

Warhead convoy movements summary 2017

The log below is based principally on observations by Nukewatchers, but complemented by deduction as to the purpose of each convoy journey and whether or not warheads were carried.

Nukewatch considers that during 2017 at least three loaded convoys travelled between the Coulport nuclear arms depot in Scotland and the Atomic Weapons Establishment (AWE) at Burghfield in Berkshire, and at least four loaded convoys travelled in the opposite direction. We estimate that between six and twelve nuclear warheads were returned to AWE and between eleven and twenty warheads dispatched to Coulport. Our best estimate is that nine warheads were returned to AWE and fourteen were dispatched to Coulport.

The tempo of warhead convoy operations in the first half of the year, including a four month pause in journeys over the period November 2016 – March 2017 is believed to have been influenced industrial action by staff at the Atomic Weapons Establishment. Overall, the picture of all convoy movements during the year represents a broadly similar level of activity when compared with activity over the past three years. However, it is approximately double the level of activity which was observed at the beginning of the decade. Although the number of convoys carrying nuclear weapons during 2017 has slightly decreased when compared with last year, it is still substantially higher than the annual number of such convoys in the first part of the decade.

Production of the UK Trident Mark 4A warhead upgrade is now believed to be under way, and the pattern of warhead convoy movements observed by Nukewatch is consistent with a programme to rotate warheads between the Coulport warhead store and the Atomic Weapons Establishment for upgrade. This is at a somewhat higher level of activity than the baseline necessary to allow the movement of nuclear weapons for maintenance and surveillance purposes which was observed over the first part of this decade.

During both 2016 and 2017 a net surplus of warheads was delivered to Coulport when compared with the numbers returned to the Atomic Weapons Establishment. Nukewatch considers that at this stage it is too early to draw any conclusions about the possible implications of this.

During 2017 no continuous run convoy trips (journeys without an overnight break) were observed to have taken place.

Special Nuclear Materials (SNM) convoys

The Ministry of Defence also transports special nuclear materials and high security cargoes in the same vehicles that are used to move nuclear warheads. Nukewatch has observed some movements of these convoys, which are shown in the log below.

- One SNM convoy travelled between AWE Aldermaston and RAF Brize Norton in April, either delivering material for onward air transport to the United States, collecting a consignment from the United States, or both.
- Two further SNM convoys were observed travelling between AWE Aldermaston and RNAD Coulport in April and November, probably transporting tritium to Coulport. A journey observed in October may have been undertaking a similar task.
- A further SNM convoy journey may have taken place in August.

Nukewatch does not monitor all SNM convoys, and further unmonitored SNM convoys are likely to have also made journeys over the year.

Convoy exercise activities are also thought to have taken place in March, June, October, and December.

**NUKEWATCH
2017 Truck Cargo Heavy Duty (TCHD) Warhead Convoy Log**

Trip purpose	Date Out	Date In	From	To	Load	No trucks	Route
	Wed 01.03.17	Wed 01.03.17	AWE Aldermaston	AWE Burghfield	Unladen	4	
Exercise	Mon 06.03.17	Mon 06.03.17	AWE Burghfield	Gamecock Barracks	Unladen	4	A34 M40
Exercise	Mon 06.03.17	Mon 06.03.17	Gamecock Barracks	AWE Burghfield	Unladen	4	M40 A34
	Tues 07.03.17	Tues 07.03.17	AWE Burghfield	AWE Aldermaston	Unladen	4	
	Thurs 16.03.17	Thurs 16.03.17	AWE Aldermaston	AWE Burghfield	Unladen	3	
2 Trident up	Mon 20.03.17	Tues 21.03.17	AWE Burghfield	RNAD Coulport	Loaded	3	M40 M1 A1 A68
2 return Trident	Tues 04.04.17	Wed 05.04.17	RNAD Coulport	AWE Burghfield	Loaded	3	M9 A1 M1 M40
	?	?	AWE Burghfield	AWE Aldermaston	Unladen	3	
SNM	Thurs 13.04.17?	Thurs 13.04.17?	AWE Aldermaston	RAF Brize Norton	?	2 ¹	
SNM	Thurs 13.04.17?	Thurs 13.04.17?	RAF Brize Norton	AWE Aldermaston	?	2	
SNM	Tues 25.04.17	Wed 26.04.17	AWE Aldermaston	RNAD Coulport	Loaded	2	
SNM	Thurs 27.04.17	Fri 28.04.17?	RNAD Coulport	AWE Aldermaston	Unladen	2 ²	
	Tues 09.05.17	Tues 09.05.17	AWE Aldermaston	AWE Burghfield	Unladen	4	
3 Trident up	Mon 15.05.17	Tues 16.05.17	AWE Burghfield	RNAD Coulport	Loaded	4	M6 M74
	Wed 24.05.17?	?	RNAD Coulport	AWE Aldermaston	Unladen	4 ²	
	Fri 09.06.17	Fri 09.06.17	AWE Aldermaston	AWE Burghfield	Unladen	3?	
Exercise	Mon 12.06.17	Mon 12.06.17?	AWE Burghfield	MoD Wethersfield?	Unladen	3?	M4 M25 M11
	?	?	MoD Wethersfield	AWE Aldermaston	Unladen	3	
SNM?	Tues 29.08.17	?	AWE Aldermaston	?	?	2?	A34
SNM?	?	?	?	AWE Aldermaston	?	2?	
	Thurs 14.09.17	Thurs 14.09.17	AWE Aldermaston	AWE Burghfield	Unladen	4	
6 Trident up	Mon 25.09.17	Tues 26.09.17	AWE Burghfield	RNAD Coulport	Loaded	4	M40 M1 A1 A66
6 return Trident	Sun 01.10.17	Mon 02.10.17	RNAD Coulport	AWE Burghfield	Loaded	4	M80 M74 A1
	?	?	AWE Burghfield	AWE Aldermaston	Unladen	4	

Trip purpose	Date Out	Date In	From	To	Load	No trucks	Route
SNM?	?	Mon 30.10.17	?	RNAD Coulport	?	2 ¹	
SNM?	?	?	RNAD Coulport	?	?	2	
Exercise?	Tues 31.10.17	?	AWE Aldermaston	?	?	1	A34
Exercise?	?	?	?	AWE Aldermaston	?	1	
SNM	Tues 07.11.17	Wed 08.11.17	AWE Aldermaston	RNAD Coulport	Loaded	2	M6
SNM	Thurs 09.11.17	?	RNAD Coulport	AWE Aldermaston	Unladen	2 ²	M74
	Mon 13.11.17	Mon 13.11.17	AWE Aldermaston	AWE Burghfield	Unladen	4	
3 Trident up	Wed 15.11.17	Thurs 16.11.17	AWE Burghfield	RNAD Coulport	Loaded	4	A34 M1 M80
1 return Trident	Mon 20.11.17	Tues 21.11.17	RNAD Coulport	AWE Burghfield	Loaded	2	M9 A1 A34
	?	?	AWE Burghfield	AWE Aldermaston	Unladen	2	
	Fri 01.12.17	Fri 01.12.17	AWE Aldermaston	AWE Burghfield	Unladen	3	
Exercise	Sun 03.12.17	?	AWE Burghfield	?	Unladen	3 ¹	A417
	?	?	?	AWE Aldermaston	Unladen	3	

Notes:

¹ Report from a member of the public.

² Journey made as individual vehicles, not travelling in convoy.

Trident up: The indicated number of Trident warheads was believed to have been transported from the Atomic Weapons Establishment for handover to the Royal Navy at RNAD Coulport.

Return Trident: The indicated number of Trident warheads was believed to have been transported to the Atomic Weapons Establishment for inspection / maintenance / refurbishment.

SNM: Convoy believed to have been carrying special nuclear materials or other sensitive material associated with the Ministry of Defence's nuclear programmes.

Exercise: Convoy believed to have been participating in an exercise, training initiative, or convoy operating procedures inspection.

Overview of the UK's nuclear weapons programme during 2017

Introduction and context

The United Kingdom was one of the original participants in the Manhattan Project to build the first atomic weapon, has been a nuclear armed state since 1952. Since then, the nation's nuclear weapons programme has become increasingly technologically dependent on the United States of America, and since 2010 the UK has also co-operated with France on nuclear warhead science.

Under the terms of the 1962 Nassau Agreement, one of the conditions for American support for the UK's programme is that the UK's nuclear weapons are assigned to NATO's nuclear forces and can only be used independently when supreme national interests are at stake.

The UK did not participate in negotiations on the Treaty on the Prohibition of Nuclear Weapons and the current government has categorically stated that it will not sign the Treaty.¹ The extensive modernisation programme for the UK's nuclear weapons systems are an indication of the country's intention to retain nuclear weapons indefinitely, despite its claim that it is committed to the long-term goal of a world without nuclear weapons² and contrary to its disarmament obligations under the Non-Proliferation Treaty.

Current status

UK nuclear doctrine and policy is outlined in the 'National Security Strategy and Strategic Defence and Security Review 2015'.³ The UK's sole nuclear weapons system is the Trident system, based around the submarine launched Trident D5 missile procured from the USA. The missiles are deployed on four Vanguard class submarines, one of which is constantly on patrol while two others are working up to or recovering from patrol, with the fourth undergoing refit. Each armed submarine carries eight Trident D5 missiles and a total of 40 nuclear warheads. The UK has no more than 120 operationally available nuclear warheads. This is part of a larger stockpile of less than 225 warheads. The Ministry of Defence has indicated that it will reduce the overall stockpile to no more than 180 warheads by the mid-2020s.⁴ Observations of warhead convoy movements undertaken by UK Nukewatch during the first half of the decade suggested that warheads were gradually being removed from service at a rate of around three warheads per year to meet this stockpile reduction target.⁵

Modernisation

In July 2016 the UK Parliament reaffirmed its decision to replace the Trident-armed Vanguard class submarines,⁶ which are currently intended to leave service by the early 2030s (significantly beyond their original design life). The successor submarine, now known as 'Dreadnought', entered the design phase in 2011 and the first of the submarines is currently under construction. The Ministry of Defence anticipates that the first submarine will enter into service in the early 2030s (postponed from an earlier target date of 2024).⁷ The intention is for the new submarines to remain in service until the 2060s. The new vessels will be the largest submarines ever constructed for the Royal Navy and will each have 12 missile tubes. This leaves open the possibility that the number of missiles carried could be increased.⁸

The submarines will be powered by a new third generation pressurised water reactor (PWR3), which is being developed with US support. The Trident warhead, although UK built, is believed to be similar to the US W76 warhead and contains a mixture of UK and US elements. The high explosive in the warhead is British.⁹ Three key components are supplied from the US.¹⁰ This warhead is being upgraded to a new Mk4A specification. The Mk4A

1 Foreign and Commonwealth Office: UK statement on treaty prohibiting nuclear weapons. 8 July 2017. <https://www.gov.uk/government/news/uk-statement-on-treaty-prohibiting-nuclear-weapons>

2 National Security Strategy and Strategic Defence and Security Review 2015, November 2015, para. 4.79 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/478933/52309_Cm_9161_NSS_SD_Review_web_only.pdf

3 National Security Strategy and Strategic Defence and Security Review 2015, op cit. P. 34-36.

4 Ibid.

5 Rob Edwards: "UK's nuclear warheads being dismantled under disarmament obligations". The Guardian, 11 August 2013. <https://www.theguardian.com/uk-news/2013/aug/11/uk-nuclear-weapons-dismantled-trident>

6 Rowena Mason and Anushka Asthana: "Commons votes for Trident renewal by majority of 355". The Guardian, 18 July 2016. <https://www.theguardian.com/uk-news/2016/jul/18/mps-vote-in-favour-of-trident-renewal-nuclear-deterrent>

7 John Ainslie, The Trident Shambles, Scottish CND, March 2016. <http://www.banthebomb.org/images/stories/pdfs/shambles.pdf>.

8 Ibid.

9 The UK Trident warhead contains EDC37, a British explosive, rather than the American equivalent, PBX9501. Ainslie, John: 'The Future of the British Bomb'. WMD Awareness Programme, October 2006.

10 The UK has purchased three W76 components—the Arming, Fuzing and Firing System, Gas Transfer System and Neutron Generator—from the US. 'Trident missiles'. Parliamentary Written Question. Official Report, 3 December 2009,

version will be in service until the 2040s. The modernised warhead will have a new arming, fuzing, and firing system, which will enhance its capability and make it more effective against hardened targets. Evidence from UK Nukewatch based on the monitoring of warhead convoy movements suggests that production of the Mk4A warhead has commenced and that upgraded warheads have been delivered to the Royal Navy for entry into service.¹¹

In 2019 the UK is due to make a decision on the production of a new warhead, which would replace the Mk4A. The Atomic Weapons Establishment is conducting research into development of a future warhead and to date over £100 million has been spent on technology studies to support refurbishment of the current system, explore options for a potential future warhead, and inform the decision on whether to refurbish or replace the existing warhead.¹² The Ministry of Defence has indicated that a replacement warhead “is not required until at least the late 2030s, possibly later.”¹³

The United States is extending the life of the D5 Trident weapon system, updating all the Trident subsystems: launcher, navigation, fire control, guidance, missile, and re-entry.¹⁴ The UK is participating in this life extension programme and the US will supply the UK with upgraded Trident D5LE missiles and with modernised fire control and navigation systems. Approval was given in 2017 to extend the planned life of the Trident II D5 missile electronic packages, increasing the costs of the missile life extension project to around £350 million.¹⁵ The life extension programme for the D5 will only sustain the missile until the early 2040s; thus the UK government has acknowledged that “investment in a replacement ballistic missile would eventually be needed.”¹⁶

Almost all of the UK’s infrastructure for deploying, developing and building nuclear weapons is being rebuilt or refurbished.¹⁷ £1.3 billion will be spent over the next ten years to upgrade the Trident submarine base at Her Majesty’s Naval Base Clyde; a £300 million programme is under way to construct new facilities at the BAE Systems shipyard at Barrow-in-Furness where the Dreadnought submarines will be built, and around £1.5 billion has been allocated to construct a new Core Production facility at the Rolls-Royce factory in Derby where PWR3 reactor components will be produced. The Nuclear Warhead Capability Sustainment Programme, a long term infrastructure upgrade programme, has been under way at the Atomic Weapons Establishment since 2005 and new joint Anglo-French hydrodynamic research facilities for warhead research work are under construction at Valduc in France under the auspices of Project Teutates.¹⁸

Budget

Replacing the Trident submarines is expected to cost £31 billion.¹⁹ Another £10 billion has been put aside to cover any extra costs or spending over the estimate. In addition, extending the life of the current Trident missiles into the early 2040s will cost around £350 million.²⁰ Keeping the current Trident submarines in operation until the early 2030s, a period significantly longer than planned when they were first built, is also expected to cost between £1.2 and £1.4 billion.²¹

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<http://www.publications.parliament.uk/pa/cm200910/cmhansrd/cm091203/text/91203w0014.htm#09120373000543>

11 Warhead convoy movements summary 2016. Nukewatch UK. <http://www.nukewatch.org.uk/wpcontent/uploads/2014/04/Convoy-log-2016.pdf>

12 Trident:Parliamentary Written Answer 122607, 23 January 2018.

<https://www.parliament.uk/business/publications/written-questions-answers-statements/written-question/Commons/2018-01-15/122607>

13 National Security Strategy and Strategic Defence and Security Review 2015, op. cit., p35.

14 Statement of Rear Admiral Terry Benedict, Director Strategic Systems Programs, Subcommittee on Strategic Forces of the Senate Armed Services Committee, 9 February 2016.

https://www.armed-services.senate.gov/download/benedict_02-09-16

15 Ministry of Defence: The United Kingdom’s Future Nuclear Deterrent: The Dreadnought Programme. 2017 Update to Parliament.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/669771/201712202017_Annual_Update_to_Parliament-The_United_Kingdoms_Future_Nu____002_.pdf

16 The United Kingdom’s Future Nuclear Deterrent: The Submarine Initial Gate Parliamentary Report, May 2011.

17 Ministry of Defence: The United Kingdom’s Future Nuclear Deterrent: The Dreadnought Programme. 2017 Update to Parliament, op cit.

18 Nuclear Information Service: AWE: Britain’s Nuclear Weapons Factory. Past, Present, and Possibilities for the Future, June 2016. <https://www.nuclearinfo.org/sites/default/files/AWE-Past%2C%20Present%2C%20Future%20Report%202016.pdf>

19 National Security Strategy and Strategic Defence and Security Review 2015, op. cit., p37.

20 Ministry of Defence: The United Kingdom’s Future Nuclear Deterrent: The Dreadnought Programme. 2017 Update to Parliament, op cit.

21 ‘Replacing the UK’s ‘Trident’ Nuclear Deterrent,’ House of Commons Library, 11 July 2016, <http://researchbriefings.parliament.uk/ResearchBriefing/Summary/CBP-7353>.

The annual operating costs of Trident are expected to consume about 6% of the defence budget, currently equating to about £2.2 billion.²² In addition to this, a further £20 billion will be spent on operating and rebuilding the Atomic Weapons Establishment over the period 2000 – 2025.²³

Perspective

The safety and reliability of the Trident system and its costs have been recurring themes in the debate over the UK's nuclear weapons during recent years. In 2014 the Secretary of State for Defence revealed that radioactivity had been discovered in the cooling water of a test reactor at the Naval Reactor Test Establishment at Dounreay in Scotland. As a result of concerns that a similar leak might develop in the reactors of in-service submarines, an unscheduled second refit costing £120 million was ordered for HMS Vanguard, the oldest of the Trident submarines.²⁴ As yet no decision has been made as to whether second refits will be required for the other three Trident submarines. Just over a year later submariner William McNeilly, the 'Trident whistleblower', published an account of alarming safety shortfalls during a patrol of the submarine HMS Victorious,²⁵ and in 2017 it was revealed that the Ministry of Defence had covered up a malfunction that caused a test firing of a Trident missile to be aborted off the coast of Florida in 2016.²⁶

During 2017 the Ministry of Defence refused to publish the annual report of the Defence Nuclear Safety Regulator, which oversees the safety of the UK's military nuclear programmes, and redacted all information about nuclear safety from the annual report of the Defence Safety Agency, raising further concerns that the defence nuclear enterprise may be facing safety challenges, as well as doubts about the UK's commitment to openness and transparency in its nuclear weapons programme.²⁷

In 2017 the Treasury and Ministry of Defence commenced a national security capability review over concerns about the costs of the UK's defence programmes.²⁸ A review of the defence equipment programme conducted by the National Audit Office concluded that the programme was not affordable, and highlighted concerns that nuclear-related project costs, which represent around a quarter of the total programme, could destabilise the entire plan because of their size and complexity. The report revealed that the costs of the Dreadnought programme had risen by £575.5 million over the 2016-17 financial year and that the forecast costs for the future nuclear enterprise exceeded the budget allocated.

The debate over Scottish independence and the Trident programme has receded slightly over recent months, but remains highly relevant to the future of the Trident programme and can be expected to reawaken if the Scottish National Party continue to perform strongly in the polls.²⁹

22 Claire Mills and Noel Dempsey: Replacing the UK's strategic nuclear deterrent: progress of the Dreadnought class. House of Commons Library, 31 January 2018.

<http://researchbriefings.files.parliament.uk/documents/CBP-8010/CBP-8010.pdf>

23 Nuclear Information Service: AWE: Britain's Nuclear Weapons Factory. Past, Present, and Possibilities for the Future, op cit., p18.

24 Nuclear Submarines. Statement to the House of Commons. 6 March 2014.

<https://hansard.parliament.uk/debates/GetDebateAsText/14030652000003>

25 John Ainslie: Substandard: The Trident Whistleblower and the safety of British submarines.

<http://www.banthebomb.org/images/stories/pdfs/Substandard1.pdf>

26 Ewen MacAskill, "Is Britain's nuclear arsenal fit for purpose?" The Guardian, 27 January 2017.

<https://www.theguardian.com/uk-news/2017/jan/27/is-uks-nuclear-arsenal-fit-for-purpose-trident>

27 Rob Edwards: "Black-out: MoD suddenly censors all Trident safety reports". Sunday Herald, 12 November 2017.

http://www.heraldscotland.com/news/15656024.Black_out__MoD_suddenly_censors_all_Trident_safety_reports/

28 Andrew Chuter: "UK launches new mini defense and security review". Defense News, 26 July 2017.

<https://www.defensenews.com/global/2017/07/26/uk-launches-newstrategic-defence-and-security-review/>

29 Ministry of Defence: The Equipment Plan 2017 to 2027. National Audit Office, 31

January 2018. <https://www.nao.org.uk/wp-content/uploads/2018/01/TheEquipment-Plan-2017-to-2027.pdf>