reported to the House.

Ordered, That embargoed copies of the report be made available, in accordance with the provisions of Standing Order No. 134.

Ordered, That the Chairman made the Report to the House.

[Adjourned till Tuesday 6 March at 9.30 am.]

List of witnesses

Tuesday 16 January 2007

Page

Ms Sian Jones, Aldermaston Women's Peace Campaign, **Mr Bruce Kent**, Campaign for Nuclear Disarmament, **Ms Di McDonald**, Executive Director, Nuclear Information Service, and **Mr John Ainslie**, Co-ordinator, Scottish Campaign for Nuclear Disarmament

Ev 1

Tuesday 23 January 2007

Professor Richard L Garwin, US National Academy of Sciences, **Mr Paul Ingram**, British American Security Information Council (BASIC), **Dr Stephen Pullinger**, International Security Information Service (ISIS) Europe, **Dr Jeremy Stocker**, International Institute for Strategic Studies (IISS), and **Dr Lee Willett**, Royal United Services Institute (RUSI)

Ev 22

Tuesday 30 January 2007

Professor Christopher Greenwood QC, Professor of International Law, London School of Economics, **Professor Nick Grief**, Bournemouth University, **Professor Steven Haines**, Professor of Strategy and the Law of Military Operations, Royal Holloway College, University of London, and **Professor Philippe Sands QC**, University College London

Ev 41

Tuesday 6 February 2007

Rt Hon Des Browne MP, Secretary of State for Defence, **Mr Desmond Bowen**, Policy Director, Mr Tom McKane, Director General, Strategic Requirements, **Rear Admiral Andrew Mathews RN**, Director General Nuclear, and **Mr Nick Bennett**, Director General, Strategic Technologies, Ministry of Defence; and **Ms Mariot Leslie**, Director, Strategic Threats, Foreign and Commonwealth Office

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6	Professor Richard L Garwin	Ev 92
7	British American Security Information Council (BASIC)	Ev 96
8	International Security Information Service (ISIS)	Ev 100
9	Dr Jeremy Stocker	Ev 109
10	Michael Codner, Dr Lee Willett, and Gavin Ireland, Royal United Services Institute (RUSI)	Ev 113
11	Professor Steven Haines	Ev 118
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32	Professor Michael MccGwire	Ev 198
33	Campaign for Nuclear Disarmament, British American Security Information Council, and Greenpeace: joint memorandum	Ev 202
34	Ministry of Defence: supplementary memorandum	Ev 205
35	Professor Richard L Garwin: supplementary memorandum	Ev 206

List of unprinted written evidence

Additional papers have been received from the following and have been reported to the House but to save printing costs they have not been printed and copies have been placed in the House of Commons Library where they may be inspected by members. Other copies are in the Parliamentary Archives, Houses of Parliament and are available to the public for inspection. Requests for inspection should be addressed to the Parliamentary Archives, Houses of Parliament, London SW1A 0PW (tel 020 7219 3074). Hours of inspection are from 9.30am to 5.00pm on Mondays to Fridays.

Ann Hillier

The Revd Christopher Aldridge

Dr Fredk G Page

West Midlands Campaign for Nuclear Disarmament

Nigel Barnacle

Heather Williams

David Bargh

René Thomas

Margaret Parry

Irene Willis

Lyn Brayshaw and Andy Mackenzie

Paul Allard

Barbara Forbes

Garry Wiles

Sarah Lasenby

Jane Hill

Laurie Gibson

Rosemary Galli

Charles G Edwards

L H Charles

Revd John B Wilcox

Mrs Tina Shaw

Megan R Atton

Vera Granbart

Jan Durham

Roger Kattenhorn

Tim Hare

Robin Le Mare

Linda Senior

Mrs Raymonde Hainton

Mrs Gillian Hansford

Chris and Carole Husson

Holly Bazin

Janet Bloomfield

Nick Godwin

Janet Phipps

Iain Reid

NAG Nuclear Awareness

Shanta Miller

Patricia Woodcock

David Sutton

Sir Michael Quinlan

Golden Oldies Against Trident

Brian Boshell

Joanne Bazley

Gwyn Williams

Peggy Souter

B E Driscoll

Denise Turp

Mrs J E Ounsted

Peter Ford

Irene Ashby

E B Worrall

Arianna Andreangeli

Mrs Daphne Philips

Mrs Margaret Dolan

Stephanie Kraye

Helena Eden

Margot Hutchison

Valerie Talbot

Profesor Robin Attfield

Sally Holland

Anneli Jones

Kath Morrell

Francis Ballin

Laurie J Wilson

Mary Timimi

Janet Upward

Hazel Neal

Kay Armstrong

Judy Dicks

J F McKay

J G McNulty

Gillian M Harbord

Monica M Davenport

Dr Alec Strachan

Sheila Q Dwyer

Dan Youmans

Clint Oldridge

Maisie Carter

Sandra Leslie

Loughborough Preparative Meeting of the Society of Friends (Quakers)

Anna Grace Lidstone

Christian Socialist Movement

Teresa Mitchell

Ulla Grant

Liz Fyfe

Derek Williams and Carol Williams

Nuclear Free Local Authorities (NFLA) Steering Committee

The Baptist Union of Great Britain, the Methodist Church and the United Reformed Church

Social Justice Committee of Penarth and District Cytun (Churches Together)

Church of Scotland, Church and Society Council

Rachel Putz

Justice and Peace Commission of the Catholic Bishops' Conference of Scotland

Mrs Marguerite Sansome

Ronald Waddams

Dr Christopher Vincenzi

P Jane Grubb

Defence Committee Reports in this Parliament

Session 2005–06

First Report	Armed Forces Bill	HC 747 (<i>HC 1021</i>)
Second Report	Future Carrier and Joint Combat Aircraft Programmes	HC 554 (<i>HC 926</i>)
Third Report	Delivering Front Line Capability to the RAF	HC 557 (<i>HC 1000</i>)
Fourth Report	Costs of peace-keeping in Iraq and Afghanistan: Spring Supplementary Estimate 2005–06	HC 980 (<i>HC 1136</i>)
Fifth Report	The UK deployment to Afghanistan	HC 558 (<i>HC 1211</i>)
Sixth Report	Ministry of Defence Annual Report and Accounts 2004–05	HC 822 (<i>HC 1293</i>)
Seventh Report	The Defence Industrial Strategy	HC 824 (<i>HC 1488</i>)
Eighth Report	The Future of the UK's Strategic Nuclear Deterrent: the Strategic Context	HC 986 (<i>HC 1558</i>)
Ninth Report	Ministry of Defence Main Estimates 2006–07	HC 1366 (<i>HC 1601</i>)
Tenth Report	The work of the Met Office	HC 823 (<i>HC 1602</i>)
Eleventh Report	Educating Service Children	HC 1054 (<i>HC 58</i>)
Twelfth Report	Strategic Export Controls: Annual Report for 2004, Quarterly Reports for 2005, Licensing Policy and Parliamentary Scrutiny	HC 873 (<i>Cm 6954</i>)
Thirteenth Report	UK Operations in Iraq	HC 1241 (<i>HC 1603</i>)
Fourteenth Report	Armed Forces Bill: proposal for a Service Complaints Commissioner	HC 1711 (<i>HC 180</i>)

Session 2006–07

First Report	Defence Procurement 2006	HC 56 (<i>HC 318</i>)
Second Report	Ministry of Defence Annual Report and Accounts 2005–06	HC 57
Third Report	Costs of operations in Iraq and Afghanistan: Winter Supplementary Estimate 2006–07	HC 129 (<i>HC 317</i>)
Fourth Report	The Future of the UK's Strategic Nuclear Deterrent: the Manufacturing and Skills Base	HC 59 (<i>HC 304</i>)
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