



# Trust and Verify

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## CW traces in Iraq

Analysis of soil samples taken in Iraq by the British Chemical and Biological Defence Establishment, Porton Down, have revealed traces of chemical agents and their breakdown products.

The most significant feature of this is that the sensitivity of analytical techniques has increased by such an extent that had these samples been analysed even a few years ago, the chemical weapons may not have been detected.

The samples were taken in vicinity of the village of Birjinni in northern Iraq in May 1992. The village had been attacked on 25 August 1988. The analysis revealed traces of mustard gas and the nerve agent, sarin. Evidence of an explosive compound used in chemical weapons was also found.

It is believed that this is the first time that an allegation of the use of nerve agents has been corroborated in this way.

## OPCW PrepCom II

The second plenary session of the OPCW Preparatory Commission (PrepCom) was held in the Hague on 19-22

April. 89 signatory states attended, compared with 93 that attended the first session (see last *Trust & Verify*).

Under the rules of procedure agreed at this session, all PrepCom meetings are to remain closed, with no non-governmental participation, unless the Commission expressly decides to open a meeting.

Working Group B (Verification, Assistance and Technical Co-operation) was convened for the first time, with Sylwin Gizowski in the chair. One of its first decisions was to mandate intersessional expert groups to look at particular areas of the verification programme. Each of these experts groups will report back to the Working Group, which will then make recommendations.

Working Group A (Budget and Administration) also met during the PrepCom session. The PrepCom's budget has been set at \$8.84m for 1993.

## CWC signatories

In the last edition of *Trust & Verify*, an incomplete list of states that have recently signed the CWC was produced. In order to prevent further confusion, here is a list of all states to have signed since the signing conference in January. Up to 22 April, 142 states had signed.

Nepal	19 January
Fiji*	20 January
Saudi Arabia	20 January
Kuwait	27 January
Qatar	1 February
Oman	2 February
United Arab Emirates	2 February
Yemen	8 February
Kyrgyzstan	22 February

## VERTIC comment

### Go for a CTBT — it is easier to verify a 'zero option'

It was President Reagan and Richard Perle who first proclaimed that a zero option is always easier to verify than a treaty which allows small amounts of limited items. The Intermediate-range Nuclear Forces (INF) Treaty's verification regime has been an undoubted success, and the high degree of confidence it created was due precisely to its elimination of all ground-based intermediate-range missiles, and the dismantling of the associated infrastructure, for the US and USSR. Bases were closed, factories no longer produced the missiles, and exercises no longer took place. The same concept also applies to limits and bans on nuclear tests.

Current considerations of curbs on nuclear testing lead some to favour a low-yield testing limit of about 1 kilotonne, in the belief that this would be easier to verify than a complete test ban. Such views are mistaken, and arise from thinking that seismology is the only method of verification for a test ban.

It is true that in designing a seismic network for a test ban, a nominal limit has to be set for the threshold of detection and identification of clandestine nuclear tests. However, seismology is not the only means to monitor underground nuclear explosions. Preparations for tests may be monitored by satellite, as was proven last year by the successful prediction of a Chinese nuclear test from satellite imagery obtained by VERTIC. Moreover, in a test ban environment, aerial overflights and on-site inspections could monitor potential test sites routinely and after any suspicious event. Employing these verification tools would make a huge difference to the level of confidence in the verification of a CTBT and are in fact more useful for a CTBT than for a Low-Yield Test Ban Treaty (LYTBT).

In order to illustrate the differences between the monitoring of a CTBT and a LYTBT let us consider the verification of each in turn.

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### Verifying a CTBT

No nuclear tests would be allowed under a CTBT regime. There would be no nuclear test sites, no nuclear testing establishment and no nuclear test budget. Any unnotified largescale drilling activities would be an infringement of the treaty and any large seismic event which fulfilled the test criteria would be viewed as suspicious and investigated further.

The verification regime would consist of:

- a global network of seismic stations, designed to detect and identify tests of say 400 tonnes, fully decoupled (muffled);
- a global network of radioactive debris detectors, designed to detect atmospheric nuclear explosions and any venting from underground explosions;
- the use of satellite imagery to keep check on key areas and to provide images of regions in which there have been unidentified and unexplained seismic events;
- the use of aircraft to fly over a region under investigation; a regime of random and challenge on-site inspections;
- extensive notification and data exchange, such as a register of mines and cavities, notification of large industrial explosions etc., all of which would be subject to inspection.

The flowchart diagram below describes how such a verification regime could work.

If an event is detected (whether seismically, by satellite or by other means) and cannot be explained satisfactorily, the monitoring body could request a satellite image, an aerial overflight or an onsite inspection in order to further ascertain the cause of the event. If it is found to be caused by a nuclear test, there can be no squabbling over the yield, whether or not it was above the threshold, or whether it was a mistake, a nuclear test would be a gross violation of the treaty — and that would be that. Just as the discovery of an INF missile in the possession of the US or Russia would be a clear breach of the INF treaty, a nuclear test discovered under a CTBT would be a clearcut violation.

This approach to verification simplifies the whole procedure. For a CTBT there is a simple question: 'has

a test occurred or not?' In the case of a low-yield test ban the questions would be not only 'has a test occurred or not?', but also, if a test did occur, 'how large was the test?' The remote measurement of the yield of a test has a level of accuracy far less precise than the simple detection of a test.

### Verifying a LYBT

Imagine a setting where nuclear tests are allowed below 1 kilotonne in TNT equivalent yield. Since nuclear tests would be allowed, test sites would remain in operation. Tests could routinely be carried out and the treaty would provide for a 'whoops factor' as an allowance for tests that went wrong and went over yield.

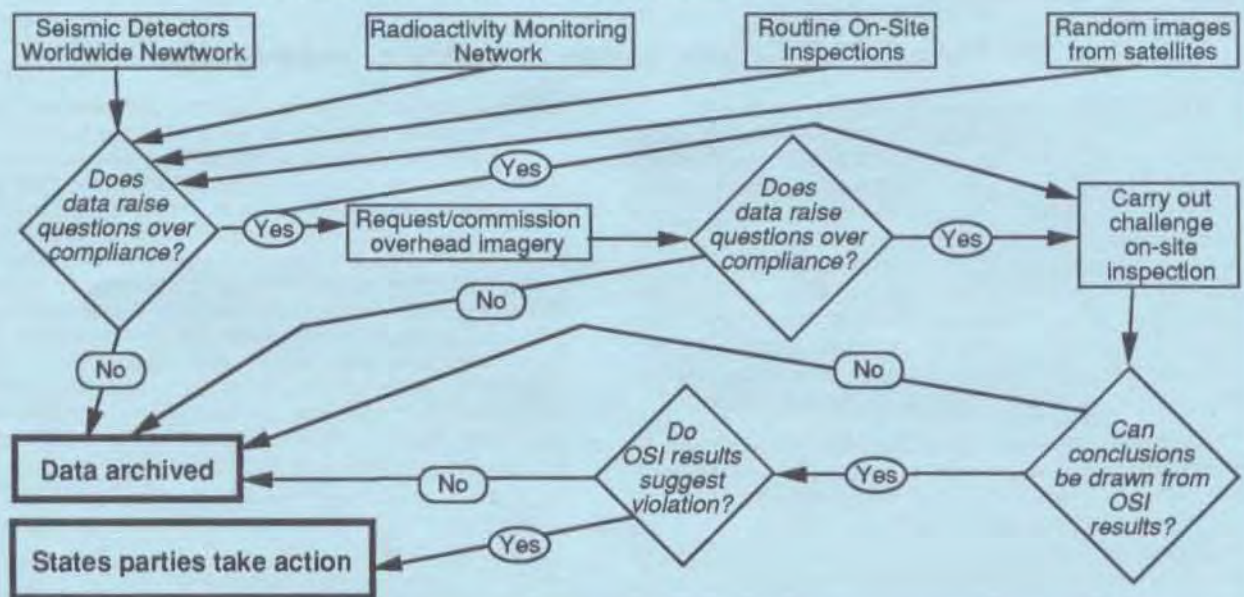
The main method for verifying this treaty would be seismic detection. Technically, it is the only method at our disposal which could discriminate between one and two kilotonne yields. There would be an uncertainty of some 30% in every yield measurement and so it would not be possible to be absolutely sure that states were consistently sticking below the kilotonne threshold. In addition there are a number of techniques, easily concealed, which can significantly reduce the observed yields of small explosions. On-site inspections could be used at the time of each test, with observers witnessing the explosion, but all other techniques — such as satellite observation, intrusive radiochemical analysis etc. — would be useless in a climate where testing were allowed.

Dependence on only one verification tool — seismology — would leave parties at the mercy of the accuracy and efficiency of that tool, rather than relying on a variety of verification tools as is the case with a CTBT.

### Conclusion

Verification of complete absence of an activity is more simple and clear cut than the case of trying to verify whether or not agreed limits have been violated. It is the disestablishment of the nuclear testing infrastructure which gives a CTBT the verification edge. Any preparations for tests or unusual activities would be legitimately viewed as suspicious, whereas in the case of a LYBT, preparations for tests would be quite legal. The secrecy surrounding nuclear tests would remain a key priority and onsite inspections would therefore be hard to arrange.

Verification scheme for a Global CTBT



Bahrain	24 February
Nicaragua	9 March
Armenia	19 March
St. Lucia	29 March

\* Fiji is listed as having signed the CWC at the signing conference. However CWC Prepcom/II/INF.1, an official Prepcom document listing the CWC signatories, lists Fiji as signing on 20 January, the same date as the deposit of its instrument of ratification.

Some confusion has occurred over the number of states to have signed the CWC. The United States Arms Control and Disarmament Agency has circulated a list, dated 31 March, purporting to show 143 signatories, however only 142 are listed. This may have arisen as Brunei Darussalam occupies two lines of the list.

Seychelles has become the third state to ratify the CWC; its instrument of ratification being deposited on 7 April.

## NPT PrepCom I

The first meeting of the Preparatory Committee (PrepCom) for the 1995 NPT Conference was taking place in New York as this edition of *Trust & Verify* went to press. The meeting started on 10 May and was scheduled to end on the 14th.

The 1995 NPT Conference will review the operation of the Treaty and make a decision on its extension. The extension decision will be of *by how long* the Treaty should be extended, not *whether* it should be.

The Secretariat, on behalf of the Depositary states, circulated a document just before the PrepCom containing draft rules of procedure for the 1995 conference. Within it is contained a draft mechanism for the extension decision.

The text is as follows:

### '1. The extension decision

- (a) The requirements of paragraph 2 of article X of the Treaty shall be considered met when there is a consensus in support of an extension proposal, provided those states joining in the consensus constitute a majority of the parties to the Treaty. To determine whether a majority of Parties to the Treaty are present, a Party may call for a roll call of those present and joining in a decision by consensus.
- (b) If a consensus is not achieved, the requirements of paragraph 2 of article X of the Treaty shall be considered met when a majority of the Parties to the Treaty votes in favour of an extension proposal which shall be determined by a roll call vote.
- (c) If the Conference is unable to reach a decision on extension in accordance with paragraph 2 of article X of the Treaty, the Conference may be recessed by the President to reconvene at a later date. The Conference may be closed only when the decision required by paragraph 2 of article X of the Treaty has been reached.'

Further text proposes mechanisms dealing with other decisions.

Although the activities of the NPT PrepCom and the OPCW PrepCom are not directly comparable, the contrast between the two regarding availability of information from them is marked. The OPCW PrepCom is in its early stages, it may yet become more open.

## Nuclear testing — US policy

The US nuclear testing moratorium continues until 1 July, when testing could legally resume. However before this can happen, the President must present Congress with an annual report containing a schedule of tests for the coming year and details of progress towards

a test ban. Congress has it in its power to 'disapprove' this report.

No such report has yet been submitted by the Clinton Administration, and there are no firm indicators of when it is likely to be submitted. Due to the time allowed for Congress to review the annual report once it has been submitted, the US will not likely to be able to resume testing until September at the earliest.

## A low-yield test ban?

Following the acceptance of the goal of a comprehensive test ban by President Clinton, officials from the Defense and Energy Departments have been airing proposals for a low-yield nuclear test ban treaty (LYTBT).

Such proposals, which would allow for nuclear tests under a certain threshold, run contrary to the testing legislation passed by Congress last year and have alarmed many in the arms control field.

A special VERTIC comment on this subject appears in this issue.

## Nuclear testing — French policy

The declared French nuclear testing moratorium ends in July, although indications are still that France is unlikely to resume testing until the United States or Russia has done so.

Officials of the Military Applications Directorate (DAM) of the Atomic Energy Commission (CEA) told the Defence Committee of the French National Assembly on 3 May that preparations have been made 'for a resumption of nuclear testing in the latter half of 1993'.

Phillippe Rouvillois (Administrateur General) and Roger Balras (Director) of the DAM told the Committee that nuclear tests were 'indispensable' and that they would like an early decision to resume testing. The Committee was also told that 'the restart of testing is needed to maintain the machinery for the conception and development of the nuclear deterrent. Tests are at present indispensable for the validation of concepts and calculations'.

The witnesses spoke of preparation for the limitation of nuclear testing, such as the PALEN project. This includes efforts to develop simulation techniques and computer modelling techniques. The committee was told that simulated testing would entail delays, increased spending and even continued testing — 'to allow validation of the relevance of models, and to adjust the parameters of simulation'.

Similar arguments have also been put forward by officials in both the United Kingdom and the United States. This testimony shows that officials in France are maintaining pressure on politicians to resume testing.

## Tomsk-7 accident

The accident at the Tomsk-7 reprocessing plant in Siberia on 6 April has contaminated surrounding land, contrary to earlier reports.

International Atomic Energy Agency figures show that some 228 grammes of plutonium are unaccounted for. However, not all of this material will have escaped into the environment. Some estimates placed the quantity of escaped plutonium as low as 23 grammes.

## French uranium enrichment

The media spotlight on Tomsk-7 has also indicated that the facility has carried out uranium enrichment for the French state-owned utility, Cogema. Cogema have confirmed that there is a contract with Russia for enriching uranium from reprocessed fuel, but has not confirmed where this contract is carried out. Other sources suggest this work is carried out at Tomsk-7.

No official reason has been given for this work being performed in Russia, but sources suggest that there is a fear that contamination of equipment that results from enriching reprocessed uranium makes the process uneconomic in France. Sources also suggest that 300-400 tonnes of uranium are to be enriched under the current contract and, intriguingly, that this is the latest in a series of contracts that date back to the 1970s.

### UN arms transfers register

The first submissions of data to the UN arms transfers register were due by 30 April. No figures are yet publicly available on the number of states that have submitted. Many returns were made close to the deadline: for example, the United Kingdom's was submitted on 29 April.

Data is collected on seven categories of weapons: main battle tanks, artillery pieces, armoured combat vehicles, combat aircraft, attack helicopters, warships and missiles and their launchers. The categories were chosen by consensus as those weapons perceived to be most destabilising and the most easily identifiable.

The data is to be published by the United Nations later in the year in a report from the Secretary-General to the General Assembly. Early innocent misreporting is expected by some of those involved in the register's establishment. In their view, the register's strength will not be dependent on any single year's data, but on its disclosure of procurement trends over time.

### Space-based weapons

Once again, the Pentagon has again aired plans to deploy weapons in space and anti-satellite systems. In testimony before the Senate Armed Services Committee the Commander of US Space Command, Air Force General Horner, indicated worries that remote-sensing satellites operated by other states could give those states advantages in a conflict.

As in previous proposals for anti-satellite weaponry, the political ramifications of such a policy have not been presented. The Space Command proposals for new weapons and rules of engagement could render satellites such as SPOT vulnerable also, as it supplies data to many states.

### Climate Change Convention

The Framework Convention on Climate Change has now been signed by a total of 161 countries, 20 of whom have ratified it.

## In the News

### Arms transfers report

A new report by Owen Greene and Malcolm Chalmers of Bradford University's Department of Peace Studies, Implementing and developing the United Nations Register of Conventional Arms, examines the development of the register to date and discusses the prospects for extending and deepening it in the mid-1990s.

### NPT seminar

The British American Security Information Council, the Centre for Defence Studies and the Council for Arms Control held a joint seminar on 6 May at King's College, London on the subject of the NPT and its 1995 extension. Participants included researchers, diplomats and officials.

### VERTIC News

The W. Alton Jones Foundation of Charlottesville, Virginia has awarded VERTIC a one-year grant under its Secure Society Program, in support of our VERTIC's work on the verification of international arms control and reduction treaties.

### Verification of Environmental Treaties

The Austrian based International Institute for Applied Systems Analysis (IIASA) is funding a substantial three year programme of research into Implementation and Effectiveness of International Environmental Commitments. VERTIC's part in the research will be to investigate verification of compliance, in collaboration with Owen Greene and Julian Salt at the University of Bradford, Juan Carlos di Primio and Wolfgang Fischer at KFA, Jülich (Germany), and David Victor of the Massachusetts Institute of Technology.

Domestic implementation of environmental agreements will be researched by several groups, including workers from the Fridtjof Nansen Institute in Norway, the Russian Academy of Sciences and the Centre for International Affairs at Harvard University. A database containing information from the programme, and other sources, will be developed a group led by Marc Levy (Harvard and Princeton), Michael Zuern (Harvard and Tuebingen) and Oran Young (Dartmouth).

For further information about the project, please contact John Lanchbery at VERTIC.

*Trust & Verify* is edited and produced by Richard Guthrie. VERTIC Comment was prepared by Patricia M. Lewis

### Trust & Verify

*Trust & Verify* is produced by VERTIC 10 times a year. Anyone wishing to contribute information for inclusion in *Trust & Verify*, or to comment on its contents, should contact the VERTIC office.

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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.

8 John Adam Street  
London WC2N 6EZ  
Telephone 071 925 0867  
Facsimile 071 925 0861

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Verification Technology Information Centre