

## PROLOGUE

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**S**OON AFTER THE ONSET OF THE AUGUST 1990 PERSIAN GULF CRISIS, rumors concerning Iraqi efforts to acquire a nuclear weapons capability began to abound in the world press and in the corridors of the International Atomic Energy Agency (IAEA), where I was working as an international civil servant in the Department of Nuclear Safety. The November 1990 safeguards mission to Iraq, which found Iraq to be in full compliance with its safeguards agreement under the Nuclear Non-Proliferation Treaty (NPT), did nothing to allay the fears aroused by these rumors.

After the 1991 Persian Gulf War, the subsequent findings of the IAEA Action Team, which was entrusted to uncover Iraq's clandestine nuclear program, brought up the natural question of how Iraq managed to pursue a secret nuclear weapons program, in spite of being an NPT member in good standing, with its nuclear activities subject to "full-scope" safeguards. As the Iraq saga began to unfold, and the IAEA launched its "Program 93+2," aimed at shoring up the deficiencies of the full-scope safeguards regime, I began to read about and study the history of verification and its application.

Beginning in 1994, I became deeply involved with the deliberations of the Ad-hoc Committee on the Establishment of the Comprehensive Test-Ban Treaty (CTBT) at the Conference on Disarmament (CD) in Geneva. Mainly, my role was to serve as an expert on verification technologies. My involvement continued with the establishment of the CTBT Preparatory Commission's Working Group B—the verification working group. During my involvement, I became acutely aware of the many problems that technical experts face when trying to set up a verification system. These experts represented many diverse national interests and concerns. They advised the diplomats, who were pushing for the fulfillment of their countries' agendas—those who wanted the treaty concluded and in force as soon as possible, and those who were doing their best to prevent this from happening. Some diplomats were pushing for the strongest possible verification mechanism, and some were frightened by the severe intrusiveness that verification would impose. There were also delegations that liked the idea of the CTBT in principle, but did not like the financial implications of an extensive verification organization.

Concluding the CTBT involved many compromises—some of them essential, some of them part of the negotiating game. Some compromises were so serious that they are bound to affect the treaty's implementation and weaken the verification effort.

Witnessing all of this, I became convinced that, if a treaty includes a verification clause, then this verification must be as nearly perfect as possible, even as it guards the inherent rights of the treaty members. Once the verifica-

tion clause is agreed upon, then the necessary resources must be allocated to the verification effort; otherwise, the system would fail as surely as if it were inherently weak.

Another, less obvious, factor that could affect the result of the verifying organization's activities is the level of the organization's transparency to its constituent states and to the public. Without this transparency, which is limited by national security and commercial confidentiality, the organization—or more accurately, its secretariat—remains the sole proprietor of critical knowledge and findings that could affect the security of many countries. For example, had it been known to the public prior to 1990 that the IAEA's inspections in Iraq were limited to a very small number of facilities, then perhaps countries would have taken stronger political action.

In researching this report, I became aware that many NPT members, contrary to their obligations, have not concluded safeguards agreements with the IAEA. Little has been done to correct this sorry fact. I also found out that there is no obligation for NPT members to adhere to the Additional Model Protocol, even for those who have yet to conclude safeguards agreements, and presumably will do so in the future.

In addition, I identified three major problems that the IAEA has in performing its safeguards duties. First, the IAEA is limited in its ability to carry out its duties, because of the inadequate safeguards agreements concluded with most states. Second, the IAEA Secretariat—the body composed of international civil servants entrusted with carrying out the tasks assigned to it by the IAEA's policy-making organs—is hampered by a stagnant budget policy, while its safeguards duties are ever increasing. Third, the IAEA is loath to publicly acknowledge either of these deficiencies, or any other problem it encounters during inspections, especially if the problems relate to specific cases.

Another problem that I gradually became aware of during my research concerns the effort to verify the non-existence of activities and materials, or “negative verification.” In its “Program 93+2,” the IAEA made great strides in its attempt to assure the world that states contain no proscribed nuclear materials or nuclear activities.<sup>1</sup> My conclusions, presented in this publication, are that, although the results of Program 93+2 are by far superior to the previously existing system, they are still far from perfect.

Still, one has to strive for the best. Acknowledging faults and omissions can lead to additional improvements to the existing system, thereby limiting the possibility of cheating by reducing the size of the hole in the net designed to catch cheaters.

## **Organization of this Book**

The purpose of this book is to review the status of international nuclear nonproliferation treaties and highlight some of the problems of verification. The book then suggests improvements that would help to ensure that no

nation is developing or testing nuclear weapons while appearing to be a “party in good standing.”

The present work is organized into three main sections. The first section is devoted to describing the basis of verification, including a qualitative description of some of its technical aspects, and to describing and discussing past experiences. This part of the book will describe the legal and technical basis of three international verification regimes that emerge from multilateral treaties—the IAEA’s full-scope safeguards, codified as Information Circular number 153 (INFCIRC/153), the results of the IAEA’s “Program 93+2,” particularly that part codified as the “Model Additional Protocol” and codified as INFCIRC/540, and the CTBT verification mechanism. A separate chapter in this section discusses wide area environmental sampling as a new verification tool. In addition, the book will discuss one imposed verification regime, namely the IAEA Action Team’s efforts to uncover and verify all of Iraq’s nuclear weapons activities. Part A concludes with a review of existing regional verification systems.

This book does not fully cover the range of all existing nuclear arms control treaties, however important they may be. The Strategic Arms Limitation Treaties, the Strategic Arms Reduction Treaties, the Intermediate Nuclear Forces Treaty, and the Anti-Ballistic Missile Treaty are beyond the scope of this work. The proposed Fissile Material Cutoff Treaty also is not covered. Treaties affecting conventional weapons or other weapons of mass destruction (WMD), such as the Chemical Weapons Convention, are also outside the scope of this work. In addition, other verification and transparency measures that fall short of a full treaty status are not considered here. Nevertheless, one may assume that the lessons drawn from this book may be applied more broadly to inform other bilateral or multilateral verification efforts.

Part B of this book will discuss the problems that were identified in the previous section. The problem issues are numerous, and include those that are already well known, those that have been experienced, and potential problems. The problems include: compromises in the negotiation and implementation of verification systems; the tendency to focus on the process of verification, rather than the outcome; the possible conflict between technical judgment and political convenience; cultural and staffing conflicts; the issue of trust; and the relationship between inspectors and the inspected state.

Part C will try to suggest possible solutions that could be applied in order to remedy the present ills. There are three general conditions that should be fulfilled for verification to succeed. First, the state or entity where verification is taking place must cooperate with the inspectors and offer full transparency in the area of activity being verified. If the inspected state does not fully cooperate with the inspectorate, important information could either not come to light or be intentionally concealed.

Second, the verification work must be done in the very best professional way. If the work of the inspection teams is not professional, its total credibility could be at stake.

Third, the verification effort must be backed up by an impartial and fair political system. If political backing is missing or—in the worst case—the political system is antagonistic and disregards facts, then the whole effort could be counterproductive and misleading, leading to complete failure.

This book then suggests that the establishment of regional verification arrangements could mitigate some of the global political issues and controls that influence the performance of verification, and perhaps its results. In such cases, regional systems would replace international inspectorates. However, international organizations would retain the roles of developing verification technologies and methodologies, and in training inspectors.

The approach taken in this work is essentially pragmatic. Once a state decides to embark on a route that is contrary to its international obligations, the facts have to be uncovered. The state's attitude will become important at the stage when the international community attempts to persuade that state to abandon its nuclear weapons development programs. However, that is not the task of verification organizations or mechanisms. Verification is a technical activity; therefore, pragmatism is called for.

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This book was all but complete in the early days of September 2001, just a few days before the terrible attack on the United States and the democratic world. It is much too early to view these attacks in a more rational way. However, some lessons must be learned quickly. One such lesson is not to give in to the great power of illusion. One must courageously and gravely decide not to accept illusions as facts. The treacherous illusions of safety and security are the easiest—and most dangerous—to believe. If this work does something to promote a realistic view of a situation, it will have fulfilled its purpose.

*Omer, Israel*  
*September 2001*

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<sup>1</sup> This book uses the term *nuclear material* somewhat more loosely than does the IAEA by taking it to mean any uranium or higher atomic number materials that can be used in the production of nuclear explosives. In addition, *nuclear activities* are taken in this book to mean any activity (including R&D) related to the production of nuclear materials or nuclear explosives.