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Analysis of the Interactions between Treaties

BDM International, Inc.
7915 Jones Branch Drive
McLean, VA 22102-3396

April 1992

Technical Report

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**Sanctions
Interactions**

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EXECUTIVE SUMMARY

BACKGROUND.

The Chemical Weapons Convention (CWC), CD/1108, prohibits the development, production, possession, acquisition, retention, and direct or indirect transfer of chemical weapons; and the use or production for the use of chemical weapons. State Parties also agree not to assist or encourage other nations to produce chemical weapons. The CWC further mandates the declaration and destruction of existing chemical weapon stockpiles and production facilities. In addition, the CWC categorizes chemicals into three Schedules based upon their toxicity and suitability for use in chemical weaponry and monitors their production and use.

In an effort to ensure the non-production of chemical weapons, the CWC requires that non-chemical weapon State Parties comply with the verification provisions. The CWC also allows for monitoring of Schedules 1, 2, and 3 chemical production activities not prohibited by the Convention: (1) industrial, agricultural, research, medical, pharmaceutical or other peaceful purposes; (2) domestic law enforcement and riot control purposes; (3) military purposes not connected with the use of chemical weapons; and (4) protective purposes. These activities, and those of the diversified global chemical and pharmaceutical industries whose production may be converted to lethal agents make the task of chemical weapons verification more difficult and necessarily more extensive and intrusive than other arms control initiatives.

The CWC relies heavily on an international on-site presence for monitoring compliance. This involves routine and challenge on-site inspection (OSI), and continuous monitoring of sites and facilities with specialized on-site instruments. The CWC verification regime is the most intrusive regime ever negotiated due to the number of facilities subject to routine inspections and the "anywhere, anytime, and no right of refusal" challenge inspections.

PURPOSE.

The purpose of this analysis was to identify the relationships between the verification provisions of other treaties and the CWC provisions (see Appendix A). The analysis of these provisions was based on the identification of specific gaps, overlapping areas, synergistic efforts, conflicting provisions, and the lessons learned for each treaty (see Appendix B). The result of the analysis was to offer recommendations to resolve conflicting provisions between the CWC and other treaties in order to enhance the effectiveness of verification of the Convention.

FINDINGS.

CWC verification provisions could have three possible effects on other treaties. First, there are treaties that will not be affected by the CWC. This study identified the Antarctic Treaty and the Nuclear Test Talks (NTT) -- i.e., the Threshold Test Ban Treaty (TTBT) and the Peaceful Nuclear Explosions Treaty (PNET) -- as unaffected by the CWC due to the nature and scope of their verification provisions. Secondly, CWC provisions could have a limited effect on treaties with little or no verification provisions. The 1925 Geneva Protocol and the Biological Weapons Convention (BWC) could be partially verified by the CWC verification provisions. Additionally, the CWC OSI provisions could uncover illicit chemical activities in violation of the UN Convention Against the Traffic in Narcotic Drugs and Psychotropic Substances. Lastly, the CWC and the U.S.-Soviet Chemical Weapons Agreement will work together to ban global chemical weapons.

Finally, there is *potential* that CWC OSI provisions could be used to inspect other treaty activities -- either unintended or intended. The current CWC challenge inspection provisions could adversely impact on the verification regimes of the NPT/IAEA, INF, CFE, and START. The misuse of "anywhere, anytime, and no right of refusal" challenge inspections could inspect facilities protected by other agreements. CWC challenge OSI could be misused to inspect facilities or geographic areas protected by quotas under another treaty. That is, each of these treaties declare the facilities that can be inspected and the number of inspections allowed. CWC challenge inspection provisions could potentially be used to access other treaty declared facilities and exceed the quotas. In addition, in some cases inspected parties have the ultimate right of refusal. The current CWC challenge OSI provisions could possibly circumvent these protective provisions which could result in loss of national security or confidential information.

Another possibility for the interaction between the CWC and other treaties is that other treaties could impact verification activities of the CWC by raising issues and delaying access to facilities that have fulfilled their quota requirements under other treaty provisions. For example, the NPT/IAEA agreements with individual facilities state that the facility will be liable to a specified number of inspections per year. If after the number of IAEA inspections has been performed, CWC inspectors assess a need to inspect the facility, it is possible that access could be challenged because the facility has fulfilled its obligation under the IAEA agreement.

Finally, common to the recent arms control treaties is the need for a database of treaty-related items that must be enumerated and considered. This applies to INF, CFE, START, the U.S.-

Soviet Chemical Weapons Agreement, and the CWC. This raises the issue of the degree to which handling and reporting of such data represents a common function which would be enhanced by addressing the interactions and commonality of such data. This has been recognized by the U.S. and is being addressed by the Defense Nuclear Agency (DNA). Under contract to DNA, BDM International is currently developing a database management system for INF, CFE, START, and a prototype for the CWC International Organization. This compliance monitoring and tracking system will handle the reporting, formatting, distribution, and compliance checking of treaty-required declarations, notifications, and reports. The commonality and compliance-related focus assures consistency.

RECOMMENDATIONS.

Under CD/1108, there are no existing conflicts among the CWC and other treaties. There are, however, limited cases where issues and conflicts *could* arise regarding CWC challenge inspections at facilities covered under other agreements. That is, there exists the *potential* for misuse of CWC challenge inspection provisions or misuse by other treaties to limit or delay CWC verification provisions. The probability of such misuse occurring is minimal due to the request for challenge inspection process in Article IX of the CWC.

Should the threat of misuse be deemed significant, further study should be performed to identify treaty loopholes and the probability of such conflicts occurring. This will depend on the scope and provisions of the CWC challenge OSI and related provisions in other treaties. A follow-on study should focus on the CWC relationship with NPT/IAEA, INF, and START, because of their quota, suspect site inspection, and declared facility provisions or limitations.

In conclusion, there exists no significant interactions or conflicts, other than the *potential*, between the CWC and any other treaty. As a result of this analysis, there are no requirements or recommendations for resolving conflicts stemming from CWC verification provisions.

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PREFACE

The analysis summarized in this report was performed by BDM International, Inc. (BDM) and Pacific-Sierra Research Services, Inc. (PSR) during the period July 26 through September 30, 1991. This report covers work performed under Technical Instruction (TI) No. FY91-06, "Analysis of the Interactions Between Treaties" of contract DNA001-90-C-0177.

Mr. Jerry Stockton is the Program Manager and Mr. Douglas Beatty is the Principal Investigator for this contract. Ms. Anne Poulin was the Technical Instruction Manager. Research and analyses were conducted by Graceanne Barbour, James Curren, Michael McHugh, and Anne Poulin, all of BDM; and Roger Fritzel, Margaret Layne, Preston Olinger, and Amy Truesdell, all of PSR. This staff, along with Ellis Mishulovich of BDM, co-authored this report. The final report was edited and prepared by Ms. Kathryn Findley and Ms. Adelina Masingill. The analytical effort was technically supported and monitored by Mr. Jonathan Fox, DNA/OPAC.

BDM would like to acknowledge the input and contributions of Mr. William Severe of the Arms Control and Disarmament Agency.

TABLE OF CONTENTS

| Section | Page |
|------------------------------------------------------------------------------------------|------------|
| EXECUTIVE SUMMARY | iii |
| PREFACE | vi |
| LIST OF TABLES | ix |
| 1 INTRODUCTION | 1 |
| 1.1 PURPOSE | 1 |
| 1.2 BACKGROUND | 1 |
| 1.3 TASK OBJECTIVE | 2 |
| 1.4 TASK SCOPE | 2 |
| 2 APPROACH | 3 |
| 3 A HISTORY OF VERIFICATION MEASURES | 6 |
| 4 TREATY VERIFICATION PROVISIONS | 14 |
| 4.1 THE CHEMICAL WEAPONS CONVENTION (CWC) | 14 |
| 4.2 ANTARCTIC TREATY | 22 |
| 4.3 NON-PROLIFERATION TREATY (NPT) AND THE IAEA | 27 |
| 4.4 THE GENEVA PROTOCOL AND THE BIOLOGICAL WEAPONS CONVENTION (BWC) | 42 |
| 4.5 NUCLEAR TESTING TALKS (NTT) | 48 |
| 4.6 INTERMEDIATE-RANGE NUCLEAR FORCES (INF) TREATY ... | 55 |
| 4.7 UN CONVENTION AGAINST TRAFFIC IN NARCOTIC DRUGS AND PSYCHOTROPIC SUBSTANCES | 68 |
| 4.8 THE U.S.-SOVIET CHEMICAL WEAPONS AGREEMENT (AND MOU) | 73 |
| 4.9 TREATY ON CONVENTIONAL ARMED FORCES IN EUROPE (CFE) | 83 |
| 4.10 STRATEGIC ARMS REDUCTION TREATY (START) | 91 |
| 4.11 "OPEN SKIES" | 103 |
| 5 CONCLUSIONS | 108 |
| 5.1 OVERVIEW | 108 |

TABLE OF CONTENTS (Concluded)

| Section | | Page |
|-----------------|-----------------------------------------------------------------|------|
| 5.2 | TREATIES NOT IMPACTED BY CWC PROVISIONS | 109 |
| 5.3 | POSSIBLE BENEFICIAL IMPACTS ON OTHER TREATIES | 110 |
| 5.4 | POTENTIAL NEGATIVE IMPACTS ON OTHER TREATIES | 110 |
| 5.5 | POTENTIAL NEGATIVE IMPACTS OF OTHER TREATIES ON THE CWC..... | 111 |
| 5.6 | RECOMMENDATIONS | 111 |
| 6 | LIST OF REFERENCES | 113 |
| Appendix | | |
| A | Key Verification Provisions..... | 115 |
| B | Interactions Between Treaties..... | 119 |
| C | List of Acronyms..... | 123 |
| D | Endnotes | 125 |
| E | Selected Bibliography..... | 127 |

LIST OF TABLES

| Table | | Page |
|-------|------------------------------------------------------------------|------|
| 1 | Key verification provisions -- CWC | 16 |
| 2 | Key verification provisions -- Antarctic | 24 |
| 3 | Interaction between CWC and the Antarctic Treaty. | 26 |
| 4 | Key verification provisions -- IAEA | 31 |
| 5 | Interaction between CWC and IAEA | 36 |
| 6 | Key verification provisions -- BWC | 45 |
| 7 | Interaction between CWC and BWC | 49 |
| 8 | Key verification provisions -- TTBT | 52 |
| 9 | Key verification provisions -- PNET. | 53 |
| 10 | Interaction between CWC and NTT. | 56 |
| 11 | Key verification provisions -- INF | 59 |
| 12 | Interaction between CWC and INF | 63 |
| 13 | Key verification provisions -- UN Convention. | 69 |
| 14 | Interaction between CWC and the UN Convention | 72 |
| 15 | Key verification provisions -- U.S.-Soviet MOU | 75 |
| 16 | Key verification provisions -- U.S.-Soviet CW Agreement. | 77 |
| 17 | Interaction between CWC and U.S.-Soviet MOU | 80 |
| 18 | Interaction between CWC and U.S.-Soviet CW Agreement. | 81 |
| 19 | Key verification provisions -- CFE | 85 |
| 20 | Interaction between CWC and CFE | 89 |
| 21 | Key verification provisions -- START | 94 |
| 22 | Interaction between CWC and START | 99 |
| 23 | Key verification provisions -- "Open Skies". | 105 |
| 24 | Interaction between CWC and "Open Skies" | 107 |
| 25 | Impact of CWC verification provisions on other treaties. | 109 |

SECTION 1 INTRODUCTION

1.1 PURPOSE.

The purpose of this analysis was to determine how the verification provisions of other treaties relate to the Chemical Weapons Convention (CWC). These treaties included, the Biological Weapons Convention (BWC); the Nuclear Testing Talks (NTT); the Intermediate-Range Nuclear Forces (INF) Treaty; the UN Convention Against Traffic in Narcotic Drugs and Psychotropic Substances; the Conventional Forces in Europe (CFE) Treaty; and the Strategic Arms Reductions Treaty (START). The study also addressed the relationship between the CWC and ongoing verification regimes such as the International Atomic Energy Agency (IAEA). This study provides recommendations, where appropriate, to resolve conflicting provisions and to enhance verification of the CWC.

1.2 BACKGROUND.

The targeting of civilians and military personnel in the Persian Gulf and the proliferation of chemical weapons capability to over 20 nations -- some of which are acquiring missile and other delivery systems of chemical agents -- have alerted national and international leaders to the breakdown of restraints against chemical weapons use. A number of factors has facilitated the spread of chemical weapons: they are relatively inexpensive, require modest technological sophistication to produce, and are generally produced from chemicals and technology with legitimate industrial applications. The widespread availability of dual-use chemicals and equipment has simplified the acquisition of chemical weapons and increased the difficulty of controlling them. Chemical weapons proliferation greatly increases the risk that chemicals will be used in violation of the 1925 Geneva Protocol, which prohibits the wartime use of asphyxiating, poisonous, or other gases, and of bacteriological weapons.

In light of this situation, the United States and the Soviet Union, along with a number of other nations, have encouraged the strengthening of the present system of chemical weapons arms control that is based on the 1925 Geneva Protocol and on the reluctance of nations to initiate gas warfare. Since the 1980s, the U.S. has worked toward concluding complex multilateral, UN-sponsored negotiations and bilateral negotiations with the Soviet Union to draft a comprehensive arms control treaty that would prohibit producing, stockpiling, transferring, and using chemical weapons. The treaty, when completed, is expected to go beyond the Geneva Protocol and the

Biological Weapons Convention by including a monitoring system to verify compliance. The CWC verification system, as currently defined in CD/1108, is to be implemented by an international agency and includes a series of declarations, reporting requirements, on-site monitoring by instruments, and on-site inspections (OSI).

1.3 TASK OBJECTIVE.

The primary objective of this analysis was to identify the relationships between the verification provisions of other treaties and the CWC. The end result of the analysis was to offer recommendations to resolve conflicting provisions between the CWC and other treaties in order to enhance the effectiveness of CWC verification.

1.4 TASK SCOPE.

BDM based this study on the text of the CWC, CD/1108, dated August 1991. In addition, the texts of relevant treaties and protocols were reviewed. The objective was to identify the key verification provisions in the CWC and other treaties for the comparison between treaties. The key verification provisions included, but were not limited to, on-site inspection regimes, diversion prevention and monitoring provisions, technical complexity of verification provisions, universality, sanctions, and types and use of inspectors/equipment for compliance monitoring. (See Appendix A.)

The analysis of these provisions was based upon the identification of specific gaps, overlapping areas, lessons learned, and synergistic efforts or conflicting provisions. The interaction between the CWC and each treaty was derived from the analysis and presented in a matrix. (See Appendix B.) From the interaction between the treaties, conclusions were drawn and recommendations were made to resolve conflicting provisions in the CWC.

This document discusses the verification provisions and the interactions between treaties and the CWC. Section 2 details the approach used to identify and resolve conflicting provisions between the CWC and other treaties. Section 3 gives a brief history of the verification tools discussed throughout the report. Section 4 contains a detailed discussion of the CWC verification provisions which are the basis for comparison between the CWC and other treaties. The remainder of the section identifies the verification provisions of each pertinent treaty and their relationships to the CWC. Lastly, Section 5 gives recommendations on resolving those conflicting provisions in the Section 4 analysis.

SECTION 2 APPROACH

The technical approach to the study supports the purpose of resolving conflicting provisions and enhancing the verification effectiveness of the CWC. It is illustrated in Figure 1.

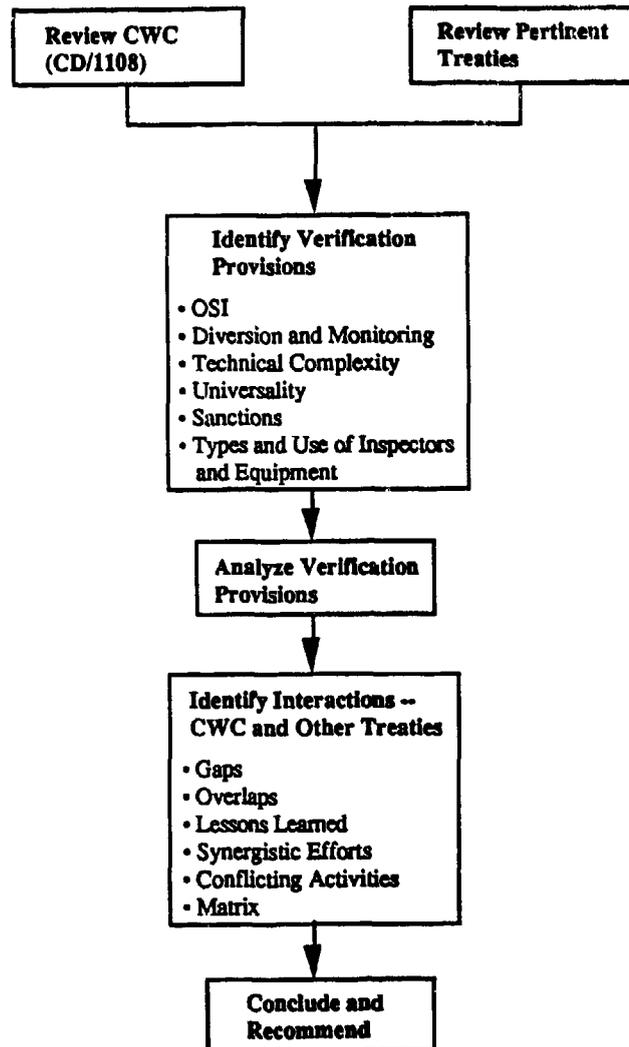


Figure 1. Technical approach.

The objective was achieved through overlapping "phases" of research and analysis. These include: (1) a review of pertinent treaties; (2) identification and analysis of the key verification provisions in each treaty; (3) identification of gaps, areas of overlap, lessons learned, and possible synergistic efforts or conflicting provisions of each treaty as it relates to the CWC; (4) development of a matrix of CWC-treaty relationships; and (5) recommendations to enhance CWC verification.

The initial effort focused on the review of the CWC (CD/1108) and relevant treaties and agreements, chosen for their verification provisions pertinent to the CWC. These are the:

- Antarctic Treaty;
- Non-Proliferation Treaty (NPT) and the IAEA;
- Biological Weapons Convention;
- Threshold Test Ban Treaty (TTBT);
- Peaceful Nuclear Explosion Treaty (PNET);
- INF Treaty;
- UN Convention Against Traffic in Narcotic Drugs and Psychotropic Substances;
- U.S.-Soviet Chemical Weapons Agreement (including the Memorandum of Understanding)
- CFE Treaty;
- Strategic Arms Reduction Treaty; and
- "Open Skies."

For each treaty, key verification provisions were identified and analyzed in terms of their relationship to the CWC. These provisions include, but are not limited to, the following:

- **On-site inspection regimes;**
- **Diversion prevention and monitoring provisions;**
- **Technical complexity;**
- **Universality;**
- **Sanctions; and**
- **Types and use of inspector/equipment for compliance monitoring.**

These provisions are presented in tabular form to provide an immediate comparison between the CWC and each treaty.

SECTION 3

A HISTORY OF VERIFICATION MEASURES

Since World War II, the critical issue of every arms control proposal has been the means of compliance verification. An understanding of the means and history of verification and the issues are important for analyzing current treaties. Previous arms limitations attempts, such as the Washington Naval Conference of 1922, had been gentlemen's agreements in which the signatories pledged to abide by the terms without intrusive verification. Unlike the pre-war treaties covering chemical weapons and naval arms, it was generally perceived that post-war negotiations would require some form of verification of treaty compliance. Allegations of non-compliance would be resolved by discussions within an international organization much like, or possibly within, the United Nations (UN).

One of the first arms control efforts was the 1946 U.S. proposal of the "Baruch Plan." It called for the establishment of an International Atomic Development Authority to be entrusted with all development and use of atomic energy and fissionable materials. After the establishment of this control Agency, nuclear weapons production would cease, U.S. weapons would be destroyed, and the Agency would be given nuclear weapons production information. The Agency would license, control, manage, and inspect peaceful atomic uses. Before the full enactment of the treaty, the entering states would agree to sanctions for treaty violations.

The Soviets responded with a proposal calling for disarmament first, and sanctions and a control agreement later. The inability to determine whether control or disarmament should come first contributed to the failure to reach an agreement early in the nuclear years. The U.S. and the Soviets failed to negotiate an arms control treaty for many years because of this basic underlying problem.

Conceptually, the means through which verification can be accomplished have remained essentially unchanged in all but one area (national technical means) since the Baruch Plan. Technological advances have allowed greater precision and monitoring capabilities, and therefore higher confidence in verification.

The general means or tools of verification can be separated into five areas:

- 1) on-site inspections;
- 2) monitoring;

- 3) national technical means;
- 4) cooperative measures; and
- 5) resolution/control body.

Some verification regimes will consist of several of these means; others will rely upon one method and exclude another. Many proposals and treaties have contained on-site inspection provisions. The procedures for these inspections vary and can allow inspectors broad or narrow rights in searching for weapons/practices inconsistent with a treaty. Inspection can also include aerial inspection. A monitoring method closely related to on-site inspection uses observers and/or devices placed on the territories of agreeing parties to observe tests, exercises, and production facilities. In many cases this monitoring is continuous and employs both personnel and technical means.

National Technical Means (NTM) is sometimes used as a euphemism for satellite reconnaissance, but NTM also encompasses seismic, air sampling, and radiation detectors. With the advent of the space age and other technological advances in the mid-1960s, both the Soviet and U.S. Governments could unilaterally employ NTM to adequately verify some agreements without the need for the intrusiveness of on-site inspection and monitoring.

In some instances, cooperative measures are specified to allow verification. Some treaties call on State Parties to neither hinder verification methods nor use deception to conceal weapons from NTM. Cooperation can entail removing facility roofs housing weapons to allow NTM to verify their contents. In the Strategic Arms Limitations Talks (SALT) II, both sides pledged not to encrypt missile telemetry to impede verification. Other cooperative measures include data exchange and prior notification of maneuvers or tests, allowing the events to be monitored and proving compliance with the levels specified in an agreement.

No treaty can be written to anticipate problems that may be encountered during implementation, thus, many post-war treaties and proposals included an international consultative body responsible for resolving problems. Among its other functions, the consultative body may interpret (or reinterpret) treaty provisions. It attempts to settle disputes and to further define permissible behavior under the existing treaty, leading to resolution of unforeseen issues or questions of interpretation.

In examining the verification problems encountered since WWII, it is interesting to note the evolution of verification means and U.S.-Soviet relations. From 1945 to 1953, Joseph Stalin held

the Soviet Union in his firm grip. It was out of the question for foreign military and technical personnel to inspect Soviet military facilities, and national technical means were not sufficiently mature to verify procedures for any potential treaty from locations outside the Soviet Union. Stalin, as well as the Korean War, effectively stalled any serious arms control attempts until after his death and the end of the war in 1953.

During the mid-1950s arms control discussions took place in the Subcommittee on Disarmament, established under the U.N. Disarmament Commission. It focused on comprehensive nuclear disarmament and conventional force reduction discussions. Because both the U.S. and the Soviet Union had entered WWII as victims of surprise attacks, the subcommittee agreed that any conventional disarmament plan must include monitoring provisions which would warn, within sufficient time, of a large scale mobilization preceding an attack. However, the Soviets objected that any monitoring or inspections before a plan was enacted would constitute espionage and would be unacceptable. In addition, the Soviets were attempting to keep Germany divided and militarily weak. This security interest grew from two costly wars between Germany and the USSR in this century and it remained a central Soviet aim of efforts at arms control in Europe from the 1950s until recently.

By the 1950s, the U.S. was forced to rethink the Baruch Plan for total nuclear disarmament. The conventional force imbalance favoring the Soviets caused the U.S. and the North Atlantic Treaty Organization (NATO) to rely on nuclear weapons to repel an attack in Central Europe. In addition, the U.S. realized that nuclear weapons production had increased to such a point that it was impossible to account for all past nuclear production. This situation made it highly questionable that an agreement banning all nuclear weapons could be verifiable, even if all states allowed intrusive verification of their fissionable materials. A potential would remain for a nation to stockpile enough nuclear weapons to yield a large strategic advantage in a conflict against a nuclear disarmed state.

On May 10, 1955, the Soviets proposed a comprehensive arms control agreement which included nuclear testing and production, as well as conventional forces in Europe; verification would be through on-site inspection and portal monitoring at selected railway crossings. In addition, a vaguely defined international organization would control fissionable materials and would resolve disputes. This agreement served as the heart of all Soviet proposals for the next several years. The West saw this proposal as an attempt to disarm West Germany and would not accept it. Additionally, the U.S. delegations were unable to discuss nuclear stockpile and testing questions, a fact which doomed negotiations during this period.

In July 1955 the U.S. offered the "Open Skies" proposal, which sought reciprocal aerial inspection after the two sides cooperatively exchanged military establishment blueprints and troop deployment information. Again, the central issue was the chronology: monitoring first, followed by disarmament, or vice versa. The Soviets remained firm that the proposal sought to legalize aerial espionage rather than lead to an arms control treaty. Between these two Soviet and U.S. proposals, all verification means -- except NTM -- were established as viable and potentially acceptable for future proposals.

By the late 1950s, comprehensive arms control proposals had met with no success, and earlier comprehensive arms control efforts then became separate issues negotiated independently. The attempt to limit or ban nuclear testing became a prime issue. In 1958 a conference of British, French, Canadian, Soviet, and U.S. experts convened in Geneva to discuss the possibility of verifying a test ban. These experts recommended a system of control posts numbering 160-180 sites, each manned by 30-40 people. Ships and aircraft would also be equipped with sensors to monitor the oceans. Suspicious events would be investigated by aerial and on-site inspection. Simultaneously with the conference, the U.S., British, and Soviets began a moratorium on testing which lasted from March 1958 to August 1961.

A series of other developments muddled these test ban negotiations. The U-2 incident, the Berlin Wall, and the Bay of Pigs hurt negotiations between East and West. The Soviets still appeared reluctant to allow on-site inspection and monitoring stations on their territory when some within the U.S. scientific community conjectured that the Soviets were violating the testing moratorium. At the same time, the advent of the space program and other advances brought technology to a level which allowed some verification of limited arms control objectives using NTM.

By 1963, a number of events partially resolved the test ban issue. The Cuban missile crisis had made both Kennedy and Khrushchev much more amenable to reducing the risks inherent in the arms race. In his June 1963 speech at American University, Kennedy pledged that the U.S. would continue attempts to negotiate a comprehensive test ban. The Soviets agreed to some on-site monitoring; however, they wanted two or three sites, while the U.S. reduced its proposal from over 20 to eight or ten. Some analysts of this period have speculated that Khrushchev would have had trouble with the Politburo if he allowed more than a few sites, while Kennedy would have had trouble with the Senate had he agreed to less than ten.

Just as it seemed as if consensus for a comprehensive testing agreement with verification provisions was within reach, a partial agreement was signed, halting progress on the Comprehensive Test Ban (CTB). The compromise came in August 1963 with the Limited Test Ban Treaty (LTBT). The LTBT, which banned weapons tests in the atmosphere, in space, and under water, was readily verifiable without using intrusive means, and had public support driven by concern about the dangers of nuclear tests. In the early 1960s, the hazards of radiation stirred domestic concerns about atmospheric testing. These concerns provided the impetus for a quick resolution of the testing issue. Technologically, verifying an above-ground test ban was not a difficult task and could be accomplished solely through NTM, without on-site inspections or monitoring stations. Accordingly, the LTBT made no provisions for verification. As a result of these two factors, rather than being a stepping stone for a comprehensive testing agreement, the LTBT quelled domestic concerns over testing and averted the need for an additional CTB agreement. Within months of signing the agreement, Kennedy and Khrushchev were gone from power, along with their first-hand knowledge of the dangers of nuclear instability. For a decade the leadership change slowed progress in nuclear testing agreements between the two powers.

Between 1957 and 1968, the U.S. took part in numerous multilateral arms control efforts which laid a ground work for future verification regimes. The IAEA, established in 1957, was a weakened version of international control authority for nuclear power that the Baruch Plan had foreseen a decade earlier. The IAEA facilitates the peaceful use of nuclear energy and provides safeguards against misuse of nuclear materials and equipment. The Antarctic Treaty, signed in 1959, was the first treaty that provided for on-site inspection. The Latin America Nuclear Free Zone Treaty (1967) also allowed for OSI. These two treaties were relatively easy to sign and have been referred to as "non-armament" treaties. No states had to give up anything they already had. Instead, they were giving up future acquisitions. The last multilateral treaty in this timeframe was the Non-Proliferation Treaty. In addition to restricting nuclear proliferation, this Treaty called for Superpower commitment to nuclear arms reductions and led eventually to the SALT discussions.

During the early stages of the SALT negotiations, the two Superpowers agreed to discuss limiting delivery systems rather than warheads. Had warheads been counted, it is very likely that an intrusive verification means would have been required. By contrast, counting delivery systems was comparatively easy. In 1972, both parties' intercontinental ballistic missiles (ICBMs) were deployed in fixed hardened silos; NTM would detect additional silo construction. The U.S. stated that mobile ICBM deployment would be considered inconsistent with the Treaty's objective as NTM could not verify these systems. NTM could verify long-range bombers and ballistic missile submarines, as well as the defensive anti-ballistic missile (ABM) systems limited in these

agreements, to a reasonable degree. The verification means remained the same in the SALT II discussions and in the unratified treaty.

Early in the SALT negotiations, both sides realized the need for a commission to address issues concerning possible non-compliance. For this reason they established the Standing Consultative Commission (SCC). The SCC meets twice a year to discuss any relevant issues. These meeting records were secret, in the hope for frank, non-political discussions. In 1979 President Carter declassified the subject matter of previous SCC discussions in a bid to show that the verification provisions of SALT I had been effective in preventing non-compliance. These documents revealed that in one instance the Soviets had fired SA-5 missiles in a way that, according to the U.S., tested the system in an ABM mode. In another case U.S. construction workers performing maintenance on a missile silo erected a small building that interfered with Soviet NTM. The SCC resolved these and other issues.

During the 1980s the SCC's role was questioned because of its inability to resolve issues such as the Krasnoyarsk radar construction. The Soviets contended that the facility was a space tracking radar, while the U.S. felt that it constituted a violation of the ABM Treaty. In 1985 Secretary of Defense Weinberger noted how politicized the SCC issue had become, stating, "The SCC has become a diplomatic carpet under which Soviet violations have been swept, an Orwellian memory hole into which our concerns have been dumped like yesterday's trash." Several years later the Soviets admitted that the Krasnoyarsk radar was not permitted under SALT, and they began dismantling the system.

Events abroad and the U.S. domestic political environment during the late 1970s and early 1980s threw a shadow over "trusting" the Soviets. The Soviets applied a questionable interpretation to a SALT provision which allowed each party to increase its missiles' dimensions. Their interpretation allowed the Soviets to develop missiles with far greater throw-weight than U.S. negotiators expected. The 1979 revelation that U.S. intelligence had recently identified a Soviet brigade in Cuba which had been there for years raised questions about NTM capabilities. The Shah's fall and the loss of collection assets in Iran gave rise to additional questions of SALT II verifiability. Finally, the Soviet invasion of Afghanistan effectively killed SALT II ratification. These developments gave many U.S. policymakers and the public the perception, correct or incorrect, that the U.S. intelligence community could not fully verify an arms control agreement solely through NTM. These situations signaled the Soviets and the U.S. President that any future arms control agreement would require intrusive verification means.

The Soviet domestic political climate has changed considerably over the last decade. Although the Soviets seemed more amenable to arms control during the Brezhnev years than under the Stalin reign, they were still reluctant to allow U.S. inspectors into the Soviet Union. The NTT allowed limited on-site monitoring provisions, but this was the exception rather than the rule in negotiations. Gorbachev's ascendancy further changed Soviet views toward intrusive verification. Interestingly, these Treaties, although negotiated in the mid-1970s, are being enacted only now.

Other treaties, such as SALT II, continued to employ NTM as the only verification means. The Soviets had stated that some of their SS-17, -18, and -19 ICBMs with multiple independent reentry vehicles (MIRVs) carried only one (albeit large) warhead. The U.S. position was that if the systems carrying only one warhead were not counted as MIRVed platforms, intrusive inspections of the missile bus were needed. The Soviets then agreed that all missiles tested as a MIRVed platform would be counted as such.

During the time these political developments occurred, technological developments changed the arms control emphasis away from NTM. Rather than monitoring large fixed systems, as SALT required, the INF negotiations required verifying the destruction of small, mobile weapon systems. To successfully accomplish this mission, NTM would need augmentation with on-site inspection, monitoring, and cooperative means. Similarly, due to mobile ICBM deployment, the START Treaty would also require means beyond NTM.

Current negotiations have produced a proliferation of resolution bodies. The Reagan Administration had severely questioned the SCC's capability in handling compliance violations. Some in the U.S. Administration felt that each treaty should establish a compliance commission. For this reason, a new body was required to hear questions on INF compliance. One such body was the Special Verification Commission (SVC). It differed slightly from the SCC in that meetings could take place as required rather than twice a year, and that SVC meeting results are made public. The compliance forum for the CFE Treaty is the Joint Consultative Group (JCG). The Joint Compliance and Inspection Commission (JCIC) will handle problems specific to the START agreement; the Organization will serve this function in the CWC.

In the 1950s, on-site verification was considered a necessary requirement for any arms control verification regime. In the 1960s and '70s, NTM seemed to have obviated this contentious necessity. Ten years ago an arms control proposal with an intrusive verification provision would have been unattainable. Now on-site and aerial inspection provisions are an integral verification aspect for many arms treaties recently negotiated or currently under negotiation. Under the Vienna

Agreement, aerial inspection is a major component, with the U.S. advocating an "Open Skies" agreement. CFE, START, and the CWC call for intrusive measures of verification. Today's verification regimes in arms control proposals recognize the limitations of NTM, and intrusive means are becoming accepted. The Treaty-Limited Equipment (TLE) dictates the shift from NTM, and the policy demands capabilities beyond NTM.

It is in this evolving context that the data collection, analysis, interpretation, and insights were addressed for each treaty. These historical considerations assisted in the review and analysis of the treaties and findings. This information provides a contemporary perspective to influence the research and analysis of each treaty.

SECTION 4 TREATY VERIFICATION PROVISIONS

This discussion of the CWC, CD/1108, includes a brief history of the CWC and a detailed discussion of its verification provisions. It provides the basis for comparison between the CWC and other treaties. The remainder of the section identifies the verification provisions pertinent to each treaty and the relationship/interaction with the CWC.

It should be noted that not all treaties, despite some general functional similarities, contain the verification detail of the CWC. Hence, the level of detail governing any one facet of a particular treaty varies considerably. As a result, the discussions which follow identify the relevant aspects of each treaty and its relationship to the CWC.

4.1 THE CHEMICAL WEAPONS CONVENTION (CWC).

4.1.1 Overview.

For more than sixty years the 1925 Geneva Protocol, which bans wartime use of poison gas and biological weapons, has been the principal international legal instrument limiting the use of chemical weapons. Many nations, however, do not consider themselves bound by its provisions if another nation uses chemical weapons against them first, and the Protocol does not regulate the manufacture and storage of chemical weapons. The Protocol's limitations prompted the United Nations to authorize the Conference on Disarmament (CD) to conduct negotiations on a multinational convention to totally ban chemical weapons; and in 1980, an *Ad Hoc* Working Group on Chemical Weapons of the Conference on Disarmament was established. While progress was made in the early 1980s (particularly the drafting of a CWC in 1984) later development -- notably reports of proliferation and Iraq's extensive use of chemical weapons against Iran during the Gulf War and against its Kurdish population during 1987-1988 -- focused unprecedented global efforts on a chemical weapons ban.

The CWC (CD/1108) Rolling Text prohibits the development, production, possession, acquisition, retention, and direct or indirect transfer of chemical weapons, and the use or preparation for use of chemical weapons. State Parties also agree not to assist or encourage other nations to produce chemical weapons. The CWC further mandates the declaration and destruction of existing chemical weapon stockpiles and production facilities. Stockpiles and facility destruction must begin within one year and must be completed not later than ten years after the

CWC enters into force. The CWC also categorizes chemicals into three Schedules based upon their toxicity and suitability for use in weaponry. Schedule 1 contains super-toxic lethal chemicals, such as nerve agents and mustard gas, that have no purpose other than in a weapons capacity. The production, stockpiling, and possession of these chemicals are prohibited except for limited quantities for research, medical, or protective purposes. Schedule 2 lists chemicals that have principally a legitimate commercial use, but can serve as key precursors to warfare agents or to the production of Schedule 1 chemicals. Schedule 3 lists chemicals that have a chemical weapons potential but are used principally for peaceful purposes. The aim of verification will be to verify that declared facilities are not used to produce any chemical listed in Schedule 1; the quantities of Schedule 2 chemicals are consistent with the needs of activities not prohibited by the CWC; and the chemicals listed in Schedule 3 are not diverted or used for prohibited purposes.

In an effort to ensure the non-production of chemical weapons, the CWC requires State Parties with no chemical weapons to comply with the verification provisions. The CWC also mandates the regulation and monitoring of the following chemical production activities not prohibited by the Convention: (1) industrial, agricultural, research, medical or other peaceful purposes; (2) military purposes not connected with the use of chemical weapons; and (3) protective purposes, such as those directly related to protection against chemical weapons. These activities, particularly those of the diversified global chemical and pharmaceutical industries whose production may be converted to lethal agents, make the task of chemical weapons verification more difficult and necessarily more extensive and intrusive than for other arms control initiatives.

4.1.2 Key Verification Provisions.

The CWC relies heavily on an international on-site presence for monitoring compliance with its obligations. This involves routine and challenge OSI, and allows for continuous monitoring of sites and facilities with specialized on-site instruments (e.g., automatic data gathering and sampling devices, tamper-proof seals, and cameras). The conclusion of agreements on subsidiary arrangements facilitate the on-site inspection and monitoring provisions. Table 1 summarizes the verification provisions in CD/1108.

Under Section 1, paragraph 3 of Part II in the Protocol on Inspection Procedures, each State Party will conclude a facility agreement with the Organization for each facility declared and subject to initial and routine on-site inspections under Articles IV, V, and Annexes 1 and 2 of Article VI. Each agreement will be based on model agreements and will detail the arrangements governing

Table 1. Key verification provisions -- CWC.

| PROVISIONS | CWC |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share, and exchange chemicals, equipment and information relating to development and non-prohibited application of chemistry |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, and Security Council |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council |
| OTHER | Facility agreements |

inspections at each facility. In addition, the Model Agreement will include provisions to take into account future technological developments. Facility agreements will be concluded for:

- chemical weapons storage and destruction facilities (Article IV);
- chemical weapons production facilities (Article V);
- the single small-scale facility and approved facilities outside the single small-scale facility producing Schedule 1 chemicals (Annex 1 to Article VI); and
- facilities that produce, process, or consume Schedule 2, parts A and B chemicals (Annex 2 to Article VI).

Facility agreements will not govern those sites producing, processing, or consuming Schedule 3 chemicals. These chemicals will be subject only to monitoring by data reporting; no routine OSI or continuous monitoring by on-site instruments will occur.

Section VI.D of Part I in the Protocol on Inspection Procedures specifies the rights of inspector teams when conducting an inspection. They are:

- unimpeded access to the inspection site and choice of items to be inspected;
- right to interview any facility personnel to establish relevant facts;
- right to inspect documentation and records deemed relevant;
- right to request instant photographs be taken; and
- right to request the inspected State Party take specified samples and perform on-site analysis of these samples.

Additional rights are established for conducting challenge inspections and investigating the alleged use of chemical weapons. These rights are discussed later in this subsection.

Article IV and its Annex address chemical weapons verification. Immediately upon receipt of a declaration, inspectors will conduct initial on-site inspections of chemical weapons storage facilities

to verify the accuracy of the information. They can employ agreed seals, markers, or other inventory control procedures to facilitate an accurate inventory of the chemical weapons at each storage facility. Subsequently, the facilities will be subject to routine monitoring to ensure that no undetected removal of chemical weapons takes place. The monitoring will be initiated as early as possible after receipt of the declaration and will continue until all chemical munitions have been removed from the storage facility. This will be ensured, in accordance with the subsidiary arrangements, through a combination of continuous monitoring with on-site instruments and routine on-site inspections or, where the use of on-site instruments is not feasible, by the continuous presence of inspectors. During routine inspections, the inspectors will verify that the monitoring system is functioning correctly and will verify the inventory in an agreed number of bunkers and storage areas. Additionally, inspectors will be present when chemical weapons are removed from the storage facility and will verify that the chemical weapons on the inventory are loaded onto the transport vehicle, at which time they will seal the cargo and/or means of transport. In accordance with agreement on storage facility subsidiary arrangements, inspectors will have unimpeded access to all parts of the storage facilities including any munitions, devices, bulk containers, or other containers therein. Inspectors have the right to choose the items to be inspected, and to receive samples taken at their request from any devices, bulk containers, and other containers at the facility.

Regarding the movement of chemical weapons from the storage facility to the destruction facility, inspectors will verify this arrival at the destruction facility by checking the seals on the cargo and/or means of transport, and will verify the inventory accuracy of the chemical weapons transported and stored, employing agreed seals, markers, or other inventory control procedures. As long as chemical weapons are stored at chemical weapon storage facilities at destruction facilities, the storage facilities will be subject to routine monitoring by either physical observation performed by inspectors or the use of devices. Inspectors will, in accordance with the subsidiary arrangements, have unimpeded access to all parts of the destruction facilities, and the storage facilities and, any munitions, devices, bulk containers, or other containers therein. Inspectors have the right to choose the items to be inspected; to monitor the systematic on-site analysis of samples during the destruction process; and to receive samples taken at their request from any devices, bulk containers, and other containers at the destruction facility or storage facility therein.

Article V and its Annex define the verification procedures of chemical weapons production facilities. Verification of the facility declarations will begin with an initial OSI to confirm that all activity has ceased except that required for closure, and to confirm through initial and subsequent routine OSI the accuracy of the declarations. Inspectors will employ agreed seals, markers, or

other inventory control procedures to facilitate an accurate inventory of the declared items at the production facility. Subsequent to the initial OSI to confirm declarations, the inspectors will conduct OSI at each production facility to verify that closure has occurred. The routine monitoring of chemical production facilities is to ensure that no resumption chemical weapons production nor removal of declared items is left undetected at this facility. Closure cessation will be ensured by a combination of continuous monitoring with on-site instruments and routine verification by OSI or, where the continuous monitoring of on-site instruments is not feasible, by the presence of inspectors. Inspectors will have unimpeded access to all parts of the chemical weapons production facilities. Inspectors will choose the items on the declared inventory to be inspected. The destruction of chemical weapons production facilities will be verified and confirmed that each item in the declared inventory is destroyed in accordance with the facilities' detailed destruction plan.

Article VI specifies those activities not prohibited under the CWC and the use of Schedule 1, 2, and 3 chemicals. Annex 1 to Article VI addresses the verification of Schedule 1 chemicals. These chemicals are strictly limited to research, medical, pharmaceutical, and protective purposes, and to quantities of less than or equal to one metric ton. Chemical production for the above-specified purposes will occur at (1) a single small-scale facility approved by the State Party, or (2) at approved facilities outside the single small-scale facility provided the aggregate amount does not exceed that stated in the CWC. The purpose of verification at the single small-scale facility will be to verify that the quantities and aggregate amounts of Schedule 1 chemicals produced are correctly declared. An initial inspection will verify this information; subsequently, the facility will be subject to routine OSI and monitoring with on-site instruments. Likewise, the purpose of verification activities of the approved facilities outside the single small-scale will be to verify that the facility is not used to produce any chemical listed in Schedule 1 except for the declared chemical; the quantities of the chemical listed in Schedule 1 produced, processed or consumed are correctly declared and consistent with needs for the declared purposes; and that the chemical listed in Schedule 1 is not diverted or used for other purposes. These facilities will also be subject to routine OSI and monitoring with on-site instruments.

Annex 2 to Article VI specifies the verification procedures of Schedule 2, Parts A and B. Each State Party will subject chemicals listed in Schedule 2, Parts A and B, and facilities which produce, process, or consume them to monitoring by data reporting, routine OSI, and use of on-site instruments. The aim will be to verify that declared facilities are not used to produce any chemical listed in Schedule 1; the quantities of chemicals listed in Schedule 2 produced, processed, or consumed are consistent with the needs of activities not prohibited by the CWC; and the chemicals listed in Schedule 3 are not diverted or used for prohibited purposes.

Section IIIA of Part II in the Protocol on Inspection Procedures addresses the standing arrangements for continuous monitoring by instruments to be applied to the initial and routine inspections discussed above. The Technical Secretariat will have the right to install and use continuous monitoring instruments and systems and seals conforming to the facility agreements, which will specify the types of continuous monitoring systems, e.g., sensors, ancillary equipment, and transmission systems. These systems will incorporate tamper-indicating and tamper-resistant devices as well as data protections and data authentication features. The Technical Secretariat will have the right to carry out necessary engineering surveys, construction, emplacement, maintenance, repair, replacement, and removal of continuous monitoring instruments, systems, and seals. During each routine inspection, the inspection team will verify that the monitoring system functions correctly and that emplaced seals are untampered.

Article IX addresses clarification and fact-finding procedures when one State Party is suspicious of another's compliance. The conduct of a challenge inspection pursuant to Article IX is discussed in Section III of Part III in the Protocol on Inspection Procedures. Such inspections will be performed by inspectors and inspection assistants especially designated for this function. Upon arrival at the inspection site, the inspection team can secure the inspection site, patrol its perimeter, station personnel at the exits, use approved equipment to monitor the perimeter of the site, and inspect any transportation leaving or entering the site. In addition, the inspection team can decide that no transports can leave the inspection site during the course of the inspection until permitted to ensure that relevant material is not destroyed or removed from the site. For the purpose of protecting confidential data, the inspected State Party can apply measures, e.g., shrouding, to protect sensitive installations and prevent disclosure of non-chemical weapons-related information; however, these measures cannot interfere with the inspection. In CD/1108, inspectors have the right to inspect the entire inspection site, including shrouded or environmentally protected objects and the interiors of structures, containers, and vehicles. Inspectors conducting challenge inspections will also have the right to collect any air, soil, wipe, or effluent samples from the inspection site and at the site perimeter upon arrival and throughout the inspection period.

Challenge inspection provisions remain a major issue at the Conference on Disarmament. In July 1991, Australia, Japan, the U.K., and the United States tabled a working paper recommending new text on challenge inspections. This proposal is a shift from the earlier approach of "anywhere, anytime, and no right of refusal" inspections. It applies only to so-called challenge inspections against installations that have been declared pursuant to Article IX. The

U.S.-led proposal allows the challenged country to protect sensitive installations from challenge inspections and restrict inspectors access to sites. Under such circumstances, the suspected country would be required to make an effort to demonstrate its compliance in terms of the challenging party's issue. The working paper would allow up to a week to pass between the notification of the intent to inspect and the start of the inspection itself, thus allowing sensitive material to be removed from the site.

Under the inspection of the alleged use of chemical weapons (Protocol on Inspection Procedures, Part IV, Section III), the inspection team will have the right to access any areas which could be affected by the alleged use of chemical weapons. It will also have the right of access to hospitals, refugee camps, and other locations it deems relevant to the effective investigation of the alleged use of chemical weapons (CW). The inspection team will have the right to collect samples, to include toxic chemicals, munitions and devices, remnants of munitions and devices, environmental samples (air, soil, vegetation, water, snow) and biomedical samples from human or animal sources (blood, urine, excreta, tissue). The team will have the right to interview and examine persons who may have been affected by the alleged CW use, the right to interview eyewitnesses to the alleged CW use, to interview medical personnel, to access medical histories, and to participate in autopsies of persons who may have been affected by CW.

The CWC does not define the types and use of inspectors and inspection assistants for initial, routine, and challenge on-site inspections and investigations of alleged use of chemical weapons. E. M. International is performing a study on the CWC inspector functions, qualifications, and training, and will provide its conclusions in a subsequent report. The CWC does, to some extent, specify the types and use of monitoring equipment. Continuous monitoring systems can consist of sensors, ancillary equipment, and transmission systems, and will incorporate tamper-indicating and tamper-resistant devices as well as data protection and data authentication features. The actual equipment to be used for verification will be specified in facility agreements concluded between a State Party and the Organization for the purpose of routine inspections.

4.1.3 Conclusions.

The CWC, when completed, will go far beyond the Geneva Protocol by including a system of monitoring to effectively verify compliance. The International Organization will implement the system, under CD/1108, which will include a series of declarations, reporting requirements, monitoring by on-site instruments, and routine and challenge on-site inspections. To effectively verify non-production of chemical weapons and non-diversion of key chemical precursors, the

Convention will subject commercial facilities as well as Government installations to its provisions. Therefore, a domestic implementation system will be necessary to assure that the United States is in compliance with the Treaty and to facilitate the Organization's verification of U.S. compliance.

While the CWC differs from other arms control agreements, it is feasible that there will be overlaps, gaps, synergism, and conflicts between it and other treaties that may aid in its negotiation and completion. In addition, lessons learned may be applied to the CWC to enhance its effectiveness in banning chemical weapons and their proliferation.

4.2 ANTARCTIC TREATY.

4.2.1 Overview.

The Antarctic Treaty was the first successfully negotiated arms control treaty in the post-WWII era, and it contributed to a partial detente in U.S.-Soviet relations in the late 1950s. The Treaty resulted from international joint scientific studies conducted in Antarctica during the International Geophysical Year (IGY) in 1957. When these studies proved useful, many in the international scientific community expressed interest in keeping Antarctica open to continued scientific investigation and exploration. Simultaneously, a partial thaw in U.S.-Soviet relations contributed to a feeling of goodwill between the two superpowers. Negotiations in Geneva looked promising, and both the U.S. and the Soviets refrained from testing nuclear weapons during the moratorium of 1958 to 1961, allowing a common ground to be established quickly without political antagonism subverting the effort.

Through provisions designed to prevent militarization and to ensure peaceful international cooperation, the Antarctic Treaty has served as a model for other exclusionary or "non-armament" treaties, such as the Latin American Nuclear-Free Zone, the NPT, and the Outer Space Treaty. None of the nations with bases or exploration activities in Antarctica had used the continent for military purposes; however, the possibility existed that the continent would become militarized in the future. This Treaty pledged the signatories to ensure that Antarctica is used solely for peaceful purposes. It also diffused overlapping territorial claims by making the continent international.

The Treaty was signed at the Washington Conference in December 1959 by the 12 nations involved in the IGY scientific research in the region: Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the Soviet Union, the United Kingdom and the United States. Since the Washington Conference, 13 other nations have signed the Antarctic

Treaty. The original Treaty has been supplemented with a number of conventions and agreed measures covering environmental issues such as flora, fauna, and seals. The intent has been to use the original Treaty as a building block to construct further protection of the continent's fragile ecosystem.

4.2.2 Key Verification Provisions.

This Treaty was the first multilateral arms control effort to contain provisions for verification. The Treaty allows anytime, anywhere on-site inspections without equipment limitations. Additionally, unrestricted aerial inspection is permitted "at any time over any and all areas of Antarctica," exclusive of bird or seal concentrations. There are no diversion prevention and monitoring provisions, universality clauses, or sanctions. Lastly, the Treaty contains provisions for consultation and dispute resolution through the Antarctic Treaty Consultative Meeting. The verification provisions are listed in Table 2 and expanded upon in the following discussion.

On-site Inspection

The Treaty's inspection provisions are quite general and untechnical. Under Article VII, each signatory has the right to designate inspectors who can inspect "all areas of Antarctica, including all stations, installations and equipment within those areas, and all ships and aircraft at points of discharging or embarking cargoes or personnel in Antarctica." Because there is no private or nationally held property in Antarctica, the Treaty does not have to concern the rights of individuals or corporations. The only requirement for inspection specified by the Treaty is that the inspecting party forward the inspectors' names to the inspected party prior to the inspection.

Several parties have exercised the rights of inspection under the Treaty. New Zealand performed the first inspection under the Treaty in 1963, followed by British and Australian inspections in the same year. The U.S. has exercised the inspection provision more than any signatory. Its inspectors visited sites in Antarctica nine times between 1964 and 1989. There have been no reported uses of Antarctica for military purposes (although there have been rumors of small scale military maneuvers by some nations) which made the inspections for military equipment perfunctory. Today, U.S. inspectors concern themselves mostly with environmental issues.

Table 2. Key verification provisions -- Antarctic.

| PROVISIONS | CWC | ANTARCTIC |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | Anytime, anywhere inspection |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | None |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | Unlimited; however, in practice limited to simple means |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | None |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | None |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Mix of civilian/military inspectors with State Department leadership No specialized equipment |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | Antarctic Treaty Consultative Meeting (ATCM) |
| OTHER | Facility agreements | Environmental issues dominate Inspections sought to enforce other Antarctic-related conventions |

Types of Inspectors and Equipment

U.S. inspection teams are a mix of civilian personnel from the scientific community and military personnel under the direction of the State Department. The inspectors generally are lightly equipped, performing their missions mainly with cameras, pens, and paper. The treaty does not prohibit using technically complex equipment, but in performing these functions, inspectors generally do not wish to be burdened with additional equipment. During the first inspections, teams possibly carried Geiger counters.

Resolution Body

Article IX of the Treaty establishes that the signatories shall meet in Antarctic Treaty Consultative Meetings. Since 1961 there have been a total of fifteen meetings held at approximately two-year intervals. These meetings take place behind closed doors to allow frank discussions and exchanges of views. Over the last few years, however, these meetings have become more public, and meeting documentation is published prior to the next meeting. The Consultative Meetings allow for the resolution of disputes concerning the Treaty and any of the related agreements and follow-on conventions. Should a Consultative Meeting fail to successfully resolve an outstanding issue, the issue is referred to the International Court of Justice (ICJ).

4.2.3 Interaction Between the CWC and the Antarctic Treaty.

The anytime, anywhere OSI provisions of the Antarctic Treaty and the challenge inspection provisions of the CWC allow inspectors a great deal of latitude in carrying out their mission. In Antarctica the provisions have no impact on military forces, as they are intended to ensure that research facilities are not being used for military purposes. In this respect, the OSI provisions are not as intrusive as the CWC, which allows OSI on military bases. A summary of the interaction between the CWC and the Antarctic Treaty is contained in Table 3.

4.2.4 Conclusions.

The Antarctic Treaty is an important forerunner to many recent and ongoing arms control agreements. Its verification provisions establish a precedent for on-site inspection that will be greatly expanded upon under the CWC. Other than the similarity of OSI intrusiveness and the consultative meeting functions which will be accomplished by the CWC Organization there is no significant interaction between the Antarctic Treaty and the CWC. This is due in large part to two

Table 3. Interaction between CWC and the Antarctic Treaty.

| CATEGORY | RELATIONSHIP |
|---------------------------------------------|------------------------------|
| GAPS OR DIFFERENCES | None |
| OVERLAPS OR SIMILARITIES | Allows anytime, anywhere OSI |
| SYNERGISTIC EFFORTS | None |
| CONFLICTING ACTIVITIES OR PROVISIONS | None |

factors: (1) OSI of Antarctica does not impact on military nor commercial industry because none exists on the continent, and (2) the focus of the Treaty has shifted to environmental issues due to the absence of a military presence.

4.3 NON-PROLIFERATION TREATY (NPT) AND THE IAEA.

4.3.1 Overview.

On-site inspections are already part of the several arms control or non-proliferation agreements to which the United States is a party. The only system that approaches the scope and complexity of the regime envisioned in the proposed CWC is the program of international safeguards defined in agreements between the IAEA and individual nations.

To understand the rationale behind this safeguards system and how it evolved, one must step back in time to the end of World War II when the United States possessed a virtual monopoly on nuclear technology, materials, and weapons. Following the war, U.S. policy was to deny access to others by imposing a total ban on nuclear exports. However, President Eisenhower announced a key shift in policy in his "Atoms for Peace" address in 1953, which promoted the peaceful worldwide application of nuclear energy. The next year, this new U.S. policy of nuclear cooperation was reflected in the Atomic Energy Act, which promised foreign nations peaceful nuclear assistance in return for assurances of non-diversion to military purposes. These assurances were demonstrated through bilateral agreements between the U.S. and recipient states. In time, these agreements were superseded by an international system administered by the IAEA when its Statute entered into force July 29, 1957. The role of the IAEA safeguards was considerably extended by the Treaty on the Non-Proliferation of Nuclear Weapons, commonly called the NPT.

The NPT was signed on July 1, 1968, by 62 nations, including the United States, Britain, and the Soviet Union. Today, there are over 130 parties to the treaty. In 1968 the U.S. Senate stalled on ratification after the Soviet invasion of Czechoslovakia in August. However, in March 1970, the Senate ratified the Treaty which entered into force March 5, 1970.

The NPT grew from worldwide concern over the increasing number of nuclear weapon states - the USSR in 1949, the U.K. in 1952, France in 1960, and the People's Republic of China in 1964 -- and the proliferation of nuclear reactors for energy power. In addition to power, nuclear reactors produce plutonium -- a fissionable material that, when chemically separated, can be used

to manufacture nuclear weapons. Diversion of this material from peaceful to weapon use would greatly increase the risk of war as a result of accident, unauthorized use, or escalation of regional conflicts, and would threaten world security.

NPT provisions attempt to prevent the diversion of nuclear materials to nuclear weapons or other nuclear explosive devices. To accomplish this, the NPT sets three goals:

- To prevent the further spread of nuclear weapons by prohibiting:
 - Nuclear weapon state parties from transferring to any recipient and assisting non-nuclear states in acquiring nuclear weapons, and
 - Non-nuclear weapon state parties from receiving, manufacturing, or otherwise acquiring or seeking assistance in the manufacture of nuclear weapons;
- To promote the peaceful uses of nuclear energy under IAEA safeguards; and
- To encourage nuclear disarmament, the cessation of the nuclear arms race, and general and complete disarmament.

The IAEA played a major role in implementing the NPT and verifying its provisions. Article III of the NPT dictates that non-nuclear weapon signatories agree to negotiate, conclude, and accept an agreement with the IAEA subjecting all peaceful nuclear activities to safeguards for the purpose of verification. Many non-nuclear-weapon states were adamantly opposed to this provision, which placed the burden of safeguards only upon them. They argued that this requirement would place their industries at a commercial disadvantage by interfering with efficient operations and threatening to compromise trade and industrial secrets. Repeated efforts at compromise failed, and by late 1967 the issue had become a serious obstacle to acceptance of NPT by major industrial non-nuclear-weapon states. To break the impasse, on December 2, 1967, President Johnson agreed that the U.S. would permit the IAEA to apply its safeguards to all nuclear activities in the U.S., excluding only those with direct national security significance. It was a gesture of good faith, made primarily to demonstrate U.S. commitment to non-proliferation. Two days later, the United Kingdom announced a similar offer and, subsequently, all nuclear-weapon states concluded such agreements with the IAEA. The U.S./IAEA agreement was signed in 1977 and entered into force in 1980.

The purpose of the IAEA is two-fold: to promote peaceful uses of atomic energy through technical assistance, and to apply international safeguards to deter the diversion of nuclear material from peaceful to weapons use. To accomplish these purposes, the IAEA enters into agreements with individual states. Each state desiring to become a party to the NPT agrees to accept safeguards on all source and fissionable material used in peaceful nuclear activities and, in turn, gives the Agency the right and obligation to apply safeguards for the purpose of verifying that such material is indeed not diverted.

Safeguards agreements which are based upon a model agreement, enumerate specific responsibilities of each party, such as:

- The state will supply a list of all relevant facilities, design information on facilities selected by Agency to receive safeguards, and initial and periodic inventory reports;
- The state will establish and maintain a State System of Accounting and Control (SSAC) and make these records available for review; and
- The Agency will apply safeguards, designate inspectors, and protect commercial facilities and industrial secrets.

The Agreement also specifies conditions under which financial obligations are met, how transfers of nuclear material are accomplished, and how safeguards terminate.

In addition to the Agreement, the IAEA concludes with each member Subsidiary Arrangements, which outline fully how the procedures laid down in the Agreement are to be implemented. Facility Attachments, which describe each facility and specify in detail how safeguards will be applied, are an integral part of the Subsidiary Arrangements.

The IAEA is the first and only multilateral system in which sovereign nations permit international teams to collect data and to inspect both government complexes and private installations to verify an arms control agreement. Thus its successes and failures in practice deserve attention in light of its applicability to the Chemical Weapons Convention now under negotiation.

4.3.2 Key Verification Provisions.

This section discusses the verification provisions presented in Table 4.

On-site Inspections

The IAEA's on-site inspection regime is established in the Agency's Subsidiary Arrangements with each member. The United States and the IAEA agreed upon arrangements that provide for ad hoc, routine, and special inspections of declared facilities. *Ad hoc* inspections verify information on initial reports (and any subsequent changes), and reports regarding imports and exports of nuclear material. *Routine* inspections verify that reports and records remain consistent and that book inventory and physical inventory are reconciled. These inspections are used to suggest possible causes of any discrepancies. The Subsidiary Arrangements determine the number and intensity of routine inspections, which may occur unannounced under specified circumstances. *Special* inspections verify information on special reports submitted after an unusual incident, for example, if safeguarded material is lost; or if information provided by the U.S. is, in the Agency's opinion, inadequate. The usefulness of special inspections has not been established since they have not been used to any significant extent. (Reference 1.)

Diversion Prevention and Monitoring Provisions

Material Accountancy and Containment /Surveillance. The IAEA Statute states that material accountancy should be "a safeguards measure of fundamental importance." The basic principle of material accountancy is that of a measured material balance, based on the bookkeeping identity: beginning inventory + inputs - outputs = ending inventory. This bookkeeping is not perfect because of measurement uncertainties, holdup in equipment and unmeasured losses, but the amounts of materials unaccounted for (MUF) are typically one percent or less. (Reference 2.) The IAEA is in a position to assess any material unaccounted for through such measures as reviewing reports and records, taking a physical inventory, making independent counts and measurements, and verifying the functions and calibrations of equipment.

Containment and surveillance (C/S) are important complementary measures. The basic principle of these safeguards is that if a quantity of nuclear material is known to have been placed in a space, and is believed not to have been removed, then that quantity should still be present in that space. Common examples of C/S devices are wire seals and tamper-proof devices applied to containers whose material content is known, and cameras used to monitor areas where the nuclear

Table 4. Key verification provisions -- IAEA.

| PROVISIONS | CWC | IAEA |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | Ad hoc Routine Special Unannounced |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | Material accountancy (primary) Containment/surveillance (secondary) Seals Continuous monitoring Sample collection and analysis |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | Analysis of samples - high level Others - low to moderate levels |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | Technical assistance on R&D projects Equitable contributions Proof of adherence |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | Curtailment of assistance Call for return of materials/equipment Suspension of membership privileges Adverse publicity |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Safeguard inspectors Inspection assistants Nuclear counting instruments Surveillance devices |
| RESOLUTION BODY | The International Organization: possibly involve the International Court of Justice and the UN General Assembly and Security Council | The IAEA consisting of: General Conference, Board of Governors, and Staff Possibly involve the International Court of Justice |
| OTHER | Facility agreements | Facility agreements |

material is stored. Significant MUF or unresolved discrepancies or anomalies discovered by any of these approaches indicate a lack of assurance that a diversion did not occur, and a need for further direct verification is indicated.

Seals. A seal is a tamper-indicating device used to join movable segments of a container in a manner such that access to the contents becomes impossible without breaking the seal or the container.

Continuous Monitoring. In addition to the surveillance associated with containment, cameras and closed-circuit TV are used to give visual information about locations and movements of nuclear material and equipment. Inspectors examine this information to detect and/or confirm all movements of material and spent fuel containers, and to monitor continuously a specific activity for short periods of time.

Sample Collection. Small samples of nuclear material may be collected and shipped to the Safeguards Analytical Laboratory (SAL) near Vienna for analysis. The IAEA also cooperates with a network of safeguards analytical laboratories located in 14 member states. (Reference 3.) Since the Agency is responsible for the samples from the time they are collected to disposal of residues, an elaborate system has been established to maintain constant control of the samples. The SAL prepares and submits an analysis report.

Universality

The first criterion for a successful international organization is that it have the genuine support of its members. Incentives were included in the Agreement itself to encourage initial memberships, and several approaches have been used subsequently to reinforce continued member nations' support for the IAEA.

Technical Assistance. Article XI of the Statute provides technical assistance to any member(s) of the Agency desiring to set up research and development projects using atomic energy for peaceful purposes. Such technical assistance includes securing special fissionable and other materials, services, equipment, and necessary facilities, and encouraging the exchange and training of scientists and experts. This assistance is not subject to political, economic or military conditions; in fact, the Agency considers special needs of underdeveloped areas of the world. By closely monitoring nuclear materials distributed and requiring the return of materials in excess of what is needed, it ensures large concentrations of materials supplied through a Technical

Assistance program will not occur in one geographic area. The Agency also assists in making arrangements to secure necessary financing from outside sources to help support the projects.

Equitable Apportionment of Member Contributions. Article XIV provides that administrative expenses be apportioned among members, using a scale based on the principles adopted by the UN in assessing its members contributions. Additionally, the Board of Governors will periodically establish a scale of charges, designed to produce Agency revenues adequate to meet the expenses of technical assistance. The proceeds shall be placed in a separate fund to be used exclusively for this purpose.

Article XIX provides that members whose financial contributions to the Agency are in arrears should have no vote. However, it also stipulates that the General Conference may permit such a member to vote if it is satisfied that the failure to pay is due to conditions beyond the members' control.

Opportunity for Proof of Adherence. The international inspection gives a country a means to prove that it is adhering to its non-proliferation regime. International inspection is a way to allay unwarranted suspicions, and is therefore highly valuable to a law-abiding state. The Agency can thus play the role of a confidence-building organization as well as a verification one.

Particular Incentive for U.S. As stated earlier, the primary reason the United States concluded an agreement with the IAEA was to demonstrate to non-nuclear states its willingness to accept the burden of safeguards. However, an additional incentive (or at least lack of opposition) for the U.S. to become a member was the limited cost of compliance with Treaty requirements -- both in economic terms and in terms of intrusiveness and additional regulatory burden. Primarily, this is because every aspect of the nuclear industry is both licensed and heavily regulated, and U.S. protocols for complying with the IAEA Safeguards program were built on 30 years of similar controls by the Atomic Energy Commission (AEC) and the Nuclear Regulatory Commission (NRC). A domestic nuclear program already included many of the same accounting concepts and reporting requirements. Thus, it was relatively easy to comply with reporting requirements of the treaty, as NRC data could simply be reformatted for submission to the IAEA.

Sanctions

In cases of non-compliance, the Security Council of the United Nations has authority under the Statute to curtail technical assistance, to call for the return of materials made available, and to

suspend the rights and privileges of membership. However, just the threat of reporting a violation to the Security Council is probably the most effective sanction the IAEA has against violators. Once a violation is made public, the unpleasant publicity may force many exporters of nuclear-related materials and technology to terminate shipments, and individual states may enact bilateral sanctions.

Types of Inspectors and Equipment

Inspectors. There are two broad categories of inspectors, Safeguards Inspectors and Inspection Assistants. The Safeguards Inspectors currently number 180-200 and are required to have a scientific degree, preferably in a nuclear-related field. Inspection Assistants currently number about 20 and are required to have a technical background in equipment maintenance, data handling, accounting, or similar fields relevant to inspection activities. Inspection assistants perform limited functions and work under the supervision of a Safeguards Inspector.

Equipment. Specialized equipment has become essential to the application of Agency safeguards. Most commonly used are nuclear counting instruments to perform nuclear non-destruction assays (NDAs) and photo and video surveillance camera systems to help establish whether any material has been removed between inspections. The increasing use of this equipment has permitted the Agency to apply safeguards at a growing number of facilities while operating within manpower and budgetary constraints.

It is often necessary to develop new equipment or modify commercially available equipment to satisfy unique Agency needs. This is usually accomplished under IAEA Member State Support Programs. Once new equipment is developed, it must be thoroughly field-tested, techniques must be defined for its use by inspectors, instruction manuals must be written, and provisions must be made for routine maintenance and repair. Support Programs perform these functions as well.

Resolution Body

The Statute prescribes certain reporting procedures in the case of a member's failure to remedy non-compliance within a reasonable time. However, since there is prevailing pressure in IAEA *not* to find, report, or publicize non-compliance so as not to offend a member state, these reports are submitted only after Inspectors are fairly certain of the non-compliance. In the face of substantial evidence, the first recourse is private consultation with the state in question, followed by reporting the non-compliance to the Director-General, and then to the Board of Governors. Usually, the

state will comply at some point in this process. If not, the final step is to report this information to the Security Council of the United Nations.

Article XVIII of the Statute provides for any disputes not settled by negotiation to be settled by the International Court of Justice, unless disputing members agree on another mode of settlement.

The U.S./IAEA have agreed on the following intermediary provisions, including:

- Settlement in accordance with international law any claim by U.S. against Agency, or vice versa, regarding damage resulting from safeguards (other than a nuclear incident);
- Consultations between Board of Governors and U.S. at request of either; and
- Submittal of the dispute to an arbitral tribunal, whose decision will be final, in the event consultations are not successful.

4.3.3 Interaction between the CWC and the IAEA.

Because the IAEA safeguards system shares some common features with the proposed CWC, this verification experience is a potentially valuable resource for the design and implementation of the CWC regime. Both are multinational in character and worldwide in scope; both are administered by an international organization, and both rely heavily on on-site inspections. It is important, however, to recognize as well that the significant differences between the two documents limit the IAEA's effectiveness as a direct model from which CWC negotiators may work. These differences include the scope of the verification regime, the types of facilities to be inspected, and the nature of materials processed. Even so, there are lessons that CWC negotiators can derive from a close look at the interaction between the two documents. The purpose of this section is to delineate these similarities and differences, and to call attention to some of the synergies and conflicts between the two agreements. This section discusses the interactive relationships presented in Table 5.

Differences

Dual vs. Single Mandate. From its inception, the IAEA has had a dual role: to serve as a technical assistance body as well as a verification body. This quality has tended to blur its objectives and to complicate its structure and functioning. Additionally, it has been the source of

Table 5. Interaction between CWC and IAEA.

| CATEGORY | RELATIONSHIP |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | Dual vs. single mandate Scope of verification regime Legal basis for verification Facilities subject to inspections Types and number of facilities to be inspected Inspection quotas Nature of materials processed Continuing development and implementation of verification equipment/methods |
| OVERLAPS OR SIMILARITIES | Organizational structure and responsibilities Concern for possible loss of confidential information Dispute settlement Budget structure National Authority Subsidiary agreements |
| SYNERGISTIC EFFORTS | Overall objective Desire to ease member verification and compliance burdens Desire to reinforce members' support for their goals and to build confidence |
| CONFLICTING ACTIVITIES OR PROVISIONS | CWC challenge inspection at a nuclear facility |

tensions, particularly in the budget area as allocations necessarily flowed in two directions -- assistance and verification.

Currently, the CWC has a single function, that of verification; however, it is conceivable that there will be pressures to include technical assistance as a second function. First, Article VIII of the current CWC Rolling Text states that one of the functions of the Conference of State Parties shall be "to [encourage] [promote] international co-operation for peaceful purposes in the field of chemical activities." And, secondly, considering less-developed countries' preference for assistance over verification, CWC negotiators might well decide that a promise of assistance will be required to entice more signatories. Such a decision should be carefully examined; efforts extended toward providing technical assistance necessarily dilute those available for verification, without which the purposes of the CWC are largely sabotaged.

Scope of Verification Regime. The objective of verification for the IAEA is merely to ensure that safeguarded nuclear material is not diverted from peaceful uses, i.e., to detect in a timely fashion if any material is being diverted, and to provide warning. The Agency's intent was never to roll back the number of nuclear weapon states or act in a "policing" capacity. The IAEA has had no experience in the investigation of alleged use or verification of disarmament activities, and the recent Iraqi inspections are the Agency's first experience with challenge inspections. The IAEA, ordinarily preferring a non-adversarial approach, has used primarily non-intrusive verification measures.

By contrast, the CWC provides for more intrusive methods on the assumption that the objectives cannot be met otherwise. While this assumption is valid, negotiators must not forget that the system of safeguards is a cooperative effort. The measures must not be so intrusive that they are unacceptable to States Parties. Or, as an Arms Control and Disarmament Agency (ACDA) representative so aptly stated, "It does not do much good to have perfect safeguard procedures as long as only 20 percent of the people accept them." (Reference 4.)

Legal Basis for Verification. Safeguards are administered under authority of three separate documents: the IAEA Statute, which came into being in 1957; INFCIRC/66.2, whose final revision was in 1968; and INFCIRC/153, the document containing the expanded safeguards required under NPT. Each of these documents built upon the experience of the former, changing as new verification technologies were developed and new insights were gained. The CWC, however, will be the single legal basis for verification of its members' activities. As such, it is of utmost importance that its provisions are formulated with adequate flexibility. If all of the

verification details are fixed at an early stage, it can be difficult to make changes later when experience or technical advances suggest improvements. Of course, some mechanism will be necessary to manage the risk of this flexibility. Disadvantages include the possibility of allowing verification approaches to become so non-uniform that there is a gradual eroding of standards.

Facilities Subject to Inspection. IAEA inspections are restricted to declared facilities engaged in nuclear activities intended for peaceful uses. Its inspectors are limited to civilian facilities in nuclear weapon states whereas, in non-nuclear weapon states, they may enter declared government facilities as well. In the CWC's much broader inspection regime, teams may inspect all facilities -- both declared and undeclared, civilian and government -- that are engaged in activities covered by the Convention. While this range appears all-inclusive, some chemical industry representatives are demanding that traders, brokers, and shippers should be subject to the CWC's provisions, since they can so easily facilitate the international distribution of CW-related material.

Types and Number of Facilities to be Inspected. Most nuclear facilities are designed for single use, or a limited number of closely related uses, and all nuclear material (with the exception of uranium ore) is subject to inspection. Additionally, most nuclear plants have a rather static production process. In the chemical industry, by contrast, it is much more common for a facility to be designed for a large number of diverse uses, some of which might be subject to controls under the CWC whereas others would not, and the production process is much more dynamic. While the IAEA monitored approximately 900 facilities worldwide in 1986, (Reference 5) there are literally thousands of chemical plants around the world producing or using a wide range of chemicals potentially subject to monitoring and data-exchange requirements under the CWC.

Inspection Quotas. All types of IAEA inspections are quantitatively limited, certain factors determine the actual allowable number of inspections, and the regime cannot concentrate unduly on particular facilities. In CWC, the number of inspections allowed at storage and production facilities is yet to be determined and, according to the Annex to Article VI, those facilities engaged in activities not prohibited by the Convention will be "based on the risk to the objectives of the Convention posed by relevant chemicals, the characteristics of the facility and the nature of the activities carried out there." Such a subjective basis allows the intended flexibility, but also provides opportunities for one party to gather sensitive information from another under the guise of inspections based on a wholly different alleged "risk." This risk could be reduced by incorporating a provision similar to the IAEA's for determining the actual or maximum number of allowable routine inspections.

Nature of Materials Processed. Nuclear materials of concern to IAEA safeguards are principally uranium and plutonium, both of which have unique properties that facilitate verification. They are mostly in the form of discrete items, making the concept of "material accountancy" a practical verification procedure. By contrast, the range of chemical materials of concern to CWC is vastly larger and, due to their inherent characteristics and bulk processing, verification will be much more difficult. Certain elements of the materials accountancy concept are applicable to CWC verification; however, as a general strategy in the overall chemical context, the system has limitations. Not the least of these is the extreme expense for both the inspectorate and the operators of bulk-processing facilities. More cost-effective inspection approaches -- for example, automated in-line measurement systems that reduce the need for inspector presence -- need to be developed.

Continuing Development and Implementation of Verification Equipment/Methods. Under the IAEA Agreement, national R&D facilities develop procedures and techniques for applying safeguards, including studying safeguards approaches and concepts; developing, testing, implementing, and maintaining safeguards instruments, methods, and techniques; assisting and evaluating safeguards results; and updating training of inspectors. Thus far, the CWC has not addressed such issues as how new verification technologies will be developed, who will perform evaluations, and who will determine acceptability.

Similarities

Organization. The international organizations, IAEA and Organization for Prohibition of Chemical Weapons (OPCW) are strikingly similar in composition and division of responsibilities, as illustrated in Figure 2.

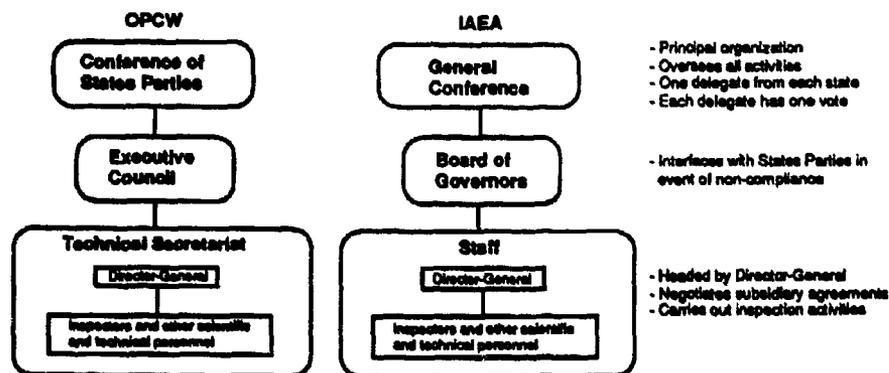


Figure 2. International organization.

Confidential Information. Of major concern to both organizations is the possibility of loss or compromise of confidential information. Such loss would result primarily from on-site inspections but may also result from data reporting. In IAEA, the concern revolves around national security information, whereas the CWC is more concerned with proprietary information, such as industrial and trade secrets and Confidential Business Data. While the CWC faces the greater challenge due to the more rigorous verification regime it purposes, negotiators are nevertheless following the IAEA's approach to the problem. Both agreements contain provisions intended to minimize (deter) intelligence gathering. Among other things, these provisions limit the amount of information an inspector may collect to the minimum necessary to verify compliance; place stringent requirements on the handling of confidential information by the staff; and allow an inspected party to take measures to protect its confidential information.

Settlement of Disputes. Both organizations seek to resolve disputes regarding interpretation or application of provisions in similar manner. If the negotiation process (or another mutually agreed upon mode) is unsuccessful, disputes may be submitted to the ICJ.

Budget Structure. The IAEA is funded primarily by contributions from member states. These contributions are based on the UN scale adopted for its members. With minor exceptions, the Agency and its members both bear the burden of expenses incurred by their respective responsibilities connected with inspection activities. Although the CWC budget structure is not yet finalized, provisions identical to those above are among the options being discussed.

National Authority. As an interface between the international organization and its members, the IAEA obligates each member to establish a SSAC. In the U.S., the National Regulatory Commission serves as the SSAC -- keeping records, making reports, and fulfilling other member obligations under the Agreement. Likewise, under CWC, each member must establish a National Authority. The U.S. is only in the initial stages of defining this entity but, when established, it will serve very similar interfacial functions.

Subsidiary Arrangements. Both IAEA and CWC have provisions that require each member to conclude Subsidiary Arrangements with the national organization. These arrangements, based on information declared by each state, specify detailed inspection procedures and arrangements for installing, operating, and maintaining seals and monitoring devices at each facility.

Synergies

The overall objective of both the IAEA and the CWC is identical -- attempting to reduce the possibility of production and proliferation of weapons of mass destruction.

Provisions of both organizations demonstrate a desire to ease the burdens of both verification and compliance. Both pledge not to hamper the economic and technological development of members states, and to consider the cost effectiveness and latest techniques in verification measures. Each attempts to build the confidence of its members through provisions such as those dealing with the protection of sensitive information.

Both organizations strive to reinforce member nations' support for their goals. While there is common interest in limiting nuclear weapon states, the wider distribution and greater ease of chemical weapons production instill an even keener interest. The IAEA and CWC both offer their members an opportunity to be part of an effort to keep weapons out of neighbors' and rivals' hands.

Conflicts

A possible conflict could occur if one State Party suspects chemical activity at a nuclear facility of another State Party and prepares to conduct a challenge inspection. When the inspectors arrive at the facility, however, the facility manager could present his IAEA agreement stating the facility had already had its allowable number of inspections for the year. This is a potential conflict that should be addressed prior to its occurrence.

4.3.4 Conclusions.

Given the difficulty of its verification responsibilities, the OPCW will need to take full advantage of all available sources of experience and insight. Though valuable lessons can be learned from other arms control agreements and national trial inspections, the IAEA offers by far the most important lessons. Because the two agreements have many similarities -- the primary one being that they both utilize worldwide, multilateral arms control verification systems that employ on-site inspections -- there are directly-applicable lessons to gain from the IAEA experience. However, because the two agreements have many differences as well -- the primary one being that, unlike IAEA, the CWC regime includes on-site inspections of *undeclared* suspicious activities -- the IAEA is limited in its effectiveness as a direct model.

4.4 THE GENEVA PROTOCOL AND THE BIOLOGICAL WEAPONS CONVENTION (BWC).

4.4.1 Overview.

This section of the report differs from other chapters in that it discusses two arms control treaties that are heavily interrelated: the Geneva Protocol of 1925 and the Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction, hereafter referred to as the BWC of 1972.

Following World War I, when the world first saw the horrible effects of chemical weapons, many leaders felt the need to take diplomatic steps to avoid CW use in future wars. The Versailles Treaty prohibited Germany from producing CW. Unsuccessful attempts to ban these weapons were made at the Washington Disarmament Conference of 1922. The Geneva Protocol, banning the use of chemical and biological weapons in war, was drafted in 1925. It is important to note that the Protocol makes no attempt to control production or stockpiles of CW, but merely bans their use. The U.S. Senate did not ratify the Protocol until 1974; however, the U.S. followed a policy of "no first use" and repeatedly affirmed the precepts of the Convention.

In spite of the Geneva Protocol, a number of nations continued CW research, development, and production. Generally these activities were called "defensive" since the weapons would only be used to respond to attack in kind. Since WWI, there has been a high degree of self-restraint in employing chemical weapons, with only a few reports of suspected employment. These violations include the Italian use against Ethiopia in 1936, and the Egyptian employment during the Yemeni Civil War in the 1960s.

A problem with such weapons is the users' inability to control the affected area after release. Like an influenza virus, some BW diseases can be transported anywhere in the world by infected people. This makes the military utility of such a weapon highly questionable, as the nation that introduces the agents might not be immune to its effects. For this reason there has never been a confirmed use of BW agents.

Despite their dubious usefulness in war, BW research has been conducted by several nations. During WWII Germany, Japan, the U.S., and probably the Soviet Union conducted research and

development of biological warfare agents. The U.S. was driven by a desire to understand these weapons and have a capability to respond in kind to a Nazi attack.

Arms control efforts in the early post-WWII era sought to encompass BW and CW agents in one agreement; however, these efforts were half-hearted and lacked a major stimulus. Some political-military leaders in the West felt that CW was needed to deter/defend against a Warsaw Pact attack on Germany. Additional reasoning held that bans on CW and BW agents might lead to pressure for a similar ban on nuclear weapons that the West would have to reject due to NATO strategy.

In the mid to late 1960s, international and U.S. domestic pressures for attempts to control these agents grew. U.S. employment of tear gas and defoliants in Vietnam was met by international condemnation and accusations that the U.S. had broken the Geneva Protocol. Perhaps more importantly, U.S. domestic concerns rose after a March 1968 accidental leak of nerve gas killed six thousand sheep in Utah. Although these concerns involved chemicals, the reaction led to appeals to control BW as well as CW agents.

A review of the U.S. position on BW and CW began after the inauguration of President Nixon in 1969. Nixon supported the Geneva Protocol and announced the intention to submit it to the Senate for ratification. In addition, he renounced U.S. use of BW and committed the U.S. to destruction of its existing stockpile. This mandate was later extended to toxins. At the same time, the U.S. started to negotiate a comprehensive BW treaty at the Conference of the Committee on Disarmament to rid the world of all such weapons. The resulting accord prohibits developing, producing, and stockpiling, acquiring or retaining BW and toxin weapons, and requires destruction or diversion to peaceful purposes of any existing stockpile.

The Senate would not ratify the BWC until questions about the Geneva Protocol and U.S. actions in Vietnam were clarified. President Ford authorized a statement by the Director of the Arms Control and Disarmament Agency (ACDA) that renounced the first use of herbicides and riot-control agents in war and changed U.S. policy to comply with a strict interpretation of the Protocol. With this issue resolved, the U.S. Senate ratified both treaties in December 1974.

4.4.2 Key Verification Provisions.

The Geneva Protocol is a gentlemen's agreement much like the Washington Naval Pact and the Kellogg-Briand Pact. As such, there are no verification provisions.

Currently the BWC lacks verification provisions that ensure compliance concerning development, production, stockpiles or other acquisition of microbial or other biological agents or toxins and their means of delivery. As shown in Table 6, the BWC does not have an OSI regime, diversion prevention, or any type of simple or complex verification provisions using monitoring equipment or inspectors.

Universality

Each State Party is obliged under Article VII to support another if the U.N. Security Council decides that the nation has been exposed to danger by violation of the Treaty. Article X also calls for the exchange of information related to disease prevention and other peaceful purposes. The Third Review Conference discussed this aspect of the Convention and asked that it be reviewed in greater depth in a relevant UN body not later than 1993.

Sanctions

The Convention has no international sanctions; however, the U.S. enacted domestic legislation in the Biological Warfare Anti-Terrorism Act of 1989. This Act provides domestic legislation that prohibits the possession or development of germ warfare devices and authorizes punishment for anyone helping foreign nations to acquire such capabilities.

Resolution Body

Under Article VI, the BWC allows the reporting of suspected violations to the UN Security Council. The signatories are pledged to cooperate with any investigation the Security Council may initiate. The U.S. and the Soviet Union have questioned each other's compliance with the BWC. In addition to these East-West questions of compliance, there is a potential that other nations, (such as Iraq which did not have BW capabilities in 1972) have since acquired them.

Other

Although the verification provisions of the BWC are nonexistent, attempts have been made to provide some measure of compliance through consultation. The BWC provides for consultation and cooperation under Article V, with a conference planned within the first five years after Entry Into Force (Article XII). In addition, the Treaty can be amended through the provisions stated in

Table 6. Key verification provisions -- BWC.

| PROVISIONS | CWC | BWC |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | None |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | None |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | None |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | Being developed |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | Domestic legislation through the BW Anti-Terrorism Act of 1989 |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | None |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | UN Security Council |
| OTHER | Facility agreements | BWC is developing CBMs |

Article XI. The consultative meetings and conferences have served as a forum for attempts at developing confidence-building measures (CBMs). The Final Declaration of the Second Review Conference, held in 1986, agreed on implementing some limited CBMs. Unfortunately, the U.S. is one of only a few signatories to abide by these confidence-building measures. Although attempts at universality have succeeded in getting over 100 nations to sign the Treaty, the conference has failed to persuade all signatories to implement the CBMs.

The CBMs were expanded at the Third Review Conference held in September 1991. They now include:

- "A" 1: Exchange of data on research centers and laboratories; and
2: Exchange of information on national biological defence research and development program;
- "B" Exchange of information on outbreaks of infectious diseases and similar occurrences caused by toxins;
- "C" Encouragement of publication of results and promotion of use of knowledge;
- "D" Active promotion of contacts;
- "E" Declaration of legislation, regulations and other measures; and
- "F" Declaration of vaccine production facilities.

This information is to be supplied annually on April 15 to the U.N. Department for Disarmament Affairs.

The Third Review Conference called for the establishment of an *Ad Hoc* group of governmental experts to be convened in April 1992 to discuss possible verification measures which could strengthen the Treaty. These measures would seek to determine if:

- a nation is developing, producing, stockpiling, acquiring or retaining microbial or other BW/TW agents for purposes other than protective or peaceful; and

- a nation is developing, producing, stockpiling, acquiring or retaining weapons, equipment, or means of delivery designed to employ such agents in conflict.

This conference will examine the complexity, cost, and limitations of proposed verification means. A final report will be provided to all signatories with a possible future conference to address the issue at greater depth.

4.4.3 Interaction Between the CWC and the Geneva Protocol and the BWC.

Although the Geneva Protocol bans CW employment, there is currently no method for inspections of suspected CW usage. The CWC Rolling Text provides for such inspections that will verify usage. In this respect, the CWC will supplement the Geneva Protocol by encompassing the prior agreement.

The CWC is historically linked to the BWC, and until 1969, BW and CW arms control efforts were pursued jointly. When Nixon unilaterally renounced BW agents and their limited military value, the U.S. began to decouple BW and CW negotiations. The key issues were limiting the arms race and verification. The Soviets still linked any attempts at BW arms control to a CW agreement. They also wanted this Treaty to be unverified. The West sought to stop a BW arms race before many countries produced and stockpiled these weapons or employed them in a conflict. In essence, the goal was to restrict the arms race to CW agents. Previous use of CW agents and the large stockpiles of these weapons meant that for a chemical arms accord to be verifiable, it would need intrusive verification provisions. On the other hand, the West felt that it was not critical to have intrusive means in a BW agreement. Though non-compliance would be difficult to detect, the Treaty would restrict research, development, and production of a whole class of weapons. After an eighteen month debate the Soviets relented and put forth a proposed treaty separating BW from CW. With this major disagreement settled, the Treaty was agreed to within months.

Alleged Treaty violations have resulted in efforts by some nations to strengthen the Treaty. Some have recommended that CWC verification will serve to provide verification provisions for the BWC; however, the affected facilities differ in various ways. For instance, BW production can take place in small biotechnology labs, while CW production requires large chemical facilities.

Another interaction is the inclusion of two toxins prohibited under the BWC, Ricin and Saxitoxin, in Schedule 1 of the CWC. This could allow for the the partial verification of the BWC

through verification of the CWC. However, it should be noted that TW agents would probably be produced in environments closely resembling pharmaceutical labs while the focus of the CWC will be large chemical facilities. The interaction between the CWC and the BWC is summarized in Table 7.

4.4.4 Conclusions.

The BWC is a disarmament treaty without verification provisions. The lack of such provisions has relegated the BWC to a confidence-building measure rather than a verifiable treaty. The inclusion of two toxins in the current CWC Schedule 1 could add to the accountability of BWC signatories and could partially verify their compliance. The CWC's OSI and diversion prevention regimes will supplement the Geneva Protocol which also had no verification provisions. The failure of the BWC and the Geneva Protocol to answer questions of non-compliance serves as a "lessons learned" exercise for the CWC's intrusive verification regime.

4.5 NUCLEAR TESTING TALKS (NTT).

4.5.1 Overview.

In 1963 the U.S., the UK, and the Soviet Union signed the LTBT which prohibits nuclear weapon testing in the atmosphere, in outer space, and under water. The three Parties agreed not to carry out any nuclear weapon test or other nuclear explosion in any non-prohibited environment, i.e., underground, that would cause radioactive debris to affect other countries. While underground explosions were not prohibited, the Parties pledged to seek the conclusion of all nuclear test explosions (Article I of the LTBT, 1963). In the spring of 1974, the U.S. and the Soviet Union agreed to discuss further restrictions on nuclear testing.

The Treaty on the Limitation of Underground Nuclear Weapons Test, commonly known as the TTBT, was signed July 3, 1974, and governs U.S. and Soviet nuclear weapon tests. Under it, each Party agrees to prohibit, to prevent, and not to carry out any underground nuclear weapon test having a yield exceeding 150 kilotons. To ensure compliance the Treaty provided for the exchange of geophysical and geological data, the exchange of precise yield and location data for two instrument calibration tests at each test site, and the reporting of all future tests. The TTBT involved a great degree of cooperation between the U.S. and the Soviet Union for the control of nuclear weapons. For the first time, each State would make available to the other, data relating to its nuclear weapon test program.

Table 7. Interaction between CWC and BWC.

| CATEGORY | RELATIONSHIP |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | BWC is a disarmament treaty without verification provisions |
| OVERLAPS OR SIMILARITIES | CWC verification regime is everything the BWC is not (the elimination scope of the CWC and BWC are identical) Inclusion of toxins in CWC creates overlaps |
| SYNERGISTIC EFFORTS | CWC inspections could partially verify BWC, intentionally or unintentionally |
| CONFLICTING ACTIVITIES OR PROVISIONS | None |

The TTBT companion treaty, the Treaty on Underground Nuclear Explosions for Peaceful Purposes (or PNET) was signed May 28, 1976. It governs all nuclear explosions carried out at locations outside the weapon test sites under the TTBT. In the PNET the two nations agreed not to carry out any individual nuclear explosions having a yield greater than 150 kilotons; not to carry out any group explosion having an aggregate yield exceeding 1,500 kilotons; and not to carry out any group explosion having an aggregate yield beyond 150 kilotons unless the individual explosions in the group could be identified and measured by agreed verification procedures. In addition, the Treaty provided for the exchange of additional data than was required under the TTBT, and specified that under certain circumstances observers from the other Party could inspect preparations for peaceful nuclear explosions (PNEs) and even place sophisticated instrumentation at the sites. Soviet agreement to the PNET represented a major concession. Previously, the U.S.S.R. maintained that these types of nuclear explosions should not be restricted in the same manner as were explosions at weapon test sites. The PNET represented a significant compromise between the two Parties with its on-site inspections provisions. Both Treaties set verification precedents in the area of OSI.

Until recently, neither of these Treaties was ratified. The U.S. did not ratify the TTBT because it judged that the verification means under the Treaty, i.e., national technical means, were not reliable due to inherent uncertainties in seismic estimates of Soviet test yields. Moreover, serious concerns arose about possible violations of the TTBT and PNET and the risk of undetected evasion. However, pending ratification, both nations agreed to observe the 150 kiloton threshold established under the Treaties.

In November 1987 the U.S. and the Soviet Union began negotiations to reach an agreement on additional verification provisions that address both the uncertainty in estimating nuclear yields and the risks of evasion. These protocols were signed on June 1, 1990, and resulted in the ratification of the TTBT and PNET. In addition, they replaced the protocols that were submitted with the Treaties in 1976. (Any references to protocols in this text pertain to the 1990 protocols.) The Treaties entered into force on December 11, 1990. They involve new and complex techniques to effectively verify the two Treaties, including direct, on-site hydrodynamic measurement of explosive yields -- a procedure designed to provide a reliable, accurate, on-site means of measuring the yield of nuclear explosions. To date, TTBT and PNET provisions have not been executed by either the U.S. or the Soviet Union. However, in May 1988, the U.S. and the Soviet Union signed the Joint Verification Experiment (JVE) Agreement which involved an exchange of data on five prior nuclear tests by each party and a visit by each party to the other's test site to monitor a single explosion with its own direct yield measurement experiment. It was an important step

toward agreement on verification measures to permit ratification of the TTBT and PNET. Upon conclusion of the JVE process in August and September of 1988, the U.S. and the Soviet Union confirmed that the conducted tests were within the limits of the two Treaties. These measurement procedures substantiated previous seismic measurements of Soviet test yields and allowed reexamination of U.S. test yields.

4.5.2 Key Verification Provisions.

Although Soviet personnel can be present at U.S. tests and have the right to 24 hour and unimpeded visual observation, neither the TTBT nor PNET have traditional OSI. Rather they have extensive monitoring provisions which involve information exchanges, NTM, and hydrodynamic and seismic yield measurements. Tables 8 and 9 also illustrate that there are no universality provisions in either treaty due to their bilateral nature. Additionally, there are no provisions for sanctions because of the government-related nature of nuclear tests and the ability of the U.S. Government to regulate U.S. nuclear programs. In case of non-compliance, each Treaty has established a forum for discussion and issue resolution in the TTBT Bilateral Consultative Commission and the PNET Joint Consultative Commission.

Diversion Prevention and Monitoring Provisions

When the Threshold Test Ban Treaty was signed in 1974, each party relied on NTM for compliance verification as specified under Article II. In cooperation with this treaty, each party agreed not to interfere with the NTM of the other party operating under the guise of the TTBT. In addition to the use of NTM and CBMs, the TTBT Protocol expanded the verification provisions to include the basic rights to carry out:

- direct, on-site hydrodynamic yield measurements in a nearby "satellite" hole for all nuclear tests declared to have a planned yield over 50 kilotons;
- collection of regional seismic data from three stations on the territory of the party for all test declared to have planned yield over 50 kilotons;
- on-site confirmation of the geology near an emplaced nuclear device as well as of the test emplacement conditions, and observation of the emplacement of the nuclear device for all tests declared to have a planned yield greater than 35 kilotons;

Table 8. Key verification provisions -- TTBT.

| PROVISIONS | CWC | TTBT |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | None |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | NTM Hydrodynamic yield measurements Seismic yield measurements Information exchange |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | Medium to high levels |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | Not applicable |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | None |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Inspectors will be scientist from U.S. national labs and DoE Escorts from OSIA Extensive list of specialized equipment |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | Bilateral Consultative Commission |
| OTHER | Facility agreements | Confidence-building measures |

Table 9. Key verification provisions -- PNET.

| PROVISIONS | CWC | PNET |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | None |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | Information exchange Local seismic network Hydrodynamic yield measurements NTM |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | Medium to high levels |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | Not applicable |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | None |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Inspectors/scientists from U.S. national labs and DoE Escorts from OSIA Extensive list of specialized equipment |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | Joint Consultative Commission |
| OTHER | Facility agreements | None |

- tests conducted in so-called "non-standard" conditions, hydrodynamic measurement of a "reference test", and a new hydrodynamic measurement technique called "hydro-plus";
- hydrodynamic yield measurements on a minimum annual number of nuclear tests, regardless of declared yield; and
- hydrodynamic measurements on each explosion in a single test consisting of more than one explosion, if the total yield exceeds 50 kilotons.

Article IV of the PNET defines the agreed verification arrangements upon signature of the Treaty in 1976. It specifies that each party will use NTM, and will provide the other party with information and access to sites of explosions for the purpose of verification, including a commitment not to interfere with verification means and procedures. These procedures are enhanced by the basic verification provisions under the Protocol to the PNET, which provides for the rights to:

- direct, on-site hydrodynamic measurements in the emplacement hole for all nuclear explosions declared to have a planned yield over 50 kilotons;
- OSI of the geology near the emplaced nuclear device and of the emplacement conditions, and observation of the nuclear emplacement of the nuclear device for all nuclear explosions declared to have a planned yield over 35 kilotons; and
- data collection from a temporarily-installed local seismic network around the explosion site, for the purpose of confirming the number of individual explosions in a group explosion, in the special case where the group explosion has a planned aggregate yield over 150 kilotons.

Types of Inspectors and Equipment

Test monitoring under the NTT Treaties will be performed by Government and civilian personnel from the Department of Energy and the national laboratories. These are the personnel performing U.S. nuclear testing and are, therefore, the best equipped to monitor that taking place in the Soviet Union. While in the U.S., their Soviet counterparts will be escorted by On-Site Inspection Agency (OSIA) personnel.

Table 10. Interaction between CWC and NTT.

| CATEGORY | RELATIONSHIP |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | <p>Inspections under the TTBT and PNET tend to monitor and observe explosions, rather than "inspect" them Diversion prevention and monitoring provisions differ Types of inspectors and equipment differ NTT have no sanctions for non-compliance</p> |
| OVERLAPS OR SIMILARITIES | <p>All have resolution bodies</p> |
| SYNERGISTIC EFFORTS | <p>None</p> |
| CONFLICTING ACTIVITIES OR PROVISIONS | <p>None</p> |

missiles, launchers, and support structures are to be eliminated no later than three years after Entry Into Force (EIF), June 1, 1988.

Articles IV and V of the Treaty outline phasing of reduction and eventual elimination of treaty-limited items (TLI). Those systems that were tested but never deployed, such as the Pershing IB, were eliminated completely within the first six months. Shorter-range missiles, support equipment, and launchers were eliminated 18 months after EIF. All intermediate-range systems were eliminated within three years after EIF. To preclude possible breakout from the Treaty by either party, missile elimination facilities were located a minimum of 1000 km from launcher elimination facilities.

As required by the Treaty, elimination of TLI took place at specified elimination facilities, at the systems' deployment sites, or by launching from a designated elimination facility into "an existing impact area." Eliminations by launching were limited to 100 intermediate-range missiles, and only within the first six months after EIF. Other eliminations could result from loss or accidental destruction. The Treaty allowed each party to convert 15 missiles, launch canisters, and launchers to static displays. Missile operating bases listed in the Memorandum of Understanding (MOU) could be converted to operating bases for ground-launched ballistic missiles (GLBMs) or ground-launched cruise missiles (GLCMs), as long as those missiles were not limited by the Treaty.

The INF Treaty mandates the establishment of various mechanisms to facilitate Treaty implementation. The Treaty MOU:

- establishes a database for technical data on all treaty-limited systems and equipment;
- names and identifies the locations of all inspectable missile operating bases, elimination facilities, and deployment areas; and
- declares the number of TLI that each Party possesses.

Primarily to update the MOU, INF identifies the Nuclear Risk Reduction Center (NRRC) as the source through which each Party notifies the other of any change in MOU data. MOU data were initially declared prior to Treaty signature and, in accordance with Article IX of the Treaty, updated 30 days after EIF. Article IX mandates that each Party update the MOU every six months following the initial update, and follow specific timelines for notification of any elimination, movement of TLI, or other activity that changes MOU data.

4.6.2 Key Verification Provisions.

The INF Treaty contains three key verification provisions: (1) NTM for verification, (2) OSI at bases within each party's territory and in TLI-basing countries, and (3) continuous portal monitoring of agreed production facilities. Paragraph 3 of Article XI provides for baseline inspections between 30 and 90 days after EIF. The Treaty is bilateral so universality is not applicable. In addition, there are no sanctions associated with the Treaty. Table 11 summarizes these key verification provisions.

On-site Inspection

The Treaty allows OSI to verify the elimination of missiles, launchers, and support structures; the elimination of missile operating bases or support facilities; and the confirmation of baseline or updated MOU data concerning a facility's TLI holdings. During these baseline inspections, each party was permitted to inspect all of the other's missile operation and maintenance facilities that were not production facilities, and all elimination facilities. The purpose of these inspections was primarily to confirm site diagrams and initial data on that site's TLI holdings, while verifying the location of each facility and its perimeter as declared in the MOU.

Each party also has the right to observe the other's elimination of missile systems outlined in the Treaty to verify that a system is in fact eliminated, and that elimination is conducted in accordance with the Protocol on Eliminations. A country also has the right to conduct short-notice, or challenge inspections, of either active or eliminated facilities to ensure that banned activities do not occur. No inspections can occur at facilities unlisted in the MOU. Once the Soviets agreed to the double zero option, negotiations on suspect site inspections (SSI) for INF effectively ceased. The Treaty's prohibitions reduce the utility of keeping clandestine stockpiles because the inability to exercise or test the weapons greatly diminishes their usefulness. However, the Treaty clearly leaves a verification gap regarding clandestine stockpiles which could be maintained at unlisted installations. The INF Treaty allows for challenge inspections at formerly declared facilities to ensure that illegal activities do not occur. The Special Verification Commission also provides Treaty parties an avenue to present suspicions of illegal activities, including suspicious activities at sites that are undeclared in the MOU.

The Treaty's Protocol on Inspections outlines required reports for each type of inspection, to be completed within two hours of the end of the inspection. Portal monitoring reports must be

Table 11. Key verification provisions -- INF.

| PROVISIONS | CWC | INF |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | Close-out inspections Challenge inspections |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | Continuous portal monitoring Eliminations TLI holdings confirmation Destructions, close-outs, locations verification |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | Relatively low levels |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | Not applicable |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | None |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Russian linguists OSIA-sponsored training Measuring and weighing devices Radiation detection Cameras, imaging devices, and other agreed equipment |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | Special Verification Commission (SVC) |
| OTHER | Facility agreements | None |

completed at the end of each month. These reports contain a chronological list of activities during the inspection and document measurements taken and pertinent conversations. The reports are prepared in Russian and English, and the Inspection Team Leader and the Escort Team Chief sign each copy. The inspecting party uses its copy of the report for subsequent evaluation and determination of compliance.

Diversion Prevention and Monitoring Provisions

Paragraph 6 of Article XI provides for the establishment of continuous monitoring of the portals of those facilities that have conducted final assembly of GLBMs. These sites are the Hercules plant at Magna, Utah and the Votkinsk machine building plant at Irkutsk, Republic of Russia. Each party has established one portal per facility, into and out of which one rail line and one road leads. The rail line and the road are to be no more than 50 meters apart. This portal is the only exit from which a vehicle large enough to carry a GLBM or its longest stage may enter or exit the facility. The inspecting country has the right to establish continuous monitoring systems at the portal, and appropriate sensors at all other facility portals. Further, inspectors may examine the contents of any vehicle or container large enough to contain a GLBM limited by the Treaty, or its longest stage, to ensure that they are not subject to Treaty restrictions.

The inspected party is required to declare that a vehicle contains an object of the same or larger size as TLI before that vehicle exits the facility. Inspectors weigh, make linear measurements, and may process electronic images of all vehicles as they enter and exit a facility. If a vehicle is not large enough or heavy enough to carry TLI, no further inspection of that vehicle is allowed. Inspectors may examine up to eight vehicles per year that are declared to contain missiles or stages large enough to be TLI, provided that they preserve the integrity of the missile or stage and that these measurements are taken only on the outside of the launch canister or shipping container. If the vehicle is large or heavy enough to contain such an item, and the inspected country has declared that it does not, the inspectors may examine the interior of the vehicle. If the vehicle contains one or more questionable objects, the inspectors may then request that representatives of the inspected party demonstrate that the objects are not TLI.

Article XII of the Treaty outlines the use of NTM in very general terms. No restrictions are placed on the allowed equipment, except that verification be conducted in "a manner consistent with generally recognized principles of international law." Both parties agreed not to interfere with the other's use of NTM, nor to use cover or concealment that impedes verification by NTM unless such measures are a standard part of training, maintenance, or operations within a declared

deployment area. Article XII enhances provisions for NTM observation by allowing each party, six times per calendar year, to request the other party to display all of its missiles with a range greater than 5500 km and their launchers within a specific deployment area. This provision was to remain in effect until START entered into force or three years after INF entered into force, whichever came first.¹

Types of Inspectors and Equipment

During OSI, the Inspection Team can examine the outside of all buildings, containers, or other structures located on that base or facility. Inspectors may make linear measurements of structures and their doorways to determine if that structure could hold a prohibited item. If a structure is large enough to contain a prohibited item, inspectors may request their in-country escorts open the container and demonstrate to the inspectors' satisfaction that it does not contain TLI. To facilitate the inspections, inspectors may use any documents, linear measurement devices, portable weighing devices, or radiation detection devices they deem necessary. Inspectors may bring cameras to the inspection site, but only the inspected party may take photographs at the inspectors' request.

Resolution Body

Article XIII establishes the SVC so that, if one party requests, the parties will meet within the SVC forum to settle disputes or questions concerning Treaty compliance or to discuss and agree upon measures that will enhance the Treaty's provisions.

4.6.3 Interaction Between the CWC and the INF Treaty.

The experience gained in implementing INF provided valuable "lessons learned" regarding preparations for Treaty implementation. First, key INF verification provisions were not resolved until the final 60 days of the INF talks. The tardiness of the decisions hindered U.S. preparations to implement inspection procedures effectively and efficiently, particularly during the baseline period of the Treaty. Initial MOU data verification demonstrated that insufficient preparation of site diagrams and other information occurred before signing the Treaty, which presented early difficulties in conducting OSI. Further, the lack of timelines and early logistical preparations resulted in inflated personnel and equipment demands from U.S. Government agencies to support the newly formed OSIA in the conduct of baseline inspections. Finally, insufficient consideration

for contractors' roles and interests in OSI presented a number of security and legal issues that, although they have been addressed as a result of INF inspections, merit closer examination.

Although the scope and nature of the CWC differs greatly from INF, many planning factors remain the same, particularly in the area of OSI. Certain preparatory activities will require even closer examination than INF, because private companies will potentially be subject to OSI. Areas of note include logistical preparations for inspection and escort operations, site preparation and security, and legal issues. The CFE and START Treaties contain provisions that now reflect lessons learned from initial difficulties in implementing INF. These lessons, when applied to the CWC negotiations, can help responsible parties and agencies initiate implementation as efficiently as possible once the Treaty goes into effect. Table 12 summarizes the interactions between the INF Treaty and the CWC.

Endgame Negotiation Issues

The complete elimination of all shorter- and intermediate-range missiles under the INF Treaty for the signatory parties provides for a comparatively simple verification regime. In the negotiating endgame, however, several technical and monitoring issues, such as portal monitoring, SSI, warhead disposition, missile conversion, research and development issues, and phasing of reductions had not been settled. During the INF negotiations, the "minutia" of procedures related to compliance monitoring activities was generally considered of secondary importance to achieving agreement on the principal issues.

The decision to allow continuous portal monitoring came very late in the INF negotiations. Technical issues concerning both OSI and portal monitoring were not resolved at Treaty signature, but were negotiated in the 30 days between ratification and the beginning of baseline inspections. Last-minute decisions led to a number of significant problems in the initial implementation phases, particularly because timelines for implementation planning had not been identified. In some cases initial U.S. and Soviet MOU data was inaccurate.

The CWC provisions include OSI during and after chemical weapons destruction, annual data exchanges on stockpiles, and challenge inspections. Because of the substantial amount of material involved in the CWC and the strict timeframe, resolution of all possible implementation and verification provisions prior to endgame negotiations is vital to prepare sufficiently for Treaty

Table 12. Interaction between CWC and INF.

| CATEGORY | RELATIONSHIP |
|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | <p>INF requires elimination of all systems/missiles CWC requires elimination of weapons and reduction of chemicals INF has no SSI or challenge other than at declared sites CWC has anytime/anywhere challenge inspections (proposed) INF production facilities are monitored (only missile motors, inpractice) CWC production facilities are destroyed Chemicals monitored under CWC are not easily identifiable</p> |
| OVERLAPS OR SIMILARITIES | <p>Notification requirements are similar On-site inspections of TLI and CW eliminations Challenge inspections of closed-out facilities No conversions of TLI or CW allowed</p> |
| SYNERGISTIC EFFORTS | <p>Use similar air/ground transportation Concurrent training of inspectors/escorts may occur Facility security procedures provided to private facilities may be similar Imaging and measuring equipment may be similar</p> |
| CONFLICTING ACTIVITIES OR PROVISIONS | <p>CWC challenge inspections may open former INF facilities to inspections under both treaties</p> |

implementation. While it would be impossible to resolve all issues until the final weeks of negotiations, adequate planning and preparation requires that as many of these issues be addressed and resolved as early in the negotiating process as possible.

Ensuring Accuracy of MOU Data

Inaccuracies and questions concerning U.S. MOU data on inspectable facilities required revisions to data and in one case raised legal questions. Site diagrams were a major problem in INF. Errors were made and corrections became necessary after EIF -- sometimes in the midst of an inspection. Due to the short notice for fulfilling site diagram requirements, Soviet inspectors raised questions concerning boundaries of one U.S. facility and roads connecting other facilities. Inaccuracies noted in the initial MOU data were subsequently corrected and incorporated into data updates.

In order to validate Soviet MOU data, OSIA formed a Validation of Technical Data (VOTD) team to visit six Soviet elimination facilities to weigh and measure Soviet TLI during baseline inspections. VOTD team personnel received specialized instruction from the U.S. Bureau of Standards in order to accomplish this task.

At this point in the CWC negotiations, some implementation issues have already been addressed. Timelines in the CWC are similar to those in INF and START, and the Army Demilitarization Program for Chemical Weapons Stockpile essentially incorporates the necessity for planning and scheduling eliminations. However, the sequence of implementation events needs considerable attention to adequately plan for manpower and other resources.

Contractor Relations

In order to accommodate INF requirements, Government facilities and civilian contractor facilities prepared for inspection activities and planned to protect sensitive or classified information. Although the Office of the Undersecretary of Defense for Acquisition (OUSDA) and Army personnel at Redstone Arsenal developed detailed site preparation guidelines and provided a detailed briefing to all DOD components involved in INF implementation shortly after the treaty was signed, preparations for OSI indicated that lack of consideration for contractors' implementation roles during the negotiating process resulted in the following:

- Soviet inspectors' presence affected facilities conducting other research and development activities.
- Some contractors' information was outdated or incorrect, resulting in last-minute notification that their facility was subject to OSI.
- Lack of initial USG guidance and control resulted in delays, misinformation or conflicting information, and confusion at contractors' facilities regarding USG requirements and priorities.
- Lack of prior funding plans and approval for contractor preparation forced the contractors to use their own funds or to delay preparation activities until contracts could be let. Reprogrammed funds also had diverse effects on other DOD activities.
- The short lead time and funding difficulties from EIF to the beginning of baseline inspections and portal operations reduced time allowed for planning, and designing equipment and facilities needed to carry out the Treaty.

Many -- perhaps the majority -- CW inspection requirements will involve activities and facilities that are not owned by, or under contract to, the U.S. Government. Although accustomed to protecting proprietary information, private chemical companies do not have the same security requirements as those imposed on DOD contractors. In some cases they will have no experience working with Government agencies. These activities will need extra consideration and guidance in preparing for inspections. USG agencies responsible for implementing CWC need to establish a central point of contact (National Authority) to issue guidance and directives in preparation for an inspection and to ensure uniformity and accuracy.

Legal Issues

The legal issues involved in any on-site inspection regime have been a subject of close scrutiny since OSI genesis. Searching private property under OSI provisions could invoke Fourth Amendment prohibitions against unreasonable search and seizure. Furthermore, there is always a risk of losing proprietary or sensitive information.

Several of these legal issues were addressed between Treaty signature and the baseline phase in INF, and contractual agreements were made between USG agencies and contractors providing the

contractors' consent to allow Soviet inspectors onto their premises. Constant OSIA escort during inspections has assured contractors that inspection procedures are carried out in a manner consistent with the Treaty. In general, Constitutional and property rights do not limit intrusive OSI if handled properly; however, inspections have limits, and the Constitution could curtail far-reaching intrusions. Careful consideration and planning for all future treaties must be exercised to minimize the risk to Constitutional and property issues under OSI.

Whenever sensitive activities take place at a facility subject to OSI, there is always a risk to classified or proprietary information. The risk increases with the operation's size and product sensitivity. Close coordination with USG personnel in developing site plans has allowed contractors to protect sensitive or proprietary information while allowing inspectors full inspection rights under INF. Under INF, protection was accomplished either by relocating certain programs, closing down all sensitive and some non-sensitive operations during a Soviet inspection, or additional security training and assigning direct responsibility to facility employees. For large state-of-the-art facilities, portal monitoring may provide the greatest amount of protection, as inspectors will see only finished products and not techniques, materials, or processes.

Some contractors anticipated possible discrimination for future Government contracts due to the imminent possibility of Soviet inspectors being on the premises. To address these concerns, the Secretary of Defense issued a memorandum reaffirming DOD's commitment to fair treatment of all defense contractors subject to OSI, and directing potential decisionmakers not to take the presence of Soviet inspectors into consideration when considering a contract award. This directive ensured that adverse decisions would be reviewed at DOD's top level to ensure fairness. Since no non-USG-affiliated activities have yet been subject to OSI, legal protection beyond DOD directives must be addressed. Revisions to the DOD Federal Acquisition Regulations (DFAR) resulted in this directive incorporating a non-discrimination clause in all solicitations and resulting contracts in excess of \$25,000. Unfortunately, this regulation provides no mechanism for potential claims against DOD. To better protect facilities subject to OSI under CWC, DFAR should be modified further to provide such a mechanism. Potential discrimination scenarios should be examined for civilian companies with chemical facilities to provide them with legal guidance prior to Treaty implementation.

INF addressed other liability issues including potential property confiscation to comply with OSI or portal monitoring, and personal injury or property damage as a result of OSI. In INF implementation, the possibility of legal property easement was recognized, although there was no need under that Treaty. INF has specific provisions stating that the inspectors may not at any time

interfere directly with ongoing activities, unnecessarily hampering operations, or affecting the facility's safe operations; however, INF did not address liability in the event of injury to a Soviet inspector. U.S. escorts maintain the right to prevent Soviet inspectors from undertaking life threatening actions. Although no existing treaty addresses potential property damage, the U.S. Government would likely assume responsibility for property damage or defective equipment resulting from an accident at the site. To prevent future disputes to the extent possible, it is vital that any future treaty utilizing OSI clearly outline all liabilities for personal injury or property damage. BDM has produced several reports addressing the legal and constitutional issues of implementing the CWC on-site inspection regime.

4.6.4 Conclusions.

The INF Treaty's most significant contributions to arms control verification were its provisions for OSI and for continuous portal monitoring. Subsequent arms control treaty negotiations have included and expanded similar provisions, which attempt to enhance each party's confidence in the other's treaty compliance. With CFE, START, and the future CWC, the number of facilities subject to inspection will steadily increase, as will the demands on those agencies responsible for implementing the treaties. The experience gained in implementing INF proved invaluable in providing lessons learned to prepare for implementation of other arms control treaties. The foremost lesson from the INF experience is the need for adequate planning time to prepare funds, personnel, facilities, and equipment and to complete logistical arrangements.

The CWC's data exchange will be far more detailed and extensive than that of INF. Because the Treaty deals not only with the weapons themselves but the weapons materials, far more facilities and activities will be vulnerable to inspections than in INF. Currently, responsible parties and/or agencies should be identified to conduct decisive preparations, to prepare site diagrams, to confirm data to be exchanged before questions arise, and to identify potential shortages or other difficulties that facilities may experience prior to or during an inspection.

CWC's demands are unique in that purely private facilities will be subject to inspections, especially if anytime/anywhere challenge inspections are agreed to. While legal issues have been addressed for U.S. Government contractors, dealing with private companies will open an entirely new set of concerns for information security, personal and property damage, and Government funding for facilities that undergo inspections. The Army Demilitarization Program for the CW stockpile essentially incorporates the necessity for planning and scheduling of eliminations, but does not outline the sequence of implementation, manpower, and other resources. As seen

through INF, insufficient planning in these areas may cause unnecessary strain on readily available resources.

4.7 UN CONVENTION AGAINST TRAFFIC IN NARCOTIC DRUGS AND PSYCHOTROPIC SUBSTANCES.

4.7.1 Overview.

The UN Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances is an international convention that seeks to ensure that signatories enact domestic legislation against drug production and trafficking. From 1912 to 1984, there have been eleven international conventions on illicit narcotics control. In 1984 discussions on narcotic drugs and psychotropic substances began under UN General Assembly auspices. Included in the UN Convention are provisions which require State Parties to eradicate drugs and to demand reduction activities, suppress illicit trade in precursor chemicals, and to ensure that commercial carriers are not used to transport illegal drugs. The UN finalized the agreement at a special convention in December 1988, and 43 nations immediately signed it.

The UN Convention is not an arms control treaty and may not seem relevant to the CWC; however, the control mechanisms for the trafficking of narcotics, as well as the universality of the UN Convention merit some review. The UN Convention contains numerous control procedures that are applicable not only to narcotics and their precursors, but also to chemical weapons and their precursors. As in the CWC, states party to the UN Convention must regulate commercial business activities to ensure that the convention is not violated by private concerns.

4.7.2 Key Verification Provisions.

The UN Convention has key verification provisions similar to the CWC. While these counterparts are not identical, they do provide insights to current chemical-related agreements. Table 13 summarizes the key verification provisions of the UN Convention.

On-site Inspection

To combat illicit trafficking of listed chemicals, the UN Convention makes implicit use of the Law of the Sea Convention of 1982 which governs inspection of suspect ships on the high seas. Under Article 17 of the UN Convention, if a State Party suspects a ship registered in another

Table 13. Key verification provisions -- UN Convention.

| PROVISIONS | CWC | UN Convention Against Traffic In Narcotic Drugs & Psychotropic Substances |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | Signatories cooperate in inspection of suspect vessels under LOS |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | Provisions for diversion of hazardous chemicals at national level Monitoring includes suspicious shipments, and documentation of precursor chemicals in Tables I and II |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | None |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | 70+ nations have signed |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | Sanctions applicable to enacting domestic penal legislation |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Coast Guard and DEA inspect after consent of ships' state of registry |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | International Narcotics Control Board UN Commission on Narcotic Drugs International Court of Justice |
| OTHER | Facility agreements | None |

signatory of illicit traffic, the customs or law enforcement elements of that State Party can ask the nation of registry for information on the ship and for permission to inspect it. The State Parties pledge to respond quickly to any such requests; however, a right of refusal is permitted and the inspections are not allowed without the consent of the country of registry. The UN Convention expanded upon the Law of the Sea by requiring each State Party to designate an agency or agencies to act upon interdiction requests. The U.S. uses U.S. Navy and Air Force assets to monitor "compliance" and DEA and Customs personnel to inspect suspect vessels.

Diversion Prevention and Monitoring Provisions

Although the UN Convention does not have verification provisions *per se*, it does have provisions equivalent to CBMs. The principal CBM is Article 12 which discusses chemical diversion. The state parties must enact laws and take appropriate measures to ensure that precursor chemicals are not diverted for illicit purposes. The precursor chemicals are listed in Tables I and II of Article 12. Domestically, State Parties must regulate any enterprise dealing with any chemicals listed in these tables and enact laws against their diversion to illicit usage. On the international level, this Article calls for establishment of a system documenting international commercial transactions of Table I chemicals (the most dangerous chemicals) and identifying suspicious transactions. All states transferring such chemicals must notify the receiving state of the transaction.

Universality

There are no provisions that attempt to provide for universality; however, knowing that the U.S. is a driving force behind the Convention and that many of the State Parties depend on the U.S. for foreign aid, there is an unwritten universality provision.

Sanctions

The sanctions imposed upon State Parties to the UN Convention relate to the domestic legislation that must be established and enforced. This is a U.S. attempt to make other nations enact penal legislation for production, cultivation, trafficking or possession of certain drugs. The laundering of drug-related money must also be made illegal by each nation.

Resolution Body

The previous anti-drug conventions had established two supervisory bodies -- The International Narcotics Control Board (INCB), and the UN Commission on Narcotic Drugs. The UN Convention expands these organizations' roles. The INCB oversees such provisions as the illicit narcotics manufacture, commercial documentation, and export labelling. The UN Commission on Narcotic Drugs reviews the operation of the Convention and can change the chemicals on Tables I and II. The Commission is also charged with taking action on non-compliance issues referred by the INCB; however, those actions are actions which the commission "deems appropriate."

If a problem arises, Article 32 states that the parties will consult and employ any peaceful means necessary to settle the dispute. Should this fail, the issue would be referred to the ICJ. This article is optional at time of signature for states like the U.S., which are unable to submit to the compulsory jurisdiction of the ICJ.

4.7.3 Interaction Between the CWC and the UN Convention Against Traffic in Narcotic Drugs and Psychotropic Substances.

Upon cursory examination, CWC and the UN Convention on Narcotics seem to have little interaction. These interactions are summarized in Table 14. The CWC is an attempt at arms disarmament, and as such relates to the military. The narcotics convention is an attempt at international law enforcement and therefore is related to procedures for law enforcement and customs officials. However, there are some legal similarities. For example, both conventions require regulation of private firms which engage in commerce in chemicals listed in the conventions' annexes. Both stipulate that procedures be enacted to prevent the diversion of chemicals to illicit purposes. Both conventions require domestic penal legislation to ensure that violation of these provisions is a criminal activity. It should be noted that no one chemical is subject to both conventions. However, there is a potential that a challenge inspection under the CWC can intentionally or inadvertently lead to discovery of chemicals violating the UN Convention. Another similarity between the two conventions is that both use oversight/resolution bodies. The INCB and the UN Commission serve much the same functions as the CWC Organization without the inspection duties. Finally, both conventions create an authority to handle notifications of intent to inspect.

Table 14. Interaction between CWC and UN Convention.

| CATEGORY | RELATIONSHIP |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | UN Convention lacks the OSI and monitoring provisions of CWC UN Convention monitors different chemicals than the CWC OSI under UN Convention is based on consent |
| OVERLAPS OR SIMILARITIES | Both have resolution bodies Regulation of commercial chemical firms producing convention-specified chemicals provided for under both Penal legislation is required by both conventions |
| SYNERGISTIC EFFORTS | CWC inspections could identify non-compliance with UN Convention |
| CONFLICTING ACTIVITIES OR PROVISIONS | None |

The only form of inspection allowed by the UN Convention is at sea in international waters after obtaining the consent of the government of registry. This right of refusal is an important precept in internationally recognized laws of the sea. The CWC allows much broader inspection procedures and, in the current Rolling Text, the inspected State Party does not have the right of refusal during challenge inspections.

4.7.4 Conclusion.

The UN Convention is a forerunner to the CWC in that it also attempts to control the activities related to dangerous chemicals. The relationship between the two agreements is an important one. The fundamentals of diversion prevention and documenting chemical production, storage, and transfer required by the UN Convention are the same as those for the CWC. Additionally, both Conventions affect private chemical manufacturers of particular chemicals and require domestic penal legislation to enforce their provisions. In conclusion, CWC OSI could partially verify that the UN Convention provisions are being fulfilled and could expose violations. Such inspections performed under the CWC could unintentionally produce an inspection regime for the UN Convention.

4.8 THE U.S.-SOVIET CHEMICAL WEAPONS AGREEMENT (AND MOU).

4.8.1 Overview.

Since June 1984 the United States and the Soviet Union have held numerous bilateral meetings on chemical weapons arms control. In 1989, as the pace of CWC negotiations slowed, the U.S.-Soviet bilateral talks took on greater importance and assumed a much higher public profile. On September 23, 1989, the U.S. and the Soviet Union signed a bilateral MOU on verification trials. The verification experiment and data exchange specified in the MOU is intended to facilitate the process of negotiation, signature, and ratification of the CWC.

Later that month, President Bush presented to the United Nations General Assembly a chemical weapons arms control proposal to the Soviet Union. In it the President said that the U.S. would (1) destroy 80 percent of its chemical weapons stockpile prior to signing the CWC, if the Soviet Union would agree to do the same and would agree to an adequate inspection regime; and (2) destroy 98 percent of its stockpile within eight years of a convention entering into force, if the Soviets would join the Convention. The remaining two percent would be destroyed in the next two years if all chemical weapons-capable states were parties to the CWC. In addition, the U.S.

agreed to cease production, should the Soviet Union accept President Bush's proposal. By proposing immediate destruction of CW stocks deeper and faster than the schedule under negotiation at the CD, the U.S. demonstrated its seriousness, flexibility, and desire to provide special impetus to the multilateral negotiations. The eight-year/two-percent proposal was intended to facilitate the convention's earliest possible Entry Into Force by providing an incentive for all states to join the convention immediately.

The Soviet Union accepted the President's United Nations Chemical Weapons Proposal of September 1989, and the U.S. accepted the Soviet condition that chemical weapons production must be ended. As a result, on June 1, 1990, Presidents Bush and Gorbachev signed a bilateral agreement addressing chemical weapons production and chemical weapons stockpiles destruction. This agreement is formally known as The Agreement Between the United States of America and the Union of Soviet Socialist Republics on Destruction and Non-Production of Chemical Weapons and on Measures to Facilitate the Multilateral Convention on Banning Chemical Weapons (i.e., the U.S.-Soviet Chemical Weapons Agreement).

The Agreement provides that each Party will (1) cease chemical weapons production upon Entry Into Force; (2) reduce and limit its chemical weapons so that its aggregate quantity of chemical weapons does not exceed 5,000 metric tons no later than December 31, 2002; (3) reduce and limit its chemical weapons so that, by the end of the eighth year after EIF of the CWC, its aggregate quantity does not exceed 500 metric tons; and (4) propose that a special multilateral conference be convened to determine whether participation in the CWC is sufficient to complete the elimination of CW stocks over the following two years. The destruction of chemical weapons will begin no later than December 31, 1992. In addition, no later than December 31, 1999, each party will have destroyed at least 50 percent of its aggregate quantity of chemical weapons. The Agreement further mandates the declaration of chemical weapons stockpiles, and storage and destruction facilities. These declarations and the storage and destruction of chemical weapons will be verified by routine or continuous OSI and monitoring instruments. Finally, the Agreement provides for bilateral challenge inspections. A series of bilateral U.S.-Soviet meetings were held during 1990 to work out the details of the inspection protocol and modalities for the challenge inspections. The verification provisions to date are discussed below.

4.8.2 Key Verification Provisions.

The verification provisions of the MOU and U.S.-Soviet agreement are similar to those of the CWC. While similarities exist in the MOU, as summarized in Table 15, they are most evident in

Table 15. Key verification provisions -- U.S.-Soviet MOU.

| PROVISIONS | CWC | U.S.-Soviet Memorandum of Understanding (MOU) |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | Phase II -- initial and routine OSI; challenge |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | Data exchange |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | Low level |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | Not applicable |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | None |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Types of inspectors unspecified Seals, cameras |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | None; employ normal diplomatic channels, specifically designated representatives, or other means agreed upon |
| OTHER | Facility agreements | None |

the case of the bilateral CW agreement as shown in Table 16. Diversion prevention is provided through data exchanges and, in the case of the bilateral agreement, through the continuous presence of inspectors and equipment. Neither the MOU nor the Agreement have universality provisions because of their bilateral natures. Additionally, neither have provisions for sanctions because the provisions affect military assets; therefore, the respective governments can manage compliance assurance. The remainder of these provisions are discussed below.

On-site Inspection

The MOU signed at Jackson Hole, Wyoming, September 23, 1989, sets out a bilateral verification experiment and data exchange to occur in two phases. In Phase I, which began in December 1989, each nation exchanged general data on their chemical weapons capabilities and conducted exchange visits to selected chemical weapons storage and production facilities; the specific facilities were mutually agreed upon by June 30, 1990. In addition, each side will permit the other side to visit two commercial chemical production facilities. To date, the initial data exchange and three exchange visits have occurred.

During MOU Phase II, to begin no later than four months prior to both countries initialling the CWC, the two sides will exchange detailed data and perform on-site inspections to verify the data exchanged under Phase I and II. Each nation will use its own national means to evaluate this data and will have the opportunity, under Phase II, to verify the data through on-site inspections. Prior to the initialling the CWC, each nation will have the opportunity to select and inspect up to five declared chemical weapons storage and production facilities. In addition, should either side, as of the exchange of Phase II data, possess a single small-scale facility for the production of Schedule 1 chemicals, it will be subject to an additional inspection. Each side will also have the opportunity to carry out up to five challenge inspections. All inspections will be carried out within the agreed four months from the date of the Phase II declarations. Routine inspections of declared facilities, as well as challenge inspections, will be conducted in accordance with the corresponding provisions of the CWC, taking into account that these inspections are bilateral and do not involve the CWC Organization. Challenge inspections may be made at any location or facility of the other party, as provided for in the draft CWC, except that, for the purposes of the MOU, and without creating a precedent, challenge inspections at facilities not on the territory of the parties may be made only at military facilities of a party in specific countries. Challenge inspections will be conducted in a manner consistent with the domestic law of the side to be inspected. To clarify questions related to the data exchanged during Phases I and II, the two parties will employ normal diplomatic channels,

Table 16. Key verification provisions -- U.S.-Soviet CW Agreement.

| PROVISIONS | CWC | U.S.-Soviet Chemical Weapons Agreement |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | Initial and routine OSI Trial challenge inspection |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | Continuous presence of inspectors Continuous monitoring with on-site instruments Data exchange |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | Low to high levels |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | Not applicable |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | None |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Types of inspectors include team leaders and deputy team leaders Military and medical specialists Sampling devices, seals, and camera equipment |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | Bilateral Chemical Weapons Commission (proposed) |
| OTHER | Facility agreements | Facility agreements and cooperative activities (proposed) |

specifically-designated representatives, or other such means as may be agreed upon. Table 15 summarizes the verification provisions in the MOU.

Verification of the June 1990 U.S.-Soviet Chemical Weapons Agreement will be through a combination of the continuous presence of inspectors and monitoring instruments at CW destruction sites, and routine, on-site inspection of CW production and storage facilities. Both nations agreed to continue verification procedures tests, including trial challenge inspections of undeclared facilities.

Under Article V of the Agreement, each party will provide access to each of its chemical weapons production facilities for routine OSI to confirm that production of chemical weapons has ceased. In addition, each party will identify and provide access to each of its chemical weapons destruction facilities and to the holding areas within for routine OSI of weapons destruction. These inspections will be accomplished by the continuous presence of inspectors and continuous monitoring with on-site instruments. Following the removal of weapons from a specific storage site, each party will have the right to conduct OSI of chemical weapons storage facilities to confirm that no weapons are being stored there. Each party will also have the right to conduct inspections of those storage facilities where chemical weapons remain to determine the quantities and types of weapons at each site. The Protocol to the U.S.-Soviet Chemical Weapons Agreement will provide detailed provisions for the implementation of these inspection measures. To date, no provisions are defined for conducting trial challenge inspections.

The objectives of inspections at chemical weapons destruction facilities will be to ensure that no chemical weapons are diverted and to confirm the destruction of chemical weapons under the Agreement. These inspections of chemical weapons destruction will begin for both Parties no later than December 31, 1992, on a reciprocal basis. The objectives of inspections at chemical weapons storage facilities will be to determine the quantity and types of chemical weapons at each facility, and to build confidence in the accuracy of the declarations provided for that facility. Inspections at chemical weapons production facilities will confirm that no resumption of chemical weapons production occurs and that no specialized chemical weapons production equipment is removed from that facility unless agreed upon.

Types of Inspectors and Equipment

Inspector qualifications and equipment required under both the MOU and the Agreement are undefined. However, due to the nature of the data and facilities subject to inspection, it is evident

that bilateral OSI will at least require chemical process engineers and chemical demilitarization personnel.

Resolution Body

There is no resolution body under the MOU. Rather the two parties will employ normal diplomatic channels, designated representatives, or other agreed upon means to communicate. Under the U.S.-Soviet Agreement there is a proposed body called the Bilateral Chemical Weapons Commission. However, the Protocol that would establish the Commission is still under negotiation.

Other

To facilitate implementation of the inspection provisions, the parties may carry out cooperative activities related to inspection procedures. Such activities may include testing of inspection procedures, development and testing of equipment, or any other activities on which the parties agree.

4.8.3 Interaction Between the CWC and the U.S.-Soviet Chemical Weapons Agreement.

There are several similarities and differences between the MOU and the CWC as summarized in Table 17. For example, both the MOU and the CWC provide for data exchanges for monitoring, on-site inspections of declared chemical weapons storage, production facilities and single small-scale facilities, and challenge OSI. The MOU inspections will be performed in accordance with the corresponding provisions in the CWC. In addition, since both the MOU and the CWC allow for inspection of chemical weapons storage and production facilities, it is reasonable to assume that the types and use of inspectors will be the same. However, CD/1108 does not set limits on the number of inspections, whereas the MOU restricts each party to five inspections of declared sites and five challenge inspections. These inspections will be completed prior to both countries initialing the CWC. This reflects the nature of the MOU as an experiment in verification effectiveness and data exchanges.

The U.S.-Soviet Chemical Weapons Agreement is also very similar to the CWC (see Table 18) in that verification will be performed through continuous monitoring with on-site instruments and continuous presence of inspectors; routine OSI of chemical weapons destruction, production, and storage facilities; and challenge inspections of undeclared sites (trial basis under the bilateral

Table 17. Interaction between CWC and U.S.-Soviet MOU.

| CATEGORY | RELATIONSHIP |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>GAPS OR DIFFERENCES</p> | <p>The MOU limits each nation to five routine OSI and five challenge OSI; the CWC does not have these types of quotas No resolution body or sanctions exist in the MOU; the CWC provides for both</p> |
| <p>OVERLAPS OR SIMILARITIES</p> | <p>Both CWC and the MOU provide for data exchanges, and routine and challenge OSI Facilities subject to routine inspection are declared CW storage, production, and destruction facilities Types of inspectors and equipment will be similar</p> |
| <p>SYNERGISTIC EFFORTS</p> | <p>Objectives to facilitate cessation of global chemical weapons production OSI performed under the MOU will be conducted in accordance with the corresponding provisions in the draft CWC</p> |
| <p>CONFLICTING ACTIVITIES OR PROVISIONS</p> | <p>None</p> |

Table 18. Interaction between CWC and U.S.-Soviet CW Agreement.

| CATEGORY | RELATIONSHIP |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | The bilateral agreement does not contain sanctions for non-compliance |
| OVERLAPS OR SIMILARITIES | Both treaties will have similar diversion prevention monitoring provisions, OSI, and general inspection procedures Both will have resolution bodies |
| SYNERGISTIC EFFORTS | Common goal to ban global chemical weapons After the CWC EIF, the provisions of the CWC will take precedence over the provisions of the bilateral CW agreement in cases of incompatible obligations; otherwise the provisions of the bilateral agreement will supplement CWC provisions in its operation between the U.S. and the Soviet Union |
| CONFLICTING ACTIVITIES OR PROVISIONS | None |

agreement). These challenge inspections could subject the commercial chemical industry to OSI. Additionally, inspectors for both agreements can employ tags, seals, and other agreed equipment for verification. These inspectors will likely have the same qualifications and functions due to the nature of the agreements. A significant difference between the two agreements is that the bilateral agreement, with the exception of trial challenge inspections, affect only CW, (i.e., military) assets and facilities; the CWC affects the commercial chemical sector as well.

The interaction between this bilateral agreement and the multilateral CWC is directly addressed in Article VIII of the U.S.-Soviet Agreement. It states that after the CWC enters into force, its provisions will take precedence over the provisions under the U.S.-Soviet Agreement in cases of incompatible, or "conflicting" provisions (e.g., quotas, sanctions). Otherwise, the provisions of the bilateral agreement will supplement the provisions of the CWC in its operation between the two Parties. After the CWC is signed, the U.S. and Soviet Union will consult each other to resolve any questions concerning the relationship between the bilateral and multilateral agreements.

4.8.4 Conclusions.

The Memorandum of Understanding, the U.S.-Soviet Chemical Weapons Agreement, and the CWC share the same objective -- to facilitate a global ban on chemical weapon production and stockpiling. The verification provisions defined in each document are similar. Each provides for data exchanges and some degree of on-site inspection. In addition, the U.S.-Soviet Agreement and the CWC provide for the continuous presence of inspectors, the continuous monitoring with on-site instruments, and the routine and challenge on-site inspections of chemical weapons destruction, production, and storage facilities.

The MOU and the bilateral agreement address their interaction with the CWC (Article V, paragraph 6 and Article VIII, paragraph 1, respectively). Under the MOU, inspections of declared and challenged facilities will be conducted in accordance with the CWC. The provisions in the U.S.-Soviet Agreement will supplement the provisions of the CWC *except* in the case of conflicting provisions. In this instance, the provisions under the CWC, upon Entry Into Force, will take precedence over the bilateral provisions. As a result of this mechanism, there are no conflicting activities or provisions that require resolution.

4.9 TREATY ON CONVENTIONAL ARMED FORCES IN EUROPE (CFE).

4.9.1 Overview.

Despite the obvious need to prevent military conflict in Europe after World War II, attempts at conventional arms control remained ineffective until 1975. In that year, 35 nations of the Conference on Security and Confidence in Europe (CSCE) signed the Helsinki Final Act. This primarily political agreement scheduled a series of CSCE future meetings for establishing confidence- and security-building measures -- cooperative measures. While they arguably represented progress in reducing the risk of war in Europe, confidence- and security-building measures did not involve arms limitations or reductions.

One attempt to address conventional arms control in Europe was the Mutual and Balanced Force Reduction (MBFR) talks that met in Vienna from 1973 to 1989. These negotiations made little progress over sixteen years due to the exclusion of forces in France and the Soviet Western Military District and attempts to place limits on personnel rather than offensive equipment. The choice of personnel limits made any agreement unverifiable and meaningless without commensurate reduction in offensive weapons systems. Additionally, the exclusion of troop sanctuaries would not appreciably reduce the risk of "surprise attack."

However, in a 1986 meeting between the alliances at Budapest, the Warsaw Pact leadership proposed to NATO, for the first time, reductions of military personnel in the region between the Atlantic and the Urals. NATO leadership responded that the huge quantitative imbalance of conventional military equipment -- not personnel -- presented the most serious European security problems. NATO proposed a new set of negotiations with the Warsaw Pact to specifically address this imbalance, independent of the CSCE talks, which included membership beyond the two organizations. Negotiations began two months later and evolved into the Negotiations on Conventional Forces in Europe (CFE Talks) with the specific objectives of reducing national holdings of key conventional weapons and establishing an effective verification regime.

One year later, both NATO and the Warsaw Pact had produced draft treaties to accomplish the weapons reduction objectives of the talks. After seven rounds of negotiation and the resolution of outstanding conflicts between the U.S. Secretary of State and the Soviet Foreign Minister, NATO and Warsaw Pact leaders signed the final draft of the CFE Treaty on November 19, 1990.

CFE offers both groups of signatory nations a clearer view of the other nations' military posture. Its universal appeal is that it provides definitive limitations to key military equipment in Europe. The agreement defines five treaty-limited equipment (TLE) categories. The symmetrical limits are alliance-wide ceilings that have national sublimits. The TLE categories and ceilings are as follows:

| | |
|-------------------------|--------|
| Main Battle Tanks | 20,000 |
| Artillery | 20,000 |
| Armored Combat Vehicles | 30,000 |
| Combat Aircraft | 6,800 |
| Attack Helicopters | 2,000 |

4.9.2 Key Verification Provisions.

The CFE Treaty signed November 1990 incorporates a sweeping verification regime. CFE specifically upholds the signatory nations' rights to utilize national (and "multinational") technical means to monitor the compliance of other signatory nations. The Treaty also specifies a detailed mandatory exchange of military information between nations. And most importantly, the Treaty provides for an intrusive OSI regime. These key verification provisions are outlined in Table 19. The Treaty contains no sanctions for non-compliance.

On-site Inspection

Provisions for four types of intrusive on-site inspections lie at the heart of the CFE verification regime. These inspection rights represent a more selective and intrusive extension of the information exchange and NTM rights and obligations. The CFE inspections seem technically simple compared to CWC inspections.

The first type of on-site inspection involves inspecting the reduction processes for TLE. The second type of inspection involves the certification of recategorizing certain types of combat aircraft. CFE does not limit nor allow right of refusal for either of these inspections types.

A third type of on-site inspection involves observations within sites declared by a signatory state. While CFE allows no right to refuse these inspections, it does subject them to a quota. Each signatory state must accept a number of these inspections equal to a certain percentage of declared equipment sites. For the first 120 days after CFE EIF, a state must accept a number equal to 20%

Table 19. Key verification provisions -- CFE.

| PROVISIONS | CWC | CFE |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | Declared facilities (quotas) Destruction process Certification process Challenge inspections (quotas, right of refusal) |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | No verification of non-production Tagging and sealing NTM |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | Low level |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | Not applicable |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | None |
| TYPES AND USE OF INSPECTORS/ EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Familiarity with inspected military equipment and operations Linguistic support Cameras, binoculars, aircraft |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | Joint Consultative Group |
| OTHER | Facility agreements | None |

of its total declared sites. For the following three years of reduction a state must accept 10% per year. Following the three year reduction period a state must accept a number of inspections equal to 20% of its declared sites within a 120 day period, then a state must accept a number of inspections equal to 15% of its declared sites for each of the following years. States must always accept a minimum of one inspection of its declared sites per year.

The fourth type of CFE on-site inspection allows for State Parties to conduct challenge inspections; however, CFE subjects these inspections to both a quota and a right of refusal. During the first 120-day period after EIF, during each of the three subsequent years, and for the 120-day period immediately subsequent, each signatory state is obligated to accept a number of challenge inspections equal to 15% of its obligatory inspections of declared sites for that same period. CFE obliges signatory states to accept challenge inspections at a rate of 23% every year thereafter. States must always accept a minimum of one challenge inspection per year.

Diversion Prevention and Monitoring Provisions

Diversion prevention and monitoring in CFE is concerned with the movement or surreptitious deployment of large numbers of TLE that can be monitored by NTM. CFE Article XV condones the use of NTM and mirrors similar provisions in previous arms control agreements such as INF and the draft Chemical Weapons Convention. CFE also attempts to enhance the effectiveness of NTM verification by banning intentional concealment measures intended to impede verification. Moreover, the Treaty outlaws the interference with the NTM of other signatory nations. The Treaty language places only two constraints upon the employment of NTM for CFE verification purposes. First, NTM must be utilized in accordance with the "generally recognized principals of international law." Secondly, the Treaty allows for the routine "cover and concealment practices associated with normal personnel training, maintenance or operations involving conventional armaments and equipment limited by the treaty."

The CFE Protocol on Information Exchange provides for extensive routine communications between the signatory nations. For example, each nation must keep the others informed of the command organization, designation, and subordination down to brigade/regiment level of all its land forces within the geographic area to which the Treaty applies. Each nation must also keep the others informed of the command organization, designation, and subordination of air forces (including air defense aviation) down to wing/air regiment level within the area of Treaty application. Independent units smaller than brigades/regiments or wings/air regiments must also be reported.

The CFE also requires that each signatory state initially declare and aggressively update descriptive listings of all its holdings, maximum allowable holdings, and its progress and shortfalls in reducing its TLE holdings such as battle tanks, armored combat vehicles, artillery, combat aircraft, and attack helicopters. Signatory states must also report the equipment locations. Moreover, CFE provides explicit standardized message formats for the information exchanges mandated which facilitate automation of the obligatory communication process between signatory nations. It is important to note that the information exchange requirements have already revealed a small degree of Soviet non-compliance. The protests of the other signatory states and high level U.S.-Soviet consultations resulted in resolution of the dispute.

Universality

The CFE Treaty is multinational, encompassing forces of 22 nations, but was bilateral in nature since it was a negotiated agreement between two military alliances. In this respect, it was very important to involve all of the nations of the two alliances.

Types of Inspectors and Equipment

The inspectors need to be familiar with the military equipment and operations being inspected. They will probably need little more than cameras, binoculars, flashlights, pens, and paper to accomplish their mission. CFE refers to a fifth type of inspection involving aerial observation of other State Parties within the geographic area of CFE application (Article XIV). The details, however, are left to the same future negotiations provided for in Article XVIII which are aimed at achieving agreement on additional measures to improve security and stability in Europe.

Resolution Body

In the event of a controversy involving CFE compliance, the Treaty established a Joint Consultative Group. This group determines any action regarding disputed matters. Unfortunately, any decision cannot be taken should any member object. There are no specified automatic sanctions.

4.9.3 Interaction Between the CWC and CFE.

Despite the dramatically different verification objectives of the two treaties, CFE and CWC have a great deal in common as summarized in Table 20. For instance, both agreements aim to track thousands of small items or quantities of material which can be readily moved and attempt to monitor activity at numerous declared installations. Both agreements would attempt to track and account for Treaty-limited materials into and out of the applicable areas -- zones for CFE, nations for CWC. In addition, both CFE and CWC involve the tracking of material closely related to Treaty-affected material while remaining exempt from the provisions of the agreement; moreover, both verification regimes must monitor reductions in Treaty-affected material.

The verification provisions of the CWC and CFE differ most significantly in their on-site inspection regimes. While CFE limits both inspections of declared sites and challenge inspections to quotas, the CWC inspection regime is ostensibly limitless. Moreover, while CFE subjects challenge inspections to a right of refusal, the CWC has no full right of refusal. This conflict could result in circumvention of the CFE inspection quotas and right of refusal in certain circumstances. For example, if a nation signatory to the CWC initiated a challenge inspection of U.S. military installations in Europe, it would not only be non-refusable, but the inspection also would not count against CFE limitations. Therefore, any nation wishing to circumvent the CFE (or CSBM) quotas or right of refusal could initiate a CWC challenge inspection instead. As a result, any benefits to be derived by the U.S. (or any nation) from the quotas or right of refusal could be undercut. It would be difficult to identify any nation attempting to utilize the CWC provisions in such a manner as an abuser of the regime, because it is entirely plausible that if the U.S. (or any nation) were to violate the CWC, it would have an interest in deploying the chemical weapons near U.S. military forces.

It is important to note, however, that the CWC challenge inspection provisions constrain the challenging nation's ability to gather information at the inspection site. Under the CWC, third party inspectors conduct the inspections accompanied by a single observer from the challenging state. Therefore, while CWC challenge inspections could provide a means to inspect CFE-related installations in excess of CFE quotas and in circumvention of the full CFE right of refusal, the marginal utility for CFE purposes of such inspections to the challenging nation would be constrained. Still, the U.S. must consider the likelihood of such a tactic and its impact on operational security.

Table 20. Interaction between CWC and CFE.

| CATEGORY | RELATIONSHIP |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | CFE has explicit geographic limitations |
| OVERLAPS OR SIMILARITIES | CFE inspectors will be able to look for and report on indications of preparedness to employ chemical weapons |
| SYNERGISTIC EFFORTS | Both treaties' verification provisions require extensive information management and telecommunications |
| CONFLICTING ACTIVITIES OR PROVISIONS | CWC challenge inspections could be utilized to circumvent CFE quotas, rights of refusal, and geographic limitations |

The CWC provisions for unlimited challenge inspections also provide a means to circumvent the deliberate geographic gaps in the CFE and the CSBM agreements' coverage. If, for example, the U.S.S.R. wished to look at the UK air base at Nicosia, Cyprus, it could do so under the guise of a CWC challenge inspection. It is likely such a challenge inspection would occur during a crisis which has attenuated the importance of the individual bases targeted for inspection. This important conflict between CFE (and CSBM) constraints and CWC freedoms means that challenge inspections provide an extension of ostensibly legitimized Soviet intrusiveness against our conventional forces, even beyond the geographical boundaries of CFE and CSBM application.

If CWC inspections are used to circumvent the geographic boundaries of CFE, then any attempt by nations such as the U.S.S.R. or Turkey to divert Treaty Limited Items to regions beyond CFE applicability could become subject to exposure through on-site inspection under the provisions of CWC combined with NTM.

The U.S. should also consider the benefit as well as the cost of the CWC's less restrained inspection regime. The U.S. could use the CWC challenge inspection provision to counteract a Soviet exploitation of one of the CFE geographic gaps. For example, a Soviet buildup on Iran's northeastern border east of the Urals could continue unexposed by CFE inspections due to the deliberate geographical gaps in the Treaty, but a CWC challenge inspection, as in the previous example, could serve to expose or discourage offensive military operations. Likewise, such an inspection could verify that a perceived threat does not actually exist. Therefore, the CWC challenge inspection regime represents a potential windfall in the escalating licensed intrusiveness in the U.S.S.R., albeit reciprocal, if the U.S. should find such inspections acceptable.

In one sense CFE inspections overlap the CWC inspection regime's objectives. All CFE inspections could attempt to verify, among other things, whether or not the observed ground forces continue to train in the use of chemical weapons. This synergistic effort and its results could be coordinated throughout NATO and non-NATO nations. CFE inspectors should also be mindful of the presence of chemical weapons stockpiles. Clearly, inspections intended to investigate primarily chemical weapons issues should be conducted as CWC inspections to avoid inefficient utilization of CFE inspections or CSBM observations which are subject to quotas.

The CFE and the CWC call for large amounts of direct or indirect communication between signatory states, yet only the CFE provides for standardized message formats. These formats not only facilitate the automation of mandated information exchange and information storage, but they also specify and standardize the precise requirements of the Treaty. The CWC requires an even

greater amount of information reporting, but provides for no standardized formats. As a result, the signatory nations may submit a variety of formats which would be difficult to compile for verification purposes. The framers of the CWC should accept as a CFE lesson learned that standardized reporting formats can make the information exchange process more efficient.

Given that the verification process of both treaties can benefit from standardized message formatting, it would be in the interest of the United States and other nations to design and utilize common automated data systems for tracking such important verification data. The same system and facilities could support the compilation of this data both at the national and international organization level. Likewise, this same synergistic effort could be utilized for reporting the U.S. information requirements.

4.9.4 Conclusions.

While CFE and the CWC differ dramatically in objectives and implementation, there is a significant potential for interaction. Most importantly, the liberal CWC inspection provisions could facilitate the circumvention of inspection limitations placed on CFE inspections. If the U.S. determines that such use of CWC inspections would be contrary to its interests, then actions should be taken during CWC negotiations to avoid this problem. But the liberal application of CWC inspections may also serve U.S. interests. There also may be opportunities for synergistic effort between the verification regimes. The development of common data management and telecommunication systems for all the requirements is the clearest of these opportunities.

4.10 STRATEGIC ARMS REDUCTION TREATY (START).

4.10.1 Overview.

On July 31, 1991, the United States and the Soviet Union signed an historic document -- the Strategic Arms Reduction Treaty, or START. This treaty required the world's two principal nuclear powers to not only limit strategic nuclear weapons and the weapon delivery systems but, for the first time, to reduce existing force levels. The START Treaty will require a 25-35 percent reduction in each party's aggregate number of deployed nuclear weapons, which will also produce a parallel reduction in the number of deployed delivery systems. All reductions must be completed within seven years in a three-phase drawdown to equal levels at the end of each phase. The treaty's duration is to be 15 years, unless superseded earlier; it also provides an option to extend for five-year increments if both sides agree.

The START Treaty is perhaps the most complicated treaty ever signed between the two nuclear superpowers, but its objective is simple: to reduce the strategic nuclear forces of both sides in order to reduce the risk of nuclear war. START will strengthen strategic stability in three ways:

- 1) While overall warhead reductions will approximate 25-35 percent, nearly 40-50 percent reductions in warheads will occur on those systems that are the most de-stabilizing, i.e., strategic ballistic missiles. Indeed, the Soviet heavy ICBM force -- the most de-stabilizing missile system of all -- will be cut exactly in half, from 308 missiles with 10 warheads each (3080 warheads) to 154 missiles (1540 warheads).
- 2) START provides incentives for each side to restructure its strategic forces in ways to make them less de-stabilizing, i.e., less threatening and more survivable. For example, new types of heavy ICBMs are banned and the weapon loads of heavy bombers are discounted in the aggregate weapons limit, while ballistic missiles are credited with the actual number of weapons they carry. In addition, there are ballistic missile warhead sublimits that cannot be exceeded within the total weapons aggregate. No such sublimit exists for heavy bombers.
- 3) START will implement a whole network of interlocking verification measures designed to ensure compliance. In addition to the standard national technical means of verification, START grants each party the right to conduct a variety of multipurpose, highly intrusive OSI of the other party's weapon systems, operational facilities, conversion procedures, storage facilities, and weapon loadings. An extensive, continually updated database containing the numbers, types, dimensions, locations, and movements of strategic systems is also mandated. These and other cooperative, collateral measures will help to ensure that each side has a clear picture of the other's capabilities, their deployment means, and their location.

The Treaty itself represents a general obligation for each side to reduce and limit its ICBMs and their associated launchers and warheads; submarine-launched ballistic missiles (SLBMs), launchers, and warheads; and heavy bombers (HBs) and their armaments, including long-range nuclear air-launched cruise missiles (LRNAs). ICBMs, SLBMs, and heavy bombers are individually and collectively referred to as strategic nuclear delivery vehicles (SNDVs).

The treaty is structured so that separate aggregate limits exist for a party's SNDVs mix, as well as for the aggregate number of warheads deployed on these SNDVs. These are known as the central limits. There are a series of equally important sub-limits under these central limits. For example, START's central limit for SNDVs is 1600 systems, of which no more than 154 (a sub-limit) can be heavy ICBMs. A party can mix and match its SNDV components (ICBMs, SLBMs, and HBs) in any way desired, provided it adheres to both the aggregate central weapons limit and weapons sub-limits. Each type of SNDV is credited with a number of weapons through counting rules. When the number of warheads attributed to a specific type of SNDV is multiplied by the number of SNDVs of that type, the product or resultant number of weapons is attributed to those SNDVs which become part of the total weapons aggregate.

The START Treaty's central limit for accountable weapons is 6000. Therefore, each side can have 1600 SNDVs in combinations that yield no more than 6000 accountable weapons. Accountable weapons are weapons credited to a SNDV without regard to its actual carriage capability. For example, an HB capable of carrying only gravity nuclear weapons and short range air-to-surface missiles is held accountable for carriage of only a single weapon, regardless of how many it can or does actually carry. In effect, START counting rules provide HBs with a discount. Therefore, if a side had 100 such HBs, only 100 weapons would be attributed to that force in the 6000 central warhead limit. Whereas, HBs generally have discounted weapon counts attributed to them, ICBMs and SLBMs are nearly always attributed with what they can actually carry.

4.10.2 Key Verification Provisions.

The START Treaty was negotiated from the onset with verification in mind. It contains detailed, interlocking, and mutually reinforcing provisions designed to complement national technical means of verification at a minimum. It is highly doubtful that NTM alone would have been able to effectively monitor the voluminous START provisions, limits, and restrictions. What was needed was a series of complementary measures that, when combined with NTM (and other forms of information gathering), provided a synergistic effect yielding an effective verification regime. There are no sanctions for non-compliance. Key verification provisions are summarized in Table 21.

On-site Inspection

START provides for nine types of OSI and three types of exhibitions. Each of these is designed for a specific and definitive purpose -- but in all cases to confirm the data accuracy

Table 21. Key verification provisions -- START.

| PROVISIONS | CWC | START |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | Nine types of OSI |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | PPCM and NTM Data exchanges Unencrypted telemetry Exhibitions Deployment area for mobiles ICBMs |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | Low level |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | Not applicable |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | None |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | No unique inspector qualifications OSI equipment relatively unsophisticated |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | Joint Compliance and Inspection Commission (JCTC) |
| OTHER | Facility agreements | None |

provided in the MOU. Baseline data inspections are the initial inspections of all facilities and systems in the MOU, and are designed to confirm and verify the initial database. Exhibitions of ICBMs, SLBMs, and HBs are designed to give each party the opportunity to confirm the accuracy of the technical data on each system before OSIs begin, so that they have an accurate understanding of what it is they will be inspecting and looking for. The various types of inspections and exhibitions are listed in Figure 3.

Diversion Prevention and Monitoring Provisions

START establishes continuous monitoring at the perimeter and portals of each side's mobile ICBM assembly facilities. The U.S. has the right to establish a monitoring facility at Votkinsk, the final assembly facility for the SS-25, and at Pavlograd, the final assembly facility for the SS-24. The Soviets have the right to continuously monitor the Thiokol Strategic Operations facility at Promontory, Utah, the final assembly facility for the accountable first stage of the PEACEKEEPER. Even though the United States has no mobile missile in production, in order to get Soviet agreement to continuously monitor their SS-24 assembly facilities the United States agreed, for the sake of reciprocity, to treat the PEACEKEEPER as a mobile missile.

Except for some specific exceptions, the sides have agreed to transmit all data from ballistic missile flight tests unencrypted. Any practice which denies full access to telemetric information is prohibited. In addition, an obligation exists to exchange telemetry tapes, interpretive data, and acceleration profiles for test flights. This one monitoring and verification provision will have a major impact on the sides' ability to monitor the development, modification, and capability, of the other's ballistic missile forces. This is probably one of the most significant Treaty measures.

The START Treaty contains specific provisions that prohibit one party from interfering with the other's satellite collection activities. Interference can mean any activity designed to blind, mislead, or render inoperable the other party's satellite(s) or to take concealing actions which could prevent Treaty monitoring and verification of activities. NTM alone is rarely sufficient to monitor complex treaties, but remains the essential baseline methodology which all other means complement.

The Treaty provides cooperative measures designed to enhance confidence and verification by requiring (up to seven times per year) each side to openly display some number of road or rail mobile missiles or heavy bombers to the NTM capabilities of the other side. Limitations of how

| TYPE INSPECTION | PURPOSE |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Baseline OSI (Article XI, paragraph 2) | Confirms the accuracy of the initial data on the numbers and types of strategic arms located at specified facilities listed in the Treaty's database. |
| Data Update OSI (Article XI, paragraph 3) | Ensures continually that the data provided and updated remain accurate through short-notice, periodic inspections at specified facilities. |
| New Facility OSI (Article XI, paragraph 4) | Confirms the accuracy of the data provided regarding a newly declared facility not previously part of the database. |
| Suspect Site Inspection (SSI) (Article XI, paragraph 5) | Ensures, through short-notice inspections at an agreed list of facilities, that the covert assembly of mobile launchers of ICBMs or first stages of such ICBMs is not occurring. |
| Reentry Vehicle (RV) OSI (Article XI, paragraph 6) | Confirms that deployed ICBMs and SLBMs at declared ballistic missile bases contain no more than the declared (allowed) number of RVs. |
| Post-Dispersal OSI (Article XI, paragraph 7) | Confirms that the aggregate number of ICBM mobile launchers and missiles located at a declared ICBM base, and those that have not returned to the base after completion of a dispersal, do not exceed the number specified for that base. |
| Conversion and Elimination OSI (Article XI, paragraph 8) | Confirms that <i>strategic offensive arms</i> subject to the Treaty's provisions have been converted or eliminated in accordance with agreed procedures. |
| Closeout OSI (Article XI, paragraph 9) | Confirms that <i>facilities</i> have been eliminated in accordance with agreed procedures. |
| Formerly Declared Facilities OSI (Article XI, paragraph 10) | Confirms that facilities which have been declared eliminated are not being used for Treaty-illegal purposes. |
| Technical Characteristic Exhibitions (Article XI, paragraph 11) | Confirms and verifies the accuracy of the technical data/characteristics of ICBMs and SLBMs of each type/variant and of mobile ICBM launchers specified in the Treaty. |
| Baseline Exhibitions (Article XI, paragraph 13) | Confirms that all non-nuclear heavy bombers, former heavy bombers, and training heavy bombers have been converted in accordance with Treaty provisions. |

Figure 3. Inspections and exhibitions.

many, when, at what facilities, and for how long vary from system to system. Such displays are designed to enhance NTM effectiveness.

The START Treaty contains a voluminous MOU which is its database. The MOU contains detailed data on the strategic force structure and aggregate force levels of both sides. In addition, it records the specific location (facility) at which every SNDV (by type) is located, and lists all facilities and ballistic missile silo coordinates at these facilities. It contains the site diagrams of inspectable facilities and provides copious information concerning the production, deployment, repair, conversion, elimination, and testing of the entire spectrum of strategic systems. It records how many warheads are deployed on each type of ICBM and SLBM, identifies which heavy bombers can carry LRNAs, and provides precise technical data on TLE characteristics. These data were provided initially at Treaty signature and will be updated continually through notifications for the life of the Treaty and in total at periodic intervals.

The START Treaty requires a myriad of notifications within various timelines to report movements, relocations, and transits, of treaty-limited systems. These notifications will specify the type and number of SNDVs affected, their new locations, and a variety of other data specified in the Treaty, depending upon the system and the event. These notifications keep each side apprised of major changes in the other's force structure. To supplement these continuous (real-time) notifications, a periodic update of the entire MOU is also provided to reconcile the accounts.

Types and Use of Inspectors and Equipment

The START inspectors are provided by OSIA. Most are military officers, augmented by others supplied by State, ACDA, and other concerned agencies. They do not need any specific training or qualifications other than the inspector course taught by OSIA.

Resolution Body

The JCIC is the formal body to which all ambiguities, concerns, challenges, proposals, and changes are brought. It was established as the official forum to resolve issues and concerns that may arise.

4.10.3 Interaction Between the CWC and the START Treaty.

This section discusses the interaction between the CWC and START presented in Table 22.

Implementation Planning

Certain lessons learned from INF implementation were applied or incorporated into the START negotiation and implementation planning phases; the latter is still underway. Since START has not yet entered into force, there obviously can be no implementation experience to relate. Most implementation planning for START began in 1988 -- well before Treaty signature -- when it was recognized that START would be an order more complex and demanding than INF. This realization, along with the experience of not having fully anticipated the problems associated with implementing INF and subsequently not being properly prepared, galvanized many into initiating early planning for START.

Certain factors are impeding advanced CWC implementation planning, not analogous to START. The multilateral nature of the CWC negotiations involving more than 50 nations as negotiating parties or observers in the consensus-rule CW Ad Hoc Committee of the Conference on Disarmament makes it very difficult to anticipate how provisions will ultimately be worded. Technical specifications for inspection-related equipment cannot be determined in final form while the list of banned substances is still undecided. The U.S. entity that will be responsible for CWC implementation is also undetermined. Therefore, at present, no one entity has the lead for planning for CWC monitoring and verification activities.

In START, the need for post-Treaty EIF technical negotiations has been largely avoided by ensuring that as many of the relevant details that could be identified were included in the basic negotiations. The high degree of detail recorded in the 700-page START Treaty is aimed at facilitating smooth implementation of this highly complex agreement's provisions. For example:

- a) The START Treaty calls for exhibitions of Treaty-Limited Equipment either before Treaty EIF or immediately after EIF, but before beginning baseline inspections. Exhibitions are designed to allow each party to certify to its satisfaction that the detailed technical data provided by the other party is accurate and that the inspecting party fully understands how the measurements and data were attained or calculated. These exhibitions, along with the detailed MOU technical data on each Treaty-limited system, should avert much ambiguity and misunderstanding. Provisions in the CWC for declarations of chemical weapons holdings and early follow-up OSI to confirm the declarations have a similar objective.

Table 22. Interaction between CWC and START.

| CATEGORY | RELATIONSHIP |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | <p>CWC eliminates weapon systems, prohibits production START reduces/limits, allows production and modernization START is mostly applicable to military facilities while CWC is heavily involved with non-military and non-government commercial industrial facilities START is dealing with easily recognized TLE whereas chemicals not easily identified START has limited SSI regime while CWC has more extensive challenge on-site inspections</p> |
| OVERLAPS OR SIMILARITIES | <p>Both have extensive declarations, data exchanges, and follow-up OSI to confirm information Both have extensive routine OSI of declared sites and facilities</p> |
| SYNERGISTIC EFFORTS | <p>None</p> |
| CONFLICTING ACTIVITIES OR PROVISIONS | <p>Challenge OSI provisions under CWC could subject START facilities to CWC inspections</p> |

- b) **The Inspection Protocol of the START Treaty contains precise, detailed procedures for each type of permitted inspection. This protocol and its annexes spell out what can be inspected, how it is to be inspected, and precisely what equipment is permitted to be used for each type of inspection. The level of detail contained in this protocol removes any doubt regarding how an inspection must be conducted, what rights and obligations are operative, and all other parameters involving the conduct of inspections. In both the bilateral U.S.-USSR CW negotiations, and the multilateral CWC negotiations, strong efforts are being made to include similarly detailed OSI protocols and procedures.**

- c) **Because site diagrams were a major problem in INF, a major part of START site diagram development began over two years before Treaty signature. Even though it was unclear which facilities were to be subject to inspection and what was to be inspectable at those facilities, a relatively small, finite number of possibilities existed. The situation in CWC contrasts greatly, in that authoritative estimates of the inspectable facilities in the United States have yet to be made. In START, illustrative diagrams were developed based on the possible outcomes, and as the negotiations progressed, modifications were made. Eventually, detailed site diagram parameters were negotiated and recorded in the Treaty. These parameters were subsequently incorporated into the inspection protocol.**

A significant lesson for CWC implementation planning can be gleaned from the START planning experience regarding site diagrams. Much wasted effort can be anticipated in the development of site diagrams as guidelines and parameters change, proposals are negotiated, and compromises are struck. This should not dissuade the effort. Each iteration uncovers new problems and ambiguities in both the general sense as well as on a site-by-site basis. With each iteration the capability to provide increasingly accurate and meaningful diagrams is enhanced; the process is constantly refined. Eventually, when the final regime of parameters is agreed upon, site diagrams can be generated quickly and with accuracy. Key to this process is the informal exchange of sample site diagrams (before Treaty signature) to provide a visual representation of a party's proposal and a working document from which the parties can negotiate.

Compliance and Inspection Plans

By and large, the START-related facilities to be inspected are military facilities, and the agencies responsible for compliance are military organizations -- the Air Force and the Navy. Each Service will take responsibility to ensure compliance with Treaty provisions involving its military equipment at its military facilities. The vertical command structure established in every military

agency, the clear lines of authority and responsibility inherent to that organizational structure, and the extensive experience with developing operational plans for military activities make the development of compliance and inspection plans for each military facility a relatively routine exercise.

Although eventually discarded, a serious proposal in START was to have suspect-site inspections at a large number of private corporations that had some capability to produce rocket motors of various sizes and power. The common element among these contractors was that they all had existing or previously USG contracts.

The CWC, however, could make numerous chemical producers susceptible to routine international inspections. Many, if not most, of these will be private firms with no USG ties, contracts, or affiliations. CWC challenge OSIs, even with some caveats for their justification and outcome, are expected to impact on a broad spectrum of Government and private industrial facilities. Significant complex legal and proprietary problems exist involving how CWC inspections might or could be directed and conducted. In addition, no USG organizational structure currently exists that can involve the large numbers of disparate private companies in a concentrated planning effort to prepare compliance and inspection plans or to actually prepare them for inspections. In this regard, the CWC faces a serious problem for which there is no START counterpart.

Logistical Preparations

The number of facilities subject to baseline inspections under START will far exceed those of INF, but it is not expected that the airlift and manpower requirements for START will have an adverse impact.

- a) MAC has been closely involved in START planning from the very beginning under the assumption that MAC would provide START inspection support.
- b) MAC had no previous experience during the INF baseline inspection period, but an experience base now exists, and the major problems have been resolved. START baseline inspections will certainly tax MAC assets, but proper advance planning and an experienced airlift force should greatly ameliorate the impact.
- c) At INF EIF, OSIA was an embryonic agency not fully manned or organized. OSIA is now a functional organization with more than three years of experience conducting

inspections and escorting Soviet inspectors. A professional cadre now exists. Careful planning is underway to implement START -- new personnel are already on board, both classroom and on-site training is underway, operational plans are being developed, and contracts are being awarded to implement the START inspection regime as smoothly as possible.

All of this infrastructure will also be in place for the CWC. However, the challenge OSI (also referred to as an "anywhere, anytime") inspection regime being negotiated as part of the CWC could lead to logistical problems because of short timelines to transport inspectors to sites whose locations are to be disclosed only shortly before the challenge OSIs are to take place. Currently, START timelines to transport inspectors -- after arrival in country and identification of the facility to be inspected -- are based on known, declared facilities. CWC challenge OSIs will add much uncertainty. Once a facility is identified, means of transportation (air and ground) must be assessed and identified, military or civilian airports located, and time factors computed. It is not reasonable to expect that under a challenge OSI regime, if timelines similar to START are adopted, that all sides could physically comply in all cases. However, it is reasonable to assert that under any regime that includes a challenge OSI provision or a provision where a very large but finite number of declared suspect sites are subject to inspection, transportation timelines similar to those in the START Treaty could be insufficient in some instances.

4.10.4 Conclusions.

The START Treaty is significantly more complex and intrusive than any previous arms control treaty. Part of the reason is that START does not eliminate an entire class of weapons. It reduces, limits, and controls strategic weapons. It permits continued production and modernization of these systems, but under tightly controlled conditions. Therefore, START inspection provisions and restrictions necessarily must be complicated, sophisticated, and intrusive since the monitoring and verification requirements are more complex.

A major START innovation -- its limited SSI regime -- may be useful to the CWC. Early in the START negotiations, a regime similar to "anywhere, anytime" was considered. It was assessed to be too expensive and potentially too intrusive, and was modified over time so that only a large list of declared facilities with certain identifiable production capabilities would be subject to SSI. Eventually, this list was reduced to three declared sites each for the Soviet Union and United States.

The START process benefited from the INF process primarily because various detailed data and procedures (negotiated in a separate agreement between the sides after INF EIF) were incorporated into the START Treaty. This could also be a CWC goal.

The principal CWC factor that will likely prove the most vexing and difficult to address, and for which there is no START counterpart, is that of Government agency contractor and private enterprise interface. Aside from the legal issues, no internal USG organizational structure exists currently that can pull all the relevant players together. No organization exists with the responsibility and authority (legal or otherwise) to bring direction and purpose to this effort. To attempt to accomplish this piecemeal or spread responsibility across a number of USG agencies probably would be counterproductive.

4.11 "OPEN SKIES".

4.11.1 Overview.

On May 12, 1989, at the Texas A&M University commencement address, President Bush announced his "Open Skies" initiative, reiterating it while visiting Germany three weeks later. The initiative would permit unarmed aircraft from European nations to fly unmolested, on short notice, over the territory of potential adversaries in order to reinforce confidence and security.

"Open Skies" represents a revival of a 1955 President Eisenhower initiative. The Soviets insisted that aerial inspection unattached to arms limitations constituted legalized espionage. An increase in the capabilities of U.S. NTM also contributed to the long-term eclipse of the 1950s initiative. Today's more relaxed European security atmosphere should provide more opportunity for an "Open Skies" initiative to develop from a proposal into an instituted operation.

The primary appeal of an "Open Skies" agreement would be that it offers a reciprocal information-gathering opportunity for signatory nations, reducing the likelihood of surprise attack, reducing the need for a heightened security posture theoretically relieving a long-time European economic burden. Another nearly universal appeal of an "Open Skies" agreement is that it would allow nations unable to afford effective NTM a similar capability. For the U.S. and the U.S.S.R. it would allow a more flexible and less expensive means to obtain similar information previously only available through NTM.

4.11.2 Key Verification Provisions.

While "Open Skies" does not contain verification provisions specifically associated with any particular treaty, its provisions could be exploited to augment the verification or efforts (especially NTM) associated with other arms control agreements. "Open Skies" could also augment existing confidence-building regimes such as the CSBMs of the CSCE Talks. The limitations of the agreement would be related to the constraints of flight safety, international law, a quota system and political geography. The key verification provisions, specifically the types of equipment for compliance monitoring, are summarized in Table 23.

The quota system, governing the allowable number of overflights, would be based on the individual signatory state's geographic size. Flights may also be limited in duration according to the overflown state's size. An "Open Skies" agreement would incorporate a minimum number of overflights accepted by each nation, just as the CFE and CSBM agreements incorporate a minimum obligation of on-site inspections and observations. Because the proposal remains in the early stages of developing an actual agreement, an assessing the technical complexity of the equipment involved can only be speculative.

Types of Inspectors and Equipment

Participants in an "Open Skies" regime would likely favor fixed-wing aircraft, due to the limited range of rotary wing aircraft. Moreover, because of their ability to land anywhere, most nations will probably hesitate to agree to allow helicopters to regularly overfly their territory. It has been noted that case law in the United States tends to rule against the constitutionality of government sanctioned, but warrantless, overflight of private property on Fourth Amendment grounds.

The sensor technology to be allowed by an agreement has yet to be determined, but it is clear that eavesdropping (e.g., signal intelligence (SIGINT)) technology will be prohibited. Some technologies discussed for purposes of an "Open Skies" agreement include commercial aerial film cameras using electronically charged coupling devices instead of film. These cameras can achieve resolutions of up to one meter from altitudes of 10 kilometers. Synthetic aperture radar (SAR) with a similar resolution for belts of ground up to three kilometers wide has been explored for the same purposes, but it involves a high degree of technical complexity and expense. Infra-red technologies have also been considered. Without further development, many aerial surveillance technologies currently used for other purposes would prove inadequate for some of the possible "Open Skies" applications.

Table 23. Key verification provisions -- "Open Skies."

| PROVISIONS | CWC | OPEN SKIES |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | None |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter at securing challenge site Continuous presence of inspectors | None |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISIONS | Low to high levels | Potentially very high level |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share/exchange chemicals, equipment, information relating to development and non-prohibited application of chemistry | None |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, Security Council | None |
| TYPES AND USE OF INSPECTORS/EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Pilots Fixed wing aircraft SLAR IR Commercial Cameras Technicians |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | None |
| OTHER | Facility agreements | Aerial observation |

4.11.3 Interaction Between the CWC and "Open Skies".

The most important interaction between a possible "Open Skies" agreement and the CWC is that CWC inspections could incorporate aerial inspections by specification or by implication. Aerial observation and photography could fill much of the coverage gap between a CWC inspection notification and the arrival of inspectors on site. For example, timely overhead photographs of a suspected storage area for chemical weapons could enhance the surety that stockpiles were not moved before the arrival of inspectors. A summary of the interaction between the CWC and "Open Skies" is in Table 24.

CWC challenge inspections by air present a potential conflict with the quota system of an "Open Skies" agreement for the same reason that CWC challenge inspections pose a threat to CFE inspection quotas. Aerial inspections pass all the limitations in intrusiveness of the new U.S. proposal involving managed access. Yet, if the final version of the CWC draft allows challenge inspections in the form of aerial overflights, a nation could conduct frequent overflights anywhere within Europe regardless of any "Open Skies" quotas.

4.11.4 Conclusions.

While an "Open Skies" agreement would be far more limited than the CWC, there is a degree of interaction. For example, the U.S. and its allies could commit resources and synergistic efforts toward the further development of aerial surveillance technology for "Open Skies," CWC, and CFE, as well as for other agreements.

Aerial observation may be incorporated into the CWC explicitly or implicitly in order to improve the timeliness of inspector observations of the targeted site without increasing the intrusiveness of the inspection. Aerial observation could also provide coverage for a suspect site before the arrival of inspectors. But applying "Open Skies" overflights in direct support would only work in the European and North American zone of applicability.

If an aerial observation regime is accepted for CWC challenge inspection purposes, the U.S. must be aware of both the risks and the opportunities that such unlimited overflights would provide in Europe and throughout the U.S.S.R., regardless of any "Open Skies" quotas. Using CWC inspections for other than strictly CWC purposes may prove unacceptable to the U.S., but other nations could employ them.

Table 24. Interaction between CWC and "Open Skies."

| CATEGORY | RELATIONSHIP |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | "Open Skies" geographic applicability is smaller |
| OVERLAPS OR SIMILARITIES | CWC could incorporate aerial observation Overflights could observe inspection targets prior to arrival of inspectors |
| SYNERGISTIC EFFORTS | Both treaties may require common aerial surveillance technology development |
| CONFLICTING ACTIVITIES OR PROVISIONS | CWC overflights may be used to circumvent "Open Skies" quotas |

SECTION 5 CONCLUSIONS

Nothing in this Convention shall be interpreted as in any way limiting or detracting from the obligations assumed by any State under the Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of the Bacteriological Methods of Warfare, signed at Geneva on 17 June 1925, and under the Convention of the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, signed at London, Moscow and Washington on 10 April 1972.

Article XIII, Relation to Other International Agreements

5.1 OVERVIEW.

The CWC (CD/1108) verification provisions will be the most intrusive regime ever negotiated. Due to the nature of arms control history, no conflicts between treaties have been encountered. However, the proliferation of arms control negotiations and agreements in the past few years and the increasing intrusiveness of the regimes *may* result in conflicts between the CWC and other treaties. These conflicts could intentionally or inadvertently shake the spirit of some of those treaties.

CWC verification could affect other treaties in three different ways. First, CWC verification provisions may not impact some treaties. Second, some CWC provisions could be used to partially verify past agreements. This may be intentional in some cases or an inadvertent byproduct of CWC inspections in others. Lastly, there is potential that some CWC inspection provisions could impact negatively on the spirit of other treaties.

Potential conflicts between the CWC and other agreements hinge on challenge inspections. In order to have a verifiable CWC regime, provisions must be made that allow challenge inspections at undeclared sites. However, nations want to control access of inspections in order to preserve confidential information and the integrity of national security. The conflict of where inspections end and espionage activities begin has been at the heart of debates on OSI throughout this century. The potential impact of the CWC on other treaties is illustrated in Table 25. These relationships are discussed in greater detail in the following sections.

Table 25. Impact of CWC verification provisions on other treaties.

| | NONE | POTENTIALLY POSITIVE | POTENTIALLY NEGATIVE |
|-----------------|------|----------------------|----------------------|
| ANTARCTIC | • | | |
| NPT/IAEA | | | • |
| GENEVA PROTOCOL | | • | |
| BWC | | • | |
| TTBT/PNET | • | | |
| INF | | | • |
| UN CONVENTION | | • | |
| U.S.-SOVIET CW | | • | |
| CFE | | | • |
| START | | | • |
| "OPEN SKIES" | | | • |

5.2 TREATIES NOT IMPACTED BY CWC PROVISIONS.

This report concludes that the CWC will not impact the Antarctic or NTT treaties due in large part to the intrusive nature of their verification regimes. The Antarctic Treaty allows for OSI of any and all areas on the continent; therefore, CWC challenge inspections could not intrude on Antarctic sites subject to OSI. That is, should a violation of the Antarctic Treaty be suspected, its own OSI provisions could address the situation. This also applies to the TTBT and PNET. Although these two treaties monitor tests rather than inspect them, the CWC challenge inspection provisions would not be needed to expose violators of the NTT. This is due to the nature of nuclear activities and the reliability of hydrodynamic and seismic measurement technologies and NTM to identify unauthorized test activities.

5.3 POSSIBLE BENEFICIAL IMPACTS ON OTHER TREATIES.

International agreements that either have limited or no verification provisions may benefit from the CWC. This will be the case for the 1925 Geneva Protocol and the BWC. The CWC will supplement the Geneva Protocol which has no verification provisions. Routine, challenge, and alleged use CWC inspections could expose violations of both treaties. The BWC will also benefit from CWC verification provisions especially if the CWC continues to include toxins. All CWC inspections could partially -- possibly, completely -- verify BWC provisions by exposing violations of BW/TW production, stockpiling, and acquisition.

Another possible application for CWC OSI is in the sphere of the international drug trade; however, the utility of this interaction is ambiguous. It is possible that CWC inspections could strengthen the 1988 UN Convention Against Traffic in Narcotic Drugs and Psychotropic Substances by uncovering illicit drug-processing activities. States party to the UN and CW conventions supporting drug trafficking could be exposed by CWC inspections. Such revelations may embarrass host states if such illicit activities are occurring without the governments' knowledge. Although such inspections could strengthen the UN Convention, they may lead to hostility and work to the detriment of both conventions. Additionally, even if an inspection does uncover a violation of the UN Convention, there are no procedures for the inspection team to report this activity.

Lastly, the CWC will have a positive impact on the U.S.-Soviet CW Agreement. The language of the bilateral agreement dictates that its provisions will supplement the CW *except* in the case of conflicting provisions or timelines. In this instance, upon EIF the CWC will take precedence over the bilateral provisions. The two treaties have a symbiotic relationship with the common goal of banning global CWs and similar provisions for destroying CW stockpiles.

5.4 POTENTIAL NEGATIVE IMPACTS ON OTHER TREATIES.

Many of the agreements already in force or signed control inspector access to a limited number of facilities. It could be possible to employ CWC challenge inspections to further verify existing agreements by allowing greater access or obtaining entry to other treaties' declared facilities. Although this could permit beneficial synergistic effects that add to the level of satisfaction in arms control verification, there could also be some negative effects.

The current CWC challenge inspection provisions could adversely impact the verification regimes of the NPT/IAEA, INF, CFE, and START Treaties in similar ways. To begin with, all of these treaties enforce quotas on the number of inspections allowed to be performed within a specific period of time at a particular facility or site. While access under a CWC challenge inspection could not be denied, it could exceed another treaty's quota. This could become an issue dependent upon the nature of the facility subject to the challenge and the nature of the challenge itself. In addition, all of these treaties declare facilities subject to inspection under its respective agreement. In some cases, the facility has the right to refuse access to inspectors. CWC challenges could circumvent this provision and gain access to a protected facility. This could not only increase tension between parties, but could also result in access that would jeopardize national security or confidential information and involve the issue of CWC challenge inspection rights.

5.5 POTENTIAL NEGATIVE IMPACTS OF OTHER TREATIES ON THE CWC.

Several possible issues could be raised regarding CWC impact on other treaties. They focus on CWC ability to subject declared facilities to challenge inspections without quota protection or the right of refusal provided by the other treaties. There is the *possibility* that existing agreements could interfere with CWC verification by limiting or delaying access to their facilities. For example, the NPT/IAEA agreements with individual facilities state that the facility will be subject to a specified number of inspections per year. If, after these IAEA inspections are concluded, CWC inspectors assess a need to inspect one of the facilities, their access may be challenged on the grounds that the facility has already fulfilled its inspection quota under other treaty provisions. This could also be the case under INF and START.

5.6 RECOMMENDATIONS.

Under CD/1108, there are no existing conflicts among the CWC and other treaties. There are, however, limited cases where issues and conflicts *could* arise regarding CWC challenge inspections at facilities covered under other agreements. That is, there exists the *potential* for misuse of CWC challenge inspection provisions or misuse by other treaties to limit or delay CWC verification provisions. The probability of such misuse occurring is minimal due to the request for challenge inspection process in Article IX of the CWC.

Should the threat of misuse be deemed significant, further study should be performed to identify treaty loopholes and the probability of such conflicts occurring. This will depend on the scope and provisions of the CWC challenge OSI and related provisions in other treaties. A follow-on study should focus on the CWC relationship with NPT/IAEA, INF, and START.

In conclusion, there exists no significant interactions or conflicts, other than the *potential*, between the CWC and any other treaty. As a result of this analysis, there are no requirements or recommendations for resolving conflicts stemming from CWC verification provisions.

SECTION 6
LIST OF REFERENCES

1. Keeley, J. F., "The International Atomic Energy Agency and the Non-Proliferation Treaty," International Verification Organizations, ed. by Ellis Morris, Center for International and Strategic Studies, York University, Toronto, Canada, 1991, p. 184 (Unclassified).
2. ter Haar, B. and de Klerk, P., "Verification of Non-Production: Chemical Weapons and Nuclear Weapons Compared," Arms Control - The Journal of Arms Control and Disarmament, Vol. 8, No. 3, December, 1987, p. 203 (Unclassified).
3. von Baeckmann, A., "The Chemical Weapons Convention and Some IAEA Experiences," SIPRI Chemical and Biological Warfare Studies No. 9 - Non-Production by Industry of Chemical-Warfare Agents: Technical Verification Under a Chemical Weapons Convention, ed. by S. J. Lundin, Oxford University Press, Oxford, 1988, p. 180 (Unclassified).
4. Mullen, M., "Verification of a Chemical Weapons Convention: Summary of Lessons Learned from the Verification Experience of the International Atomic Energy Agency," Unclassified Attachment to Lessons of the IAEA Inspection Experience for Verification of A Convention on Chemical Weapons - A Workshop Report (U), by Amy Gordon, SAIC, McLean, VA, December 26, 1990, p. 18 (CONFIDENTIAL).
5. Keeley, J.F., International Atomic Energy Agency Safeguards as a Model for Verification of a Chemical Weapons Convention, ed. by H. B. Schiefer, Department of External Affairs, Ottawa, Canada, October, 1988, p. 53 (Unclassified).

APPENDIX A
KEY VERIFICATION PROVISIONS

| PROVISIONS | CWC | ANTARCTIC | IAEA | BWC |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | Anytime, anywhere inspection | Ad hoc Routine Special Unannounced | None |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | None | Material accountability (primary) Containment/surveillance (secondary) Seals Continuous monitoring Sample collection and analysis | None |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISION | Low to high levels | Unlimited; however, in practice limited to simple means | Analysis of samples - high level Others - low to moderate levels | None |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share, and exchange chemicals, equipment and information relating to development and non-prohibited application of chemistry | None | Technical assistance on R&D projects Equitable contributions Proof of adherence | Being developed |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, and Security Council | None | Curtailment of assistance Call for return of materials/equipment Suspension of membership privileges Adverse publicity | Domestic legislation through Anti-Terrorism Act of 1989 |
| INSPECTORS AND EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Mix of civilian/military inspectors with State Department leadership No specialized equipment | Safeguard inspectors Inspection assistants Nuclear counting instruments Surveillance devices | None |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | Antarctic: Treaty Consultative Meeting (ATCM) | The IAEA consisting of: General Conference, Board of Governors, and Staff Possibly involve the International Court of Justice | UN Security Council |
| OTHER | Facility agreements | Environmental issues dominate Inspections sought to enforce other Antarctic-related conventions | Facility agreements | BWC is developing CBMs |

| IAEA | BWC | TTBT | PNET |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Ad hoc Routine Special Unannounced | None | None | None |
| Material accountability (primary) Containment/surveillance (secondary) Seals Continuous monitoring Sample collection and analysis | None | NTM Hydrodynamic yield measurements Seismic yield measurements Information exchange | Information exchange Local seismic network Hydrodynamic yield measurements NTM |
| Analysis of samples - high level Others - low to moderate levels | None | Medium to high levels | Medium to high levels |
| Technical assistance on R&D projects Equitable contributions Proof of adherence | Being developed | Not applicable | Not applicable |
| Curtailement of assistance Call for return of materials/equipment Suspension of membership privileges Adverse publicity | Domestic legislation through the BW Anti-Terrorism Act of 1989 | None | None |
| Safeguard inspectors Inspection assistants Nuclear counting instruments Surveillance devices | None | Inspectors will be recruited from U.S. national labs and DoE Escorts from OSLA Extensive list of specialized equipment | Inspectors/scientists from U.S. national labs and DoE Escorts from OSLA Extensive list of specialized equipment |
| The IAEA consisting of: General Conference, Board of Governors, and Staff Possibly involve the International Court of Justice | UN Security Council | Bilateral Consultative Commission | Joint Consultative Commission |
| Facility agreements | BWC is developing CBMs | Confidence-building measures | None |

| PROVISIONS | CWC | INF | UN CONVENTION | MOU | US- |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| ON-SITE INSPECTION REGIME | Initial inspection Routine inspection Challenge inspection Alleged use of chemical weapons | Close-out inspections Challenge inspections | Signatories cooperate in inspection of suspect vessels under LOS | Phase II -- Initial and routine O&I; challenge | Initial or 1 routine Trial challenge |
| DIVERSION PREVENTION AND MONITORING PROVISIONS | Continuous monitoring Data reporting/declarations Sample analysis Perimeter securing at challenge site Continuous presence of inspectors | Continuous patrol monitoring Eliminations TLI holdings confirmation Destructions, close-outs, locations | Provisions for diversion of hazardous chemicals at national level Monitoring includes suspicious shipments, and documentation of precursor chemicals in Tables I and II | Data exchange | Continuous pre- Continuous mo- Instruments Data exchange |
| TECHNICAL COMPLEXITY OF VERIFICATION PROVISION | Low to high levels | Relatively low level | None | Low level | Low to high level |
| UNIVERSALITY | Assist and protect against chemical weapons Research, share, and exchange chemicals, equipment and information relating to development and non-prohibited application of chemistry | Not applicable | 70+ nations have signed | Not applicable | Not applicable |
| SANCTIONS | SPs will enact penal legislation Organization can restrict or suspend SP rights and privileges Collective measures in conformity with international law, UN General Assembly, and Security Council | None | Sanctions applicable to enforcing domestic penal legislation | None | None |
| INSPECTORS AND EQUIPMENT FOR COMPLIANCE MONITORING | Types and use of inspectors are undefined System may include sensors, ancillary equipment, transmission systems and employ sampling devices, seals, cameras | Russian linguists OSIA-sponsored training Measuring and weighing devices Radiation detection Cameras, imaging devices, and other agreed equipment | Coast Guard and DEA inspect after consent of ships' state of registry | Types of inspectors unspecified Seals, cameras | Types of inspectors and de- Military and ma- Sampling device equipment |
| RESOLUTION BODY | The International Organization: Possibly involve the International Court of Justice and the UN General Assembly and Security Council | Special Verification Commission (SVC) | International Narcotics Control Board UN Commission on Narcotic Drugs International Court of Justice | None; employ normal diplomatic channels, specifically designated representatives, or other means agreed upon | Bilateral Chemical Commission (CWC) |
| OTHER | Facility agreements | None | None | None | Facility agreement activities (prop) |

| UN CONVENTION | MOU | US-SOVIET CW | CFE | START | OPEN SKIES |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| rights in inspection of border LOS | Phase II -- initial and routine OSI challenge | Initial and routine OSI Trial challenge inspection | Declared facilities (quotes) Destruction process Certification process Challenge inspections (quotes, right of refusal) | None types of OSI | None |
| reversion of hazardous material level the suspicious shipments, location of precursor sites I and II | Data exchange | Continuous presence of inspectors Continuous monitoring with on-site instruments Data exchange | No verification of non- production Tagging and sealing NTM | PFCM and NTM Data exchanges Unencrypted telemetry Exhibitions Deployment area for mobile ICBMs | None |
| | Low level | Low to high level | Low level | Low level | Potentially very high level |
| signed | Not applicable | Not applicable | Not applicable | Not applicable | None |
| able to enacting legislation | None | None | None | None | None |
| DEA inspect after state of registry | Types of inspectors unspecified Seals, cameras | Types of inspectors include team leaders and deputy team leaders Military and medical specialists Sampling devices, seals, and camera equipment | Familiarity with inspected mili- tary equipment and operations Linguistic support Cameras, binoculars, aircraft | No unique inspector qualifications OSI equipment relatively unsophisticated | Pilots Fixed wing aircraft SLAR IR Commercial Cameras Technicians |
| otics Control Board on Narcotic Drugs of Justice | None; employ normal diplomatic channels, specifically designated representatives, or other means agreed upon | Bilateral Chemical Weapons Commission (proposed) | Joint Consultative Group | Joint Compliance and Inspection Commission (JCIC) | None |
| | None | Facility agreements and cooperative activities (proposed) | None | None | Aerial observation |

APPENDIX B
INTERACTIONS BETWEEN TREATIES

| CATEGORY | ANTARCTIC | IAEA | BWC | NTT |
|--------------------------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | None | Dual vs. single mandate Scope of verification regime Legal basis for verification Facilities subject to inspections Types and number of facilities to be inspected Inspection quotas Nature of materials processed Continuing development and implementation of verification equipment/methods | BWC is a disarmament treaty without verification provisions | Inspections under the TTBT and PNET tend to monitor and observe explosions, rather than "inspect" them Diversion prevention and monitoring provisions differ Types of inspectors and equipment differ NTT have no sanctions for non-compliance |
| OVERLAPS OR SIMILARITIES | Allows anytime, anywhere OSI | Organizational structure and responsibilities Concern for possible loss of confidential information Dispute settlement Budget structure National Authority Subsidiary agreements | CWC verification regime is everything the BWC is not (the elimination scope of the CWC and BWC are identical) Inclusion of toxins in CWC creates overlaps | All have resolution bodies |
| SYNERGISTIC EFFORTS | None | Overall objective Desire to ease member verification and compliance burdens Desire to reinforce members' support for their goals and to build confidence | CWC inspections could partially verify BWC, intentionally or unintentionally | None |
| CONFLICTING ACTIVITIES OR PROVISIONS | None | CWC challenge inspection at a nuclear facility | None | None |

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| BWC | NTT | INF | UN CONVENTION |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>BWC is a disarmament treaty without verification provisions</p> | <p>Inspections under the TTBT and PNET tend to monitor and observe explosions, rather than "inspect" them Diversion prevention and monitoring provisions differ Types of inspectors and equipment differ NTT have no sanctions for non-compliance</p> | <p>INF requires elimination of all systems/missiles CWC requires elimination of weapons and reduction of chemicals INF has no SSI or challenge other than at declared sites CWC has anytime/anywhere challenge inspections (proposed) INF production facilities are monitored (only missile motors, in practice) CWC production facilities are destroyed Chemicals monitored under CWC are not easily identifiable</p> | <p>UN Convention lacks the OSI and monitoring provisions of CWC UN Convention monitors different chemicals than the CWC OSI under UN Convention is based on consent</p> |
| <p>CWC verification regime is everything the BWC is not (the elimination scope of the CWC and BWC are identical) Inclusion of toxins in CWC creates overlaps</p> | <p>All have resolution bodies</p> | <p>Notification requirements are similar On-site inspections of TLI and CW eliminations Challenge inspections of closed-out facilities No conversions of TLI or CW allowed</p> | <p>Both have resolution bodies Regulation of commercial chemical firms producing convention-specified chemicals provided for under both Penal legislation is required by both conventions</p> |
| <p>CWC inspections could partially verify BWC, intentionally or unintentionally</p> | <p>None</p> | <p>Use similar air/ground transportation Concurrent training of inspectors/escorts may occur Facility security procedures provided to private facilities may be similar Imaging and measuring equipment may be similar</p> | <p>CWC inspections could identify non-compliance with UN Convention</p> |
| <p>None</p> | <p>None</p> | <p>CWC challenge inspections may open former INF facilities to inspections under both treaties</p> | <p>None</p> |

| CATEGORY | MOU | US-SOVIET CW | CFE |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| GAPS OR DIFFERENCES | The MOU limits each nation to five routine OSI and five challenge OSI; the CWC does not have these types of quotas No resolution body or sanctions exist in the MOU; the CWC provides for both | The bilateral agreement does not contain sanctions for non-compliance | CFE has explicit geographic limitations |
| OVERLAPS OR SIMILARITIES | Both CWC and the MOU provide for data exchanges, and routine and challenge OSI Facilities subject to routine inspection are declared CW storage, production, and destruction facilities Types of inspectors and equipment will be similar | Both treaties will have similar diversion prevention and monitoring provisions, OSI, and general inspection procedures Both will have resolution bodies | CFE inspectors will be able to look for a report of indications of preparedness to employ chemical weapons |
| SYNERGISTIC EFFORTS | Objectives to facilitate cessation of global chemical weapons production OSI performed under the MOU will be conducted in accordance with the corresponding provisions in the draft CWC | Common goal to ban global chemical weapons After the CWC EIP, the provisions of the CWC will take precedence over the provisions of the bilateral CW agreement in cases of incompatible obligations; otherwise the provisions of the bilateral agreement will supplement CWC provisions in its operation between the U.S. and the Soviet Union | Both treaties' verification provisions require extensive information management and telecommunications |
| CONFLICTING ACTIVITIES OR PROVISIONS | None | None | CWC challenge inspections could be utilized to circumvent CFE quotas, rights of refusal and geographic limitations |

| | CFE | START | OPEN SKIES |
|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| contain sanctions | CFE has explicit geographic limitations | CWC eliminates weapon systems, prohibits production START reduces/limits, allows production and modernization START is mostly applicable to military facilities while CWC is heavily involved with non-military and non-government commercial industrial facilities START is dealing with easily recognized TLE whereas chemicals are not easily identified START has limited SSI regime while CWC has more extensive challenge on-site inspections | "Open Skies" geographic applicability is smaller |
| ersion preven- OSI, and | CFE inspectors will be able to look for and report of indications of preparedness to employ chemical weapons | Both have extensive declarations, data exchanges, and follow-up OSI to confirm information Both have extensive routine OSI of declared sites and facilities | CWC could incorporate aerial observation Overflights could observe inspection targets prior to arrival of inspectors |
| al weapons of the CWC isions of the f incompatible ns of the nt CWC provi- U.S. and the | Both treaties' verification provisions require extensive information management and telecommunications | None | Both treaties may require common aerial surveillance technology development |
| | CWC challenge inspections could be utilized to circumvent CFE quotas, rights of refusal, and geographic limitations | Challenge OSI provisions under CWC could subject START facilities to CWC inspections | CWC overflights may be used to circumvent "Open Skies" quotas |

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APPENDIX C
LIST OF ACRONYMS

| | |
|-------------|--------------------------------------------------------|
| ABM | anti-ballistic missile |
| ACDA | Arms Control and Disarmament Agency |
| AEC | Atomic Energy Commission |
| BW | biological weapons |
| BWC | Biological Weapons Convention |
| C/S | containment and surveillance |
| CBM | confidence-building measures |
| CD | Conference on Disarmament |
| CFE | Conventional Forces in Europe |
| CSBM | confidence- and security-building measures |
| CSCE | Conference on Security and Confidence in Europe |
| CTB | Comprehensive Test Ban |
| CW | chemical weapons |
| CWC | Chemical Weapons Convention |
| DFAR | DOD Federal Acquisition Regulations |
| DOD | Department of Defense |
| EIF | entry/entered into force |
| GLBM | ground-launched ballistic missile |
| GLCM | ground-launched cruise missile |
| HB | heavy bomber |
| IAEA | International Atomic Energy Agency |
| ICBM | intercontinental ballistic missile |
| ICJ | International Court of Justice |
| IGY | International Geophysical Year |
| INCB | International Narcotics Control Board |
| INF | Intermediate-Range Nuclear Forces |
| JCG | Joint Consultative Group |
| JCIC | Joint Compliance and Inspection Commission |
| JVE | Joint Verification Experiment |
| km | kilometers |
| LRNA | long-range nuclear air-launched cruise missile |
| LTBT | Limited Test Ban Treaty |
| MAC | Military Airlift Command |

| | |
|---------------|----------------------------------------------------------------|
| MBFR | Mutual and Balanced Force Reduction |
| MIRV | multiple independent reentry vehicle |
| MOU | Memorandum of Understanding |
| MUF | materials unaccounted for |
| NATO | North Atlantic Treaty Organization |
| NDA | nuclear non-destruction assays |
| NPT | Non-Proliferation Treaty |
| NRC | Nuclear Regulatory Commission |
| NRRC | Nuclear Risk Reduction Center |
| NTM | National Technical Means |
| NTT | Nuclear Testing Talks |
| OPCW | Organization for Prohibition of Chemical Weapons |
| OSI | on-site inspection |
| OSIA | On-Site Inspection Agency |
| OUSDA | Office of the Undersecretary of Defense for Acquisition |
| PNE | peaceful nuclear explosion |
| PNET | Peaceful Nuclear Explosion Treaty |
| POE | Point of Entry |
| SAL | Safeguards Analytical Laboratory |
| SALT | Strategic Arms Limitations Talks |
| SAR | Synthetic Aperture Radar |
| SCC | Standing Consultative Commission |
| SIGINT | signal intelligence |
| SLBM | submarine-launched ballistic missile |
| SNDV | strategic nuclear delivery vehicles |
| SSAC | State System of Accounting and Control |
| SSI | suspect site inspection |
| START | Strategic Arms Reductions Treaty |
| SVC | Special Verification Commission |
| TDY | temporary duty |
| TLE | treaty-limited equipment |
| TLI | treaty-limited item(s) |
| TTBT | Threshold Test Ban Treaty |
| UN | United Nations |
| USG | United States Government |
| VOID | Validation of Technical Data |

APPENDIX D

ENDNOTES

1. The 3-year time limit for this provision ended on 1 June 1991. START was signed 31 July 1991 in Moscow, and is currently undergoing each Party's ratification process.
2. National Security Directive (NSD) 296, 1988 established the On-Site Inspection Agency (OSIA) to carry out the implementation of INF. Since then NSDs 41 and 44 assigned the responsibility for the implementation of CFE and TTBT/PNET respectively to OSIA. Although OSIA has conducted planning activities in anticipation of START and CWC, no formal directives have been issued assigning them responsibility for those treaties.

APPENDIX E
SELECTED BIBLIOGRAPHY

- Argonne National Laboratory, Accommodation of On-Site Inspection at DOE Facilities, September, 1988 (Unclassified).
- Aroesty, J., Wolf, K.A., and River, E.C., Domestic Implementation of a Chemical Weapons Treaty, Rand Publication Series, October, 1989 (Unclassified).
- Bailey, T.A., A Diplomatic History of the American People. Tenth Edition, Prentice Hall, Englewood Cliffs, NJ, 1980 (Unclassified).
- Barton, J.H. and Weiler, L.D., International Arms Control. Issues and Agreements, Stanford University Press, Stanford, CA, 1976 (Unclassified).
- Calogero, E., Goldberger, M., Kapitzka, S., Verification: Monitoring Disarmament, Westview Press, 1990 (Unclassified).
- Conference on Disarmament, Convention on Chemical Weapons, August 27, 1991. CD/1108 (Unclassified).
- Department of State Press Release (Statement by the Secretary of State at Ottawa), "Open Skies and the New Era in Security," February, 14, 1980 (Unclassified).
- Dunn, Lewis A. and Amy E. Gordon, On-Site Inspection for Arms Control Verification: Pitfalls and Promise, The Center for National Security Negotiations, 1989. Volume 1, No. 2 (Unclassified).
- Geissler, E., Strengthening the Biological Weapons Convention by Confidence-Building Measures, Oxford University Press, NY, 1990 (Unclassified).
- Hawes, J., "Open Skies: From Idea to Negotiation," NATO Review, April, 1990 (Unclassified).
- Kirk, R., "Lessons of the IAEA Experience for a Chemical Weapons Verification Organization - The Perspective of a U.S. Resident Representative," Unclassified Attachment to Lessons of the IAEA Inspection Experience for Verification of A Convention on Chemical Weapons - A Workshop Report (U), by Amy Gordon, SAIC, McLean, VA, December 26, 1990 (CONFIDENTIAL).
- Klotz, F.G., America on the Ice. Antarctic Policy Issues, U.S. Arms Control and Disarmament Agency, Washington, D.C., 1990 (Unclassified).
- Kokoski, K., Verification of Conventional Arms Control in Europe, Westview Press, 1991 (Unclassified).
- Pounds, Timothy J., "Proposals for On-Site Inspection over the Years: From the Baruch Plan to the Reagan Initiatives," Arms Control Verification and the New Role of On-Site Inspection, ed. by Lewis A. Dunn with Amy E. Gordon, D.C. Heath and Co., Lexington, MA, 1989 (Unclassified).

Protocols to the Threshold Test Ban and Peaceful Nuclear Explosions Treaties With the Union of Soviet Socialist Republics, U.S. Government Printing Office, Washington, D.C., 1990 (Unclassified).

Seaborg, G.T., Kennedy, Krushchev, and the Test Ban, University of California Press, Berkeley, CA, 1981 (Unclassified).

"The Agency's Safeguards System (1965, as provisionally extended in 1966 and 1968)," INFCIRC/16.2, Revision 2, IAEA, Vienna, 1968 (Unclassified).

"The Structure and Content of Agreements between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons," INFCIRC/153, IAEA, Vienna, 1972 (Unclassified).

The White House, The President's "Open Skies" Initiative, May, 1989 (Unclassified).

Tucker, J., "Open Skies: Back to the Future," Arms Control Today, October, 1990 (Unclassified).

Turrentine, A.R., "Lessons of the IAEA Safeguards Experience for On-Site Inspection in Future Arms Control Regimes," Arms Control Verification and the New Role of On-Site Inspection, ed. by Lewis A. Dunn with Amy E. Gordon, D.C. Heath and Co., Lexington, MA, 1989 (Unclassified).

U.S. Arms Control and Disarmament Agency, Agreement Between the United States of America and the Union of Soviet Socialist Republics on Destruction and Non-Production of Chemical Weapons and on Measures to Facilitate the Multilateral Convention on Banning Chemical Weapons, Washington, D.C., June 1990 (Unclassified).

U.S. Arms Control and Disarmament Agency, Fiscal Year 1992 Arms Control Impact Statements, U.S. Government Printing Office, Washington, D.C., 1991 (Unclassified).

U.S. Arms Control and Disarmament Agency, Issues Brief - Biological Weapons Convention Review Conference, 1991, Washington, D.C., 1991 (Unclassified).

U.S. Arms Control and Disarmament Agency, Open Skies Conference, Ottawa, Canada, February, 1990 (Unclassified).

U.S. Arms Control and Disarmament Agency, Open Skies: Basic Elements, Official Text, Washington, D.C., December, 1989 (Unclassified).

U.S. Arms Control and Disarmament Agency, Report of the United States Antarctic Inspection, Washington, D.C., 1989 (Unclassified).

U.S. Arms Control and Disarmament Agency, Strengthening Stability Through Openness, Washington, D.C., July, 1990 (Unclassified).

U.S. Arms Control and Disarmament Agency, "Texts and Histories of the Negotiations," Arms Control and Disarmament Agreements, 1990 ed. Washington, D.C., 1990 (Unclassified).

U.S. Arms Control and Disarmament Agency, Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms (U), Washington, D.C., July 31, 1991 (SECRET).

U.S. Arms Control and Disarmament Agency, Treaty on Conventional Forces in Europe, Washington, D.C., November 19, 1990 (Unclassified).

U.S. Arms Control and Disarmament Agency, Union of Soviet Socialist Republics - United States: Agreement Regarding a Bilateral Verification Experiment and Data Exchange Related to Prohibition of Chemical Weapons, Washington, D.C., September 1989 (Unclassified).

U.S. Arms Control and Disarmament Agency, 1990 Annual Report, U.S. Government Printing Office, Washington, D.C., 1991 (Unclassified).

U.S. Capability to Monitor Soviet Compliance With the Threshold Test Ban Treaty (TTBT) and the Treaty on Peaceful Nuclear Explosions (PNET), U.S. Government Printing Office, Washington, D.C., 1990 (Unclassified).

U.S. Senate, Biological Weapons Anti-Terrorism Act of 1989. Report 101-210, Washington, D.C., November 16, 1989 (Unclassified).

U.S. Senate, United Nations Convention Against Illicit Traffic in Narcotic Drugs and Psychotropic Substances. Executive Report 101-15, Washington, D.C., November 14, 1989 (Unclassified).

Working Paper: Recommended Text for Article IX - Challenge Inspection, Contributed by Australia, Japan, the United Kingdom of Great Britain and Northern Ireland, and the United States of America, July 15, 1991 (Unclassified).

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August 1, 2001

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ATTN: OCQ/MR LARRY DOWNING

SUBJECT: DOCUMENT CHANGES

The Defense Threat Reduction Agency Security Office reviewed the following documents in accordance with the Deputy Secretary of Defense Memorandum entitled, "Department of Defense Initiatives on Persian Gulf War Veterans' Illnesses" dated 22 March 1995, and determined that the documents were unclassified and cleared for public release:

DNA-TR-93-84, AD-B244408, Acoustic Resonance Spectroscopy in CW Verification Tooele Field Trial (August 1992).

DNA-TR-93-129-V1, AD-B192045, Global Proliferation – Dynamics, Acquisition Strategies and Responses, Volume 1 – Overview.

DNA-TR-93-129-V2, AD-B192046, Global Proliferation – Dynamics, Acquisition Strategies and Responses, Volume 2 – Nuclear Proliferation.

DNA-TR-91-216, AD-B163637, Harmonizing the Chemical Weapons Convention with the United States Constitution.

DNA-TR-92-180, AD-B175230, Evaluation of the Concept of a List for the BWC.

DNA-TR-92-61, AD-B167663, Basic State Party Functions and Skills Under CWC.

DNA-TR-92-66, AD-B167357, Domestic Reporting Requirements for Chemical Industry.

DNA-TR-91-213, AD-B163260, Analysis of the Interactions Between Treaties.

DNA-TR-93-70, AD-B177262, Chemical Weapons Convention Inspections of Private Facilities Application of United States Environmental and Safety Laws.

DNA-TR-92-182, AD-B173450, Commercial Products from Demilitarization Operations.

DNA-TR-91-217-V3, AD-B169350, Chemical Weapons Process Parameters, Volume 3 – Users' Guide.

DNA-TR-92-116-SUP, AD-B175292, Technical Ramifications of Inclusion of Toxins in the Chemical Weapons Convention (CWC), Supplement.

DNA-TR-92-128, AD-B175452, Task 1 Report Target Vapor Identification and Database Development.

DNA-TR-92-196, AD-B174940, Task 2 Report Algorithm Development and Performance Analysis.

DNA-TR-93-68, AD-B178109, CW Detection Instrument R&D Design Evaluation.

Enclosed is a copy of the referenced memorandum. If you have any questions, please call me at 703-325-1034.

Ardith Jarrett

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