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fully operational and on time, represents a considerable achievement.

8. The second Trident boat, VICTORIOUS, has faced a more demanding schedule than VANGUARD and last year MoD expressed concerns that it might prove too tight.²⁵ Progress since then has been good. Following successful contractor sea trials and the completion of further work by the contractor she was accepted by the Royal Navy at Faslane in January 1995; the standard of finish and performance is regarded as "very good".²⁶ After post acceptance trials and the work up of crew, VICTORIOUS will sail to King's Bay to collect 12 D5 missiles.²⁷ Rear Admiral Irwin expressed "high confidence" that she will deploy on time at the turn of the year.²⁸ VIGILANT is due to be rolled out of the Devonshire Dock Hall at Barrow later this year. The construction of VENGEANCE continues: all missile tubes are now in place and the major hull units are being joined together. No problems are reported in respect of either boat.²⁹

9. The estimated real costs of the submarine construction programme have fallen by £70 million since last year.³⁰ The overall reduction is the result of numerous minor cost adjustments: savings include £14 million in the cost of support and spares, £5 million from changes in the VAT regime and the reallocation of a further £5 million from construction into running costs. These have been offset by a £12 million increase due to additional use of design agency services and another £8 million for work not included in the original contract.³¹ With the programme approaching completion, the current estimate of £4,243 million at 1994-95 prices is regarded by MoD as increasingly firm.³² This is reflected in the reduction of the allocated contingency by £24 million to £40 million³³ and an estimated fall of £40 million in the cost of the final two submarines.³⁴ Now that VANGUARD is operational and VICTORIOUS is completing post acceptance trials the scope for further cost increases is significantly narrowed and there may well be further savings to be achieved in the construction of the final two boats due to refinement of production techniques in the light of experience. We would be disappointed if the current overall estimated programme costs were exceeded.

Strategic Weapon System

10. The development of the Strategic Weapon System (SWS) has proceeded well. VANGUARD's two test firings of unarmed missiles off Florida last summer were reported to be "highly successful".³⁵ She subsequently collected 16 D5 missiles from King's Bay which were fitted with nuclear warheads on the Clyde and cleared for deployment. VICTORIOUS is scheduled to undertake test missile firings during her DASO later this summer. The testing and installation of SWS equipment in the remaining two Trident boats is said to be making "steady progress".³⁶ The modifications required for the use of Trident in a sub-strategic capacity are intended to be completed by the time VIGILANT enters service in 1998 and Trident assumes the sub-strategic role.³⁷

11. We reported last year that 44 D5 missiles had been purchased from the US, and this

²⁵Second Report, HC 297 of Session 1993-94, para 10

²⁶Evidence, p 23, A6

²⁷HC Deb, 9 May 1995, col 405w

²⁸Q1427

²⁹Evidence, p 23, A6

³⁰Evidence, p 21, A3a

³¹Q1418

³²Evidence, p 20, A1b; Q1418

³³Evidence, p 22, A3e

³⁴Q1418

³⁵Evidence, p 18, para 4

³⁶*ibid*

³⁷Evidence, p 24, A9

remains the current total.³⁸ MoD insists that final decisions have yet to be taken on the number of missiles to be procured,³⁹ but some idea can be gained by the fact that £718 million⁴⁰ at outturn prices out of a total estimated cost of £1,240 million (at 1994-95 prices) had been committed by August 1994.⁴¹ Some 58 per cent. We expressed some concern last year that a reduced US missile programme would lead to an increase in the unit cost of missiles procured by the UK. Since then the US mid-term elections and nuclear posture review seem to have ensured that production will continue for some years yet. This was certainly the impression we gained in Washington when we visited in March 1995 and it is shared by MoD.⁴²

12. Recent speculation has focused on the potential increases in unit cost resulting from the fixed costs of production being spread over fewer missiles each year. MoD acknowledged that "there is some possibility of that happening" but denied that "mind-bendingly large increases are in the pipeline".⁴³ There have already been some increases in costs on the US side since last year: £27 million due to the inclusion of additional contract incentive fees falling to the UK, £11 million from an increase in US estimates of missile costs and £12 million due to a revision of in-year expenditure estimates. These expenses have been partly offset by £20 million savings resulting from a reduction in the number of guidance parts required. However, the major contributor to the overall £26 million reduction in the estimated real costs of D5 missiles was the £55 million saving due to the effects of exchange rate fluctuations on actual spend in 1993-94.⁴⁴ Without this favourable movement in the currency markets MoD acknowledged that the increase in missile programme costs would have been "somewhere between £25 million and £30 million"⁴⁵ — more than twice the sum of the contingency allocated this year for the whole SWS programme. Without an increase in contingency — and this was reduced by £9 million since 1993-94⁴⁶ — or beneficial exchange rate movements, any similar increases in unit costs to those experienced last year would begin to eat into unallocated contingency, which currently stands at £153 million.⁴⁷

13. In spite of the threat of some increases in actual missile costs, MoD remains committed to its original timetable for procurement, now forecast to complete in two to four years' time.⁴⁸ Figures relating to the numbers of missiles likely to be purchased over this period emerged in error from the US Government this year. MoD were quick to identify these as "very provisional figures" and were anxious to assure us that "Ministers have not yet taken a decision on the size and timing of future UK orders".⁴⁹ Witnesses told us that the containment of costs was being looked at very closely with US counterparts,⁵⁰ but emphasised the need to avoid a situation in which large numbers of missiles reached the end of their 20 year life spans simultaneously, and also the benefits of tailoring procurement to fit the submarine construction timetable.⁵¹ **MoD should not allow these factors to tie it so tightly to its planned procurement programme as to incur heavy financial penalties in future years. We note that no missiles have been purchased in either of the last two years, when the exchange rate has been relatively advantageous. Given the warning signs already appearing, and trailed in our Report last year,⁵² it would be inexcusable**

³⁸Second Report, HC 297 of Session 1993-94, para 17

³⁹HC Deb, 25 April 1995, col 497w

⁴⁰HC Deb, 25 November 1994, col 461w

⁴¹Evidence, p 20, A1b

⁴²Q1458

⁴³*ibid*

⁴⁴Evidence, p 29, A2

⁴⁵Q1457

⁴⁶Evidence, p 22, A3e

⁴⁷*ibid*

⁴⁸Evidence, p 24, A9c

⁴⁹Q1464

⁵⁰Q1458

⁵¹Q1459

⁵²Second Report, HC 297 of Session 1993-94, para 18

if a reluctance to accelerate missile purchases led to significant subsequent cost increases as a result of procurement decisions taken in the US.

Tactical Weapon System

14. The development of Trident's Tactical Weapon Systems (TWS) has long been a major weakness of the programme. Problems relating to the Self Protection Mast have now been resolved, although we heard last year that "some elements of the system's capability have still to be demonstrated fully".⁵³ Though the TWS was cleared to support VANGUARD's deployment, it remains below full capability. **The Sonar 2054 system is the main cause of concern.** Early trials of the system identified operability and reliability problems which we explored further in oral evidence. Rear Admiral Irwin explained that the towed array handling system — consisting of a drum around which the array is reeled — was not reliable enough to be used. Problems experienced in reeling the towed array, which is hundreds of yards long, back onto the drum, were apparently caused by the impact of changes in depth on some parts of the array.⁵⁴ Rather than being deployed at sea, the towed array has to be attached and removed manually at base, an exercise which he described as a "thorough nuisance".⁵⁵ The trials carried out from the back of surface ships may have been successful but were clearly not a realistic test for a system designed to be used at some depth. Rear Admiral Irwin explained that to trial the array on SSNs would not be straightforward: "It is not just something you can fit to a submarine without making changes".⁵⁶ We are nonetheless surprised that it was not thought wise to conduct trials of the system — or at least a similar version — on other submarines. Nor can we be wholly optimistic about the prospects for speedy resolution of the problem. Rear Admiral Irwin told us he "would not wish to be held too closely" to the programme for repair, which sees completion by the end of this year.⁵⁷ **It is disturbing that the longstanding problems identified with the towed array sonar are still to be resolved, and that the first Trident boat has had to deploy with a vital system less than fully operational.**

15. Concerns over the progress of the sonar suite are not new. We were informed in the 1993 annual report on Trident that contractor's sea trials of all Sonar 2054 equipments had been completed "with the exception of the Towed Array".⁵⁸ It was only during the subsequent oral evidence session that we established the reasons for the delay: a towed array was lost at an early stage in the trial and enquiries followed into the cause over a period of months, preventing the integration of the towed array with the rest of the sonar suite.⁵⁹ The 1994 annual report revealed that "considerable progress" had been made in resolving the problems identified in the sea trials.⁶⁰ The likely cause of the fault was reported to relate to assembly rather than production; changes in procedures were expected to avoid further problems.⁶¹ It was acknowledged that some elements of the system's capability had still to be tested; these tests were planned to take place in advance of VANGUARD's entry into operational service.⁶² In answer to our written questions this year MoD told us that "some problems" with the sonar suite still remained and that "a programme of work to resolve some outstanding system operability issues is in hand".⁶³ It was not reported, either in writing or orally, that the Sonar 2054 was one of only three projects identified in the 1995 Departmental Report as having the status of "major weakness".⁶⁴ This designation was given as a result

⁵³Second Report, HC 297 of Session 1993-94, para 20.

⁵⁴Q1484

⁵⁵Q1481

⁵⁶Q1486

⁵⁷Q1482

⁵⁸Sixth Report, HC 549 of Session 1992-93, Evidence, p 26, A6a

⁵⁹*ibid*, para 29

⁶⁰Second Report, HC 297 of Session 1993-94, Evidence, p 21, para 5

⁶¹*ibid*, Evidence, p 9; Q1167

⁶²*ibid*, Evidence, p 25, A5a

⁶³Evidence, p 23, A7a

⁶⁴Evidence, p 33