REVENGE 4 Mar 92 13 Apr 92 40 days ? ?

REPULSE 8 Apr 92 33 days 5 days

Safety -3 – Missile/Warhead risk

In 1990 Dr Sidney Drell produced a report for Congress on the safety of US nuclear weapons. This pointed out that the Trident system was potentially dangerous because the nuclear warheads are arranged in a circle around the third stage of the missile. Three years later a further report was written by John Harvey, now head of policy in the US nuclear weapons establishment, NNSA, and Stephan Michalowski, now senior scientist at OECD. They pointed out that fragments from the detonation of the third state of a Trident could potentially cause a nuclear explosion. 15 years later Michalowski said: "the explosion of a boatload of missiles in a port would be an unimaginable catastrophe. It is a very, very scary thought".

Separating the missiles and warheads in peacetime would effectively remove the possibility of this kind of accident. The missile bunkers at Coulport are designed to contain the detonation of a missile and the warheads store is located at a safe distance from the missile bunkers.

Re-arming the submarine with missiles and warheads would reintroduce this hazard – and loading them in a hurry would be particularly dangerous. But if it was argued that it was necessary to have Trident at sea then the cost-benefit analysis in such a crisis would presumably be different.

Safety – 4 – personnel factors

- **Lack of trained experienced crew could increase risks – see personnel**
- **Overusing crew can lead to accidents**

Cost -1 – reduce numbers of crews

Cost 2 – increase submarine life

There are a two main factors that affect how long a submarine can remain in service – the reactor and hull. If Trident submarines were kept on a low state of alert then it should be possible to substantially extend the reactor and hull life.

Cost 3 – postpone replacement

Increasing submarine life would mean that the Trident Replacement decision could be postponed.

Cost 4 – reduce overhead costs

Impact on conventional forces – 1 – cost

Impact on conventional forces – 2 – protecting forces

A range of military units from the army, navy and air force have been allocated to protecting Polaris and Trident. In 1978 the Chiefs of Staff produced a report on the UK's ability to withstand a conventional attack from the Soviet Union. This identified a number of major shortcomings in the countries defences. One of these was a shortage of minesweepers. The report said:

> "The Royal Navy's mine countermeasures vessels would have as their first priority keeping open the approaches to the nuclear submarine base at Faslane; after this, insufficient

resources would remain to deal adequately with the tasks of clearing cross channel routes and providing safe access to our major ports".[1]

Prime Minister Jim Callaghan noted:

"after securing the approaches to the nuclear submarine base at Faslane, we had insufficient resources to clear the cross-Channel routes and to provide safe access to our major ports"[2]

The table below shows the forces allocated to protecting Trident in 1998 and the smaller number assigned to this role in 2007.

	1998		2007	
	Committed	**Contingent**	**Committed**	**Contingent**
Attack Submarines	2	1	0	2
Destroyers & Frigates	1	2	0	1
Minewarfare vessels	1	3	1	3
RM Commando	0.5			
Royal Fleet Auxiliary Vessels	1		0	1
Infantry battalions		5		
Air Defence Aircraft		2		
Maritime & Reconnaissance Aircraft	4	8	0	8
Merlin ASW Helicopters (c)			0	5
Survey vessels (c)			1	0

With regard to the "contingent" commitment of one frigate or destroyer today this allocation has been further clarified: "One nominated, at extremely high readiness and activated when required"[3] A recent example of the conflict between allocating forces to protecting Trident and other tasks is the deployment of minehunters based at Faslane. Two of Sandown class were deployed to the Gulf and returned to Faslane in early March.

Personnel

A recent parliamentary reply shows that as at 1 March there were just under 1,000 personnel assigned to Trident submarines, 114 officers and 883 ratings. This is equivalent to 142 in each of 7 crews, with 2 crews on 3 submarines and 1 on HMS Vigilant in Devonport. This figure is slightly higher than the nominal crew figure of 135. There are currently significant shortages of Trident

[1] TNA PREM 16-1563 Response to the Soviet Threat to Targets in the UK, Chiefs of Staff 16 January 1978
[2] TNA PREM 16-1563 20 February 1978 Defence against the Soviet threat to the United Kingdom

[3] Written Answer by Bob Ainsworth 17 November 2008 Hansard

missile operators and nuclear watchkeepers. With regard to these same posts, personnel are spending too much of their time deployed on operations.

If Trident were taken off patrol then the number of personnel deployed should be reduced. However there would be a need to increase this if continuous patrols were restarted. The current routine is that an INDEX exercise is carried out, to put the crew through their paces, before Trident submarine goes on patrol. With a reduced state of alert INDEX exercises could be carried out from time to time, and possibly before restarting patrols.

If one submarine was kept in a fully functioning state as a training vessel, this could quickly be put to sea for a limited nuclear deployment. Restoring continuous patrols would mean having a second submarine fully operational within less than 3 months. Patrols could be maintained for a short period with one crew on each of two operational submarines, but sustaining this posture would mean restoring the double-crewing arrangement in due course.

A key issue would be training. Not all training is done on submarines. The Trident Training Facility at Faslane has a suite of simulators, including a mock up of the Trident fire control system. The US Navy produces a range of computer programmes which can be used for training both on-shore and at sea. Many routines and emergency drills can be practiced with the submarine moored at Faslane. A substantial amount of sea training could be carried out with a single Trident submarine.

One problem would be how to generate a sufficient number of trained personnel to recreate the numbers of crews which would be needed to restore continuous patrols over a long period. A solution would be to shift trained submariners from SSN onto Trident.

If we consider the submarine fleet as a whole then there are some skills unique to Trident, some unique to SSN, and many that are common to both. It is normal for submariners to move between Trident and SSN during their careers. So long as there is a significant SSN fleet there will be a pool of trained submariners with many of the skills required for Trident. One area where the skills for Trident are unique is the missile system, however much of the missile training is done on simulators. The occasional test firing of missiles off Cape Canaveral need not be affected by taking Trident off patrol.

If continuous patrols were restored from a low alert state then this would impose two pressures on the SSN fleet:

- There would be demands to shift key personnel, particularly senior staff, from the SSN fleet to Trident in order to reintroduce double crewing.
- Secondly the SSN themselves would be needed to provide protection to Trident.

This is a problem, but is not insurmountable. Currently the SSN fleet carries out several tasks – Strategic Intelligence, Support to the Strategic Deterrent, Integrity of UK, Op Telic and Op Calash (Gulf) and Falkland Islands Contingency.[4] If Trident was taken off patrol and put on a low state of alert, then SSN would be freer to carry out other functions. However if it was felt that the top priority was to restore Trident patrols, then some of the other tasks which are currently undertaken by SSN would have to be sacrificed. This illustrates the real nature of the question of whether to retain continuous patrols – it is not an issue that can be considered in isolation from all other military tasks – there is a need to decide on priorities and to assign resources accordingly. It is hard

[4] Written Answer by Bob Ainsworth 17 November 2008, Hansard

to understand why Trident is given the priority that it is today. Trident submarines could potentially assist with the "Integrity of UK" defence role currently assigned to SSN, particularly if they were not armed with missiles or warheads.

The Navy argue that continuous patrols create an ethos and high morale. This is only partly true. Serving on Trident patrols brings particular problems for the men involved. Many service personnel in the Army, Air Force and Navy are forced to serve for months on end away from home. But for most there are good links from their bases to their families. When not on duty they are able to communicate with partners and children by phone or internet. This is not the case with Trident submariners on patrol. They cannot send any messages to their families and can only receive short censored messages from partners and families. News which is likely to cause a problem, for example a close bereavement, is deliberately withheld until the submarine returns to port. Ending continuous patrols would change the lives of those working in the Trident fleet and in many ways it would be a change for the better.

Keeping one submarine at sea at all times creates a high target for the personnel involved – achieving that target can bring a sense of achievement, but it can also bring costs. It distorts the prioritisation of work within the Navy and particularly within Faslane. Where society recognises that this is the first priority then the extra effort may be considered worthwhile. But in Britain in 2009 most people do not think that the first priority for the armed services is to keep a Trident submarine at sea.

Comparison of de-alerting and de-mating

Advantages of ending continuous patrols

Verifiable reduced state of alert
Require fewer crews
Longer submarine life
Postpone decision on replacement submarine
Financial savings
Less of a potential threat
Setting an example to others

Further advantages of De-mating

Remove peacetime risk of missile/warhead accident
Verification easier
With alert state of months -
- no increase in alert status of protecting forces
- fewer crews
- longer submarine life
- longer postponement of replacement submarine
- greater financial savings

Continuous patrols and the rationale for Trident

To assess the case for ending continuous patrols it is necessary to look behind the practical details to some of the fundamental questions of British nuclear weapons.

Who is the potential enemy

The Duff-Mason report, which underpinned the decision to purchase Trident, considered whether the proposed nuclear weapon system had to be capable of dealing with a threat from any part of the world - and concluded that it did not. Their analysis focused on the Soviet Union. The specifications for Trident and the nature of its deployment were drawn up with a view to tackling a potential threat from the Soviet Union. The invulnerability that was built into the Trident system was invulnerability from Russian forces. If the concern is about rogue states and new nuclear powers, then keeping a submarine at sea at all times is excessive.

Any proposal for using Trident, either a limited nuclear strike or the full force, against any country other than Russia is fraught with difficulties. Any Trident launch could be interpreted against an attack against Russia. A small number of British Trident missiles could blind Moscow's Early Warning System, with less than 15 minutes notice. So what does London do ? Do they inform Moscow – "by the way in 12 hours time we are going to fire a Trident missile at Iran (or wherever)" ? This could well result in the Russian nuclear forces being put on a very high state of alert, either as a precaution or to restrain Britain from acting. Alternatively do they keep quiet, cross their fingers, and hope that Moscow doesn't misinterpret their attack ? There would always be a significant "Russian" factor to any potential Trident strike, whoever the target was.

The Independence of Trident

The United States and Russia each maintain a range of nuclear forces on different states of alert. One factor influencing whether or not it is necessary to retain continuous patrols is whether British nuclear forces are seen as an independent capability – or if they are regarded as part of NATOs nuclear forces. If they are integrated into a wider US arsenal then why do they need to be on a higher alert state than NATO's Dual Capable Aircraft ?

There are three basic scenarios when British nuclear weapons might be used:

- When the US supported it
- When the US was opposed it
- When the US was ambivalent about it

In the first case the British Trident force would be able to carry out its attack plan. The second scenario is the crucial one. The US is so closely involved in the British Trident programme that they could probably take effective action to disrupt any plan to launch an independent strike – either by cyber warfare, jamming communications, or ultimately finding and destroying the submarine. The complex software in the Trident Fire Control system is almost all written in the US – and this provides a potential ability to restrict Britain's use of the system.

If the US was ambivalent about a British nuclear strike – then yes it probably could go ahead. But how likely is it that the US would not have a clear view of whether or not it was in their interest for Britain to engage in a nuclear war ?

Rationality of a British nuclear response against Russia

The Duff Mason report pointed out that, faced with the situation where the Soviet Union had launched a nuclear attack on Britain, there would be no logical reason for British nuclear weapons to be used in response -

> "In these circumstances the actual use of our strategic nuclear force in retaliation against the Soviet Union would represent an act of rage and revenge ... there can be no certainty that a Government would take a deliberate decision to launch this act involving the killing of large numbers of enemy civilians but serving no rational purpose".[5]

Denis Healy and David Young, a former nuclear adviser, have said that if Soviet missiles had destroyed much of Britain they would have advised that Britain should not retaliate. British nuclear deterrence rested on the possibility that the British Prime Minister and Chief of Defence Staff would act irrationally and unethically and launch a nuclear attack which would be, in Lord Carver's words, either suicide or a voice from the grave.

Cost Benefit of continuous patrols

The issue of the vulnerability of Trident submarines should not be considered in isolation. It should be thought of within the context of a range of costs and benefits and of priorities.

Costs of continuous patrols:

- Financial – higher running costs; need for a replacement sooner - with low state of alert Trident replacement could be postponed. High cost then has impact on other defence projects and wider public expenditure.
- A threat to others – Invulnerability is only one side of the coin – on the other is the constant potential to launch a devastating nuclear strike at short notice.
- Allocation of resources – requirement for dual crews, maintenance support and protection forces.

The potential value of continuous patrols is very limited:

- Only for independent use of Trident
- Only really for use against Russia.
- An independent British nuclear attack on Russia would not be rational or ethical.

[5] Duff-Mason part I para 11

conventional weapons and the B61 nuclear bomb. There are around 350 B61s deployed at 7 airbases across Europe. Some B61s are allocated to aircraft from 5 European airforces and the remainder to USAF Europe. All the bombs are kept under US control in peacetime.

The nuclear alert status of these aircraft has been steady reduced since the end of the Cold War. In 1981 5% of the aircraft were on minutes notice and the remainder on days or weeks notice. In 1995 half of the force was on weeks notice and the other half on months notice. In 2002 the whole force was reduced to months notice. If NATO's nuclear-armed aircraft can be reduced to an alert status measured in months – then why not Trident ?

The Government acknowledge that there no nuclear threat today or in the immediately future. So it is not unreasonable to suggest that there would be months or years notice of any dramatic change.

Re-alerting

There are two possible forms of re-alerting – either putting one submarine to sea, possibly with a limited number of missiles and nuclear warheads, in response to a particular scenario, or alternatively restoring continuous patrols. The former would be far easier to achieve.

Risks and costs of continuous patrols:

Safety – 1 – risk of accidents at sea

Vanguard/Le Triomphant – will Vanguard be full repaired and crew trained before goes to sea ?

USS San Fransisco -

Safety – 2 – Subs are kept at sea when there is a serious reactor defect (1990 and 2000)

POLARIS SUBMARINES ON PATROL 16 August 1990 to 1 May 1992

submarine from to patrol work up change length exercise over

REPULSE ? 23 Jul 90? ? ?

REVENGE Jul 90 28 Aug 90 ? ? ?

RESOLUTION 16 Aug 90 3 Dec 90 109 days 16 days 12 days

REVENGE 2 Dec 90 18 Feb 91 79 days 3 days 12 hours

RESOLUTION 14 Feb 91 1 Jun 91 108 days 9 days 4 days

REVENGE 27 May 91 12 Jun 91 16 days nil 4 days

RESOLUTION 7 Jun 91 8 Jul 91 31 days nil 5 days

REVENGE 4 Jul 91 24 Sep 91 82 days nil 4 days

REPULSE 20 Sep 91 23 Dec 91 94 days 23 days 4 days

RESOLUTION 18 Dec 91 14 Mar 92 89 days nil 5 days