



Trust and Verify

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Protocol to Climate Change Convention

The first Conference of the Parties (CoP) to the Framework Convention on Climate Change, meeting in Berlin from 28 March to 7 April 1995, has agreed on a mandate to negotiate a protocol to the Convention.

Having concluded that the current commitments in the Convention (to stabilise greenhouse gas emissions at 1990 levels by the year 2000) are not adequate, the Conference decided to set up an open ended *ad hoc* group to begin negotiations on a protocol, or other legal instrument. The group should complete its work by 1997 in order for the protocol to be adopted by the third CoP in 1997, and come into force by the year 2000.

The aim of the protocol negotiating process will be 'to set quantified 'limitation and reduction objectives within specified time-frames ... for anthropogenic emissions by sources and removals by sinks of greenhouse gases ...' and to elaborate policies and measures for doing so.

The Conference also decided to run a four year pilot phase for joint implementation projects. The pilot phase will not allow 'credits' but will allow developing country participation.

A more detailed report will appear in the next edition of *Trust & Verify*.

Nuclear activities in the CD

Fissile material cut-off mandate agreed

On 23 March the Conference on Disarmament approved a report by Ambassador Shannon of Canada, which included a mandate for negotiations on a fissile material cut-off. The Ambassador had been attempting to reach a consensus on this issue for some months.

The mandate for the cut-off negotiations reads as follows:

1. The Conference on Disarmament decides to establish an Ad Hoc Committee on a 'Ban on the production of fissile material for nuclear weapons or other nuclear explosive devices'.
2. The Conference directs the Ad Hoc Committee to negotiate a non-discriminatory, multilateral and internationally and effectively verifiable treaty

banning the production of fissile material for nuclear weapons or other nuclear explosive devices.

3. The Ad Hoc Committee will report to the Conference on Disarmament on the progress of its work before the conclusion of the 1995 session.

CTBT and safety tests

On 6 April 1995 Ambassador Weston of the United Kingdom made the following statement to the Conference on Disarmament in Geneva:

I would like to make a statement concerning the Scope of the CTBT.

As my delegation has made clear from the outset, our aim is to establish a comprehensive ban on nuclear weapons test explosions. We consider that such a ban, effectively verified and commanding universal adherence, would contribute significantly to meeting the international community's objectives of non-proliferation and global security. It would also place severe constraints on the five nuclear weapon states.

But the UK, in common with the other nuclear weapon states, will continue to bear the responsibility of ensuring the safety and reliability of its nuclear weapons. This point was stressed in the statement that I made on behalf of the UK and France on 8 March in Working Group 2. At that time, we retained the bracketed reference to exceptional explosions in the draft Article on Scope.

We have listened carefully to the views of other delegations and have taken them into consideration. I am happy to be able to say that we are now prepared to withdraw the phrase on exceptional tests. We would therefore agree to this being deleted from the revised version of the Rolling Text. This in no way diminishes our responsibility to ensure the safety and reliability of our nuclear weapons. I would like to state for the record that we consider that the Scope Article should not be interpreted as prohibiting the UK, in common with the other nuclear weapon states, from fulfilling its responsibilities to maintain the safety and reliability of its nuclear weapons.

France has indicated that they agree with the removal of this bracketed text.

Declaration by four nuclear-weapon states

Also on 5 April, Ambassador Gerald Errera of France made the following declaration at the Conference on Disarmament on behalf of France, Russia, the UK and the US:

We wish to express our continuing strong support for the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), our desire that the forthcoming Review and Extension Conference in New York should decide on its indefinite and unconditional

Calculations of British Nuclear Warhead Numbers

The following is, in the editor's view, a useful case study of being able to deduce significant information about military programmes from data that appears at first to be insufficient.

The nuclear weapon stockpiles of the smaller nuclear-weapon states are coming under increasing international scrutiny as the stockpiles of the two major nuclear powers are reduced.

In recent weeks further official information has been made available regarding the British nuclear stockpile.

On 28 March 1995, Malcolm Rifkind, Secretary of State for Defence made the following statement during a question and answer session on the floor of the House of Commons:

I am able to inform the House that when, in the next few years, Trident takes over the sub-strategic nuclear role and the WE177 free-fall bomb is withdrawn, the UK will have 21 per cent fewer nuclear warheads than it did in the 1970s, after the non-proliferation treaty came into effect. The total explosive power of those warheads will be some 59 per cent lower than the 1970s figure.

This was followed soon after by the following announcement given as an answer on 4 April to a planted Written Parliamentary Question:

In 1993 the Government announced that in the longer term we would utilise the flexibility of the Trident system to undertake the sub-strategic as well as the strategic nuclear role. I am pleased to say that the arrangements for this are progressing well. The Trident system will provide a continuously available sub-strategic capability when the second submarine — HMS Victorious joins the patrol cycle around the end of this year, and the capability will be fully robust when HMS Vigilant enters service in 1998. In the light of this we have decided that the WE177 free-fall bomb should be withdrawn from service by the end of 1998.

Calculations

The first of these statements allows a series of calculations to be carried out which reveals other information about deployed warhead numbers.

These are detailed on the page opposite.

Consequences

Taking the first of the numbered equations from the page opposite:

$$RAF_{1970} = 33 \times loads$$

Assumption: that *loads* will be an integer in the range 1 to 4, then RAF_{1970} , in this equation, = 33, 66, 99 or 132. As we are working to 2 significant figures, approximations will have crept in, therefore, RAF_{1970} should be taken as 35, 65, 100 or 130.

A set of figures that will comply with this data is: *loads* = 3, which means $RAF_{1970} = 100$.

Assumption: that no Yellow Sun or Blue Steel weapons are in service at '1970' (these were weapons used by the V-bomber force until the deterrent was taken over to the Polaris system).

Under this scheme, the 1970 warhead total is 3 x 48 Polaris warheads plus 100 WE177s, giving a total of 244; and the planned total is 3 x 64 Trident warheads giving a total of 192.

192 is 21% fewer than 244. (21.31%)

The WE177s were deployed in two versions with the RAF — WE177A and WE177B — in similar casings but of a different yield and total weight. It is known that the WE177B is of a higher yield and production of it was given priority. A third type of WE177 deployed was a nuclear depth bomb, removed from service in 1991, which has been referred to as WE177C, although this may not be its service designation. It is likely that these weapons were the WE177As transferred to the Navy.

100 WE177s, comprising 10 WE177A (at a yield of 25 kt—total 250 kt) and 90 WE177B (at a yield of 200 kt—total 18000 kt), give a WE177 total of 18250 kt and a '1970' total of 47050.

These figures give an average yield of 1.825 kt for the WE177 stockpile which is consistent with 1.8 times the Trident yield of 100 kt.

The total explosive power for Trident would be 19200 kt.

19200 is 59% less than 47050. (59.19%)

It may be no coincidence that WE177B was procured (for deployment at low level) to replace the cancelled Skybolt system which was to carry 90 warheads.

Conclusions and Comment

This is clearly not QED, but appears to be a useful guide to deployed numbers.

The summary of the estimated number of deployed warheads at the end of each year is as follows:

'1970'	244	(144 Polaris + 100 WE177)
1990	196	(96 Chevaline + 100 WE177)
1991	151	(96 Chevaline + 55 WE177)
1992	141	(96 Chevaline + 45 WE177)
1994	173	(64 Chevaline + 64 Trident + 45 WE177)
1995	205	(32 Chevaline + 128 Trident + 45 WE177)
1998	192*	(192 Trident)

(* The Government has reserved the right to deploy a maximum of 96 warheads per Trident submarine, which would give a total of 288.)

The introduction of Chevaline happened in the years 1982–87.

This means that far from these figures indicating disarmament in the light of the end of the cold war, these figures indicate that, on current plans, the same number of warheads are to be deployed in the long-term as were deployed at the end of the Cold War, with provision for possible increases.

Ironically, the real disarmament occurred with the deployment of Chevaline at the height of the Cold War.

If these figures are wrong, VERTIC challenges the Government to tell us. If we hear nothing, we shall assume that they are broadly correct.

These calculations were carried out by Richard Guthrie of VERTIC with contributions from Stephen Pullinger of the International Security Information Service (ISIS).

Background calculations

Warhead numbers

As the planned warhead numbers are a 21 per cent reduction on '1970', then 'Planned' = $0.79 \times '1970'$.

Let RAF_{1970} be the number of deployed RAF weapons in '1970' and let $loads$ be the number of submarine loads of warheads deployed on SSBNs.

The calculation is then:

$$\text{Trident warheads} = 0.79 \times (\text{Polaris warheads plus RAF warheads})$$

Assumptions: (i) $loads$ for Polaris equals $loads$ for Trident; and (ii) Trident has 64 warheads per boat [a consequence of earlier work]

$$64 \times loads = 0.79 \times (48 \times loads + RAF_{1970})$$

$$\frac{64}{0.79} \times loads = 48 \times loads + RAF_{1970}$$

$$RAF_{1970} = \left(\frac{64}{0.79} \times loads\right) - (48 \times loads)$$

$$RAF_{1970} = (81 \times loads) - (48 \times loads) = (81 - 48) \times loads$$

$$RAF_{1970} = 33 \times loads$$

[NB this is accurate only to 2 significant figures]

(1)

Yield totals

As the planned yield total is a 59 per cent reduction on '1970', then 'Planned' = $0.41 \times '1970'$.

Let $yield_{Polaris}$ be the yield of each Polaris warhead, $yield_{Trident}$ be the yield of each Trident warhead and $yield_{RAF}$ be the average yield of the RAF weapons.

The calculation is then:

$$\text{Trident yield} = 0.41 \times (\text{Polaris yield plus total RAF yield})$$

$$64 \times loads \times yield_{Trident} = 0.41 \times ((48 \times loads \times yield_{Polaris}) + (RAF_{1970} \times yield_{RAF}))$$

$$RAF_{1970} \times yield_{RAF} = \frac{64}{0.41} \times (loads \times yield_{Trident}) - (48 \times loads \times yield_{Polaris})$$

$$RAF_{1970} \times yield_{RAF} = (156 \times loads \times yield_{Trident}) - (48 \times loads \times yield_{Polaris})$$

Assumption: if $yield_{Polaris} = 2 \times yield_{Trident}$ [a consequence of earlier work]

$$RAF_{1970} \times yield_{RAF} = (156 \times loads \times yield_{Trident}) - (48 \times loads \times 2 \times yield_{Trident})$$

$$RAF_{1970} \times yield_{RAF} = (156 \times loads \times yield_{Trident}) - (96 \times loads \times yield_{Trident})$$

$$RAF_{1970} \times yield_{RAF} = (156 - 96) \times (loads \times yield_{Trident})$$

$$RAF_{1970} \times yield_{RAF} = 60 \times loads \times yield_{Trident}$$

(2)

Substituting the result of (1) into (2):

$$(33 \times loads) \times yield_{RAF} = 60 \times (loads \times yield_{Trident})$$

$$33 \times yield_{RAF} = 60 \times yield_{Trident}$$

$$yield_{RAF} = \frac{60}{33} \times yield_{Trident} = 1.8 \times yield_{Trident}$$

(3)

continuation in force and our determination to continue to implement fully all the provisions of the Treaty, including those in Article VI.

We welcome the fact that the nuclear arms race has ceased and that, in keeping with the fundamental changes that have taken place with respect to international security, important steps have been taken towards nuclear disarmament, as a result of the agreements on deep reductions in the nuclear armaments of the Russian Federation and

the United States of America as well as the significant reductions made by France and the United Kingdom in their nuclear weapon programmes.

We welcome the important progress made at the CD in the multilateral negotiations on a comprehensive nuclear test ban treaty to which we are all contributing actively. We also welcome the establishment by the CD on an Ad Hoc Committee with a mandate to negotiate a non-discriminatory

multilateral and internationally and effectively verifiable treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices. We urge that the negotiations begin forthwith.

We underline the importance of the harmonised security assurances which we have given to non-nuclear weapon State Parties to the NPT against the use of nuclear weapons, as well as the commitments as regards the provision of appropriate assistance to a non-nuclear weapon State Party to the NPT victim of aggression or threat of aggression with nuclear weapons. We believe that these strengthen international peace and security.

We solemnly reaffirm our commitment, as stated in Article VI, to pursue negotiations in good faith on effective measures relating to nuclear disarmament, which remains our ultimate goal.

We reaffirm our determination to continue to negotiate intensively, as a high priority, a universal and multilaterally and effectively verifiable comprehensive nuclear test ban treaty, and we pledge our support for its conclusion without delay.

We call upon all states parties to the NPT to make the Treaty permanent. This will be crucial for the full realisation of the goals set out in Article VI.

We call upon all States that are not Parties to the NPT to accede to it soon, thereby contributing to the enhancement of both regional and global security.

A truly universal and fully implemented Treaty is in the interests of all.

Tokyo CW attack

The attack on the Tokyo subway system using a nerve agent, Sarin, has brought to the fore the lack of legal powers in many states to deal with such an event until it happens.

There are many countries in the world, including Japan, where the production of Sarin is not, of itself, a criminal offence.

A requirement of the Chemical Weapons Convention (CWC), which has yet to be ratified by many states, is for national legislation to make such production an offence.

999 years of peace?

Should the British Government's disposal plans for military bases be seen as a long-term confidence-building measure?

It has started offering leases on certain military facilities, such as Old Sarum, for 999 years.

If William the Conqueror had given such leases on defence establishments after he had invaded the British Isles in 1066 there would still be 70 years of lease left today.

VERTIC News

Rethinking the OSCE

VERTIC has published report no. 5 in the 'Confidence Building Matters' series, entitled *Rethinking the OSCE: European Security after Budapest* by Walter Kemp and Dennis Sammut.

Copies are available from the VERTIC office.

Verification 1995 launch

At 8.30 on Thursday 20 April, *Verification 1995* will be launched over breakfast at the UN Plaza Hotel.

The launch will be chaired by Ambassador Jayantha Dhanapala, President of the NPT Conference, with presentations by Tim Trevan, of the United Nations Special Commission; David Fischer, formerly of the International Atomic Energy Agency; and Richard Guthrie, co-editor of *Verification 1995* and editor of *Trust & Verify*.

The focus of the launch will be the contribution that verification can make to the nuclear non-proliferation regime.

As space will be limited, any person wishing to attend should contact the VERTIC office beforehand.

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Trust & Verify

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What is VERTIC?

VERTIC is an independent organization aiming to research and provide information on the role of

verification technology and methods in present and future arms control and environmental agreements.

VERTIC co-ordinates six working groups comprising 21 UK consultants and 11 overseas advisors.

VERTIC is the major source of information on verification for scientists, policy makers and the press.

VERTIC is funded primarily by grants from foundations and trusts and its independence is monitored by an Oversight and Advisory Committee.

Other publications

In addition to *Trust & Verify*, VERTIC publishes the *Verification* (formerly *Verification Report*) series of yearbooks and a variety of research reports each year. Details of VERTIC publications are available on request.

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