Biological Inspections in Iraq:
Lessons for BWC Compliance and Verification

Yang Ruifu, Ph.D.[1]

The 1972 Biological and Toxin Weapons Convention (BWC), which entered into force in 1975, prohibits the development, production, and stockpiling of germ weapons. Iraq signed this treaty on 11 May 1972, but did not ratify the accord until about two decades later.[2] In the interim, Iraq developed, tested, and produced several different types of biological weapons, most notably anthrax and botulinum toxin. The inspections that finally uncovered the evidence of Iraq's biological weapons program were not conducted under the auspices of the BWC, in part because the treaty does not have any provisions for such inspections.[3] Instead, the unique circumstances existing after Iraq's defeat in the first Persian Gulf War led to the formation of the United Nations Special Commission (UNSCOM) on Iraq, a small inspectorate that reported directly to the Security Council. UNSCOM executed the inspections that led Iraq to admit on 1 July 1995, after over four years of denial, its past offensive biological weapons program.[4]

Iraq was not the only country confirmed in the 1990s to have ignored the BWC's prohibitions; one of the three states principally responsible for negotiating the BWC secretly maintained a biological weapons program for decades. In 1969, the United Kingdom proposed a ban on biological weapons. Efforts to draft the BWC moved

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[1] Dr. Yang Ruifu is a professor at the Institute of Microbiology and Epidemiology at the Academy of Military Medical Sciences. He is also the deputy director of the key state laboratory of pathogens and biosecurity, and the director-in-chief-of the laboratory of analytical microbiology at the National Center for Biomedicine Analysis.

[2] The BWC opened for signature 10 April 1972 and entered into force 26 March 1975. Iraq ratified the BWC on 19 June 1991. For more about the treaty and its current status, go to: http://www.opbw.org. Security Council Resolution 687 set the terms for a ceasefire in the Gulf War, established UNSCOM, and obligated Iraq to ratify the BWC, which it finally did in June 1991. See United Nations Security Council Resolution 687, 3 April 1991.

[3] The BWC provides for states to bring compliance complaints to the United Nations Security Council, which can in turn launch an investigation of the compliance concerns. This mechanism remains unused in part because of the assumption that one of the five permanent members of the Security Council would exercise its veto power to block an investigation. See Article VI, *Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction*.

[4] United Nations, *Report of the Secretary-General on the Status of the Implementation of the Special Commission's Plan for the Ongoing Monitoring and Verification of Iraq's Compliance with Relevant Parts of Section of Security Council Resolution 687 (1991)*, 11 October 1995). Available at: http://www.un.org/Depts/unscom/sres95-864.htm.

quickly forward after the United States renounced its offensive biological weapons program and the Soviet Union joined the negotiations.[5] Given the USSR's status as one of the BWC's founders, Russian President Boris Yeltsin's 1992 admission that the USSR had maintained an offensive biological weapons program shocked many even though signs of the USSR's program had previously appeared.[6] In 1979, when 64 people near the city of Sverdlovsk died from anthrax, the U.S. government accused the Soviet Union of cheating on the BWC, charging that the deaths were attributable to an anthrax production facility located there, not the consumption of tainted meat, as the Soviets said.[7] A senior scientist, Vladimir Pasechnik, who defected from the Soviet Union in 1989, told the British of his part in the covert Soviet biological weapons program.[8] Not until 1999, however, did the basic story of the Soviet biological weapons program reach the public with the publication of Ken Alibek's autobiography. Alibek was the second highest ranking official in Biopreparat, the complex of supposedly commercial facilities that served as a cover for much of the USSR's biological weapons program.[9]

Long before Soviet and Iraqi cheating on the BWC was revealed, arguments were made to strengthen the BWC by adding inspections and other monitoring provisions to the BWC similar to the ones that enabled compliance monitoring of the Nuclear Nonproliferation Treaty and the Chemical Weapons Convention.[10] Such monitoring

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[5] For an overview of the BWC's negotiating history, see U.S. Arms Control and Disarmament Agency, *Arms Control and Disarmament Agreements: Texts and Histories of the Negotiations* (Washington, D.C.: U.S. Department of State, 1996): 95-6.

[6] R. Jeffrey Smith, "Yeltsin Blames '79 Anthrax on Germ Warfare Efforts," *Washington Post*, 16 June 1992, A1; J. Dahlburg, "Russia Admits It Violated Pact on Biological Warfare," *Los Angeles Times*, 15 September 1992, A1. Yeltsin also took steps to close down the program, cutting its funding by 30 percent and its personnel by 50 percent. The United States. Richard Boucher, U.S. Department of State, "Joint U.S./UK/Russian Statement of Biological Weapons, Press Release, Office of Public Affairs (Washington, D.C.: 14 September 1992); Decree of the Russian Federation on Fulfilling International Obligations with Regard to Biological Weapons, Moscow, 11 April 1992.

[7] The United States. Department of State. *Soviet Noncompliance with Arms Control Agreements* (Washington, D.C.: 2 December 1987); Mathew Meselson, Jeanne Guillemin, et al., "The Sverdlovsk Anthrax Outbreak of 1979," *Science* 226, no. 5188 (18 November 1994): 1202-8.

[8] Pasechnik ran the Institute of Ultra Pure Biopreparations in St. Petersburg. Among other activities, scientists at this institute developed an antibiotic resistant strain of *Yersinia Pestis*, the causative agent of the plague. "Vladimir Pasechnik," *The Telegraph*, 29 November 2001. Available at: http://www.telegraph.co.uk/news/main.jhtml?view=DETAILS&grid=&targetRule=5&xml=/news/2001/11/29/db2903.xml.

[9] Ken Alibek, with Stephen Handelman, *Biohazard* (New York: Random House, 1999).

[10] Article III of the 1970 Treaty on the Non-Proliferation of Nuclear Weapons calls for members to accept safeguards inspections from the International Atomic Energy Agency to assure the peaceful use of the atom. The United States. *Arms Control and Disarmament Agreements: Texts and Histories of the Negotiations,*

provisions, it was believed, would correct a major weakness in the BWC. On-site inspections were not widely incorporated into arms control treaties until the late 1980s, when it was deemed advisable to augment national technical means of verification (e.g., satellite imagery) with other, more intrusive monitoring measures.[11] Revelation of the Soviet and Iraqi biological weapons programs helped to motivate the initiation of international negotiations in 1995 to add a monitoring protocol to the BWC. Leading into the negotiations, the BWC's members examined 21 measures that might be useful to determine compliance with the BWC.[12]

The negotiations to craft a monitoring protocol for the BWC, however, began to collapse in 2001. The first blow to the process came with the U.S. government's rejection of the draft monitoring protocol in July 2001.[13] The culminating blow to international talks came in December 2001, when the U.S. government proposed that all negotiations cease.[14] Instead, the 155 members of the BWC had the option of participating in discussions from 2003 to 2005 of various topics associated with BWC compliance.[15] Similar talks are slated to continue until 2010, but resumption of negotiations to draft a monitoring protocol is on hold for the indefinite future.[16]

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72. For other inspection provisions, see the Verification Annex, *Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction*.

[11] In particular, see the on-site monitoring provisions of the 1987 Intermediate-Range Nuclear Forces Treaty, *Arms Control and Disarmament Agreements: Texts and Histories of the Negotiations,* 329-40. Following the inspection breakthrough in 1987, the 1990 Conventional Forces in Europe Treaty and the 1991 Treaty between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms (START) also contained extensive monitoring provisions.

[12] The United Nations. Ad Hoc Group of Governmental Experts to Identify and Examine Potential Verification Measures from a Scientific and Technical Standpoint, *Summary Report*, BWC/CONF.III/VEREX/8 (Geneva: 24 September 1993).

[13] The United States. Department of State. M.D. Kellerhals, Jr., "Proposed Biological Weapons Protocol Unfixable, U.S. Official Says," International Information Programs, 25 July 2001. Available at: http://usinfo.state.gov/topical/pol/arms/stories/01072503.htm. See also Michael R. Gordon and Judith Miller, "U.S. Germ Warfare Review Faults Plan on Enforcement," *New York Times*, 20 May 2001, 1; A.G. Higgins, "Germ Warfare Group Suspends Negotiations Following U.S. Pullout," Associated Press, 3 August 2001.

[14] "BWC: Review Conference Collapses," Global Security Newswire, 10 December 2001.

[15] The topics discussed were biosecurity and domestic criminalization legislation; disease surveillance and response and investigation of suspicious disease outbreaks; and codes of ethics for scientists. Fifth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, *Final Document*, BWC/CONF.V/17 (Geneva: United Nations; 8 December 2006). Available at: http://www.opbw.org/rev_cons/5rc/docs/final_dec/BWC-CONF.V-17-(final_doc).pdf.

[16] The topics to be discussed include domestic implementing measures and regional cooperation; biosecurity, biosafety, and various measures, including scientific codes of conduct, to discourage the

Arguably, the UNSCOM inspections could be a goldmine of knowledge about the planning, inspector training, and operational strategies, tactics, and technologies for inspections to determine compliance with the BWC. The UNSCOM inspections were conducted at numerous types of sites, including those actively masking illicit biological weapons activities and those engaged in legitimate commercial and other peaceful work. Iraqi officials at some facilities cooperated reasonably with the inspectors, but at others, Iraqi officials deliberately tried to mislead the inspectors and hide the truth. In other words, the UNSCOM biological inspections demonstrated many of the real-world contingencies critical to understanding the feasibility of monitoring compliance with the BWC. With the objective of learning from the UNSCOM biological inspections in mind, this essay will seek to convey one former UNSCOM inspector's insights into the utility of on-site monitoring of dual-use facilities.

Selected Observations from UNSCOM's Biological Inspections in Iraq

On 15 June 1998, UNSCOM dispatched an inspection team to Iraq for the purposes of on-going monitoring and verification, confirming the location and status of critical pieces of equipment that could be employed for both civilian and military activities. This UNSCOM team visited numerous sites over the next three months, including academic and commercial facilities, departing on 14 September 1998. This inspection team was designated Biological Group 16 (BG16), for the 16th of UNSCOM's 17 biological monitoring groups. The BG16 team was one of over 70 UNSCOM biological inspection missions in Iraq. Most of these missions involved inspections of multiple Iraqi facilities. UNSCOM's biological inspection missions had different basic objectives, including inspections to clarify Iraq's declaration and conduct initial site visits; to establish baseline data for ongoing monitoring and verification; to inventory, tag, and document dual-use equipment; to conduct interim monitoring activities; to initiate ongoing monitoring and verification; to analyze the parameters for monthly

misuse of advances in the life sciences; the enhancement of infectious disease surveillance and response and international cooperation, exchange, and assistance in biological science and technology; the provision of assistance to any BWC member requesting aid in the event of a suspected germ weapons attack. The United Nations. Sixth Review Conference of the States Parties to the Convention on the Prohibition of the Development, Production, and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on Their Destruction, *Final Document*, BWC/CONF.VI/6. (Geneva: 8 December 2006). Available at: http://www.opbw.org.

monitoring; to destroy equipment and facilities used in Iraq's biological weapons program; to review documentation pertinent to dual-use activities; to interview pertinent Iraqi personnel; and to clarify Iraq's past bioweapons program activities. Some UNSCOM inspections were conducted jointly with other groups in UNSCOM's Baghdad office or with an inspection team deployed for a special mission. Before his involvement in BG16, the author also participated in a special visiting team that worked with members of BG15 to inspect presidential sites in Iraq, which included the palaces of Iraqi president Saddam Hussein as well as other facilities that Iraq deemed sensitive.

UNSCOM staffed its inspection teams with personnel from many nations.[17] The nations that provided inspectors to UNSCOM often sent top professionals in their respective areas of expertise but many, if not most, of these individuals had no prior experience as inspectors. UNSCOM therefore provided a week of training, sometimes more, for inspectors entering Iraq for the first time. The training took place mostly at UNSCOM's field office in Bahrain, although the last segment of the training was often held at UNSCOM's office in Baghdad. The instruction covered the terms and provisions governing UNSCOM's inspections to ensure that personnel knew their rights as inspectors as well as the rights and obligations of the Iraqis. In anticipation that inspectors would go to sites where materials hazardous to their health would be present, another featured topic of instruction was the use of the appropriate personal protection equipment (e.g., gloves, masks). The training reviewed such technical matters as the procedures for the collection of samples and other pertinent evidence, the rules for maintaining chain of custody for evidence, and methods of documentation. Finally, the instruction provided some background information about Iraqi culture to help the inspectors understand how the Iraqis might behave in certain situations.

Prior to each inspection, UNSCOM's BG16 team met to review many aspects of the plan for the coming inspection. All UNSCOM chief inspectors had a certain amount

[17] Nations providing inspectors to UNSCOM paid the salaries of personnel they loaned to UNSCOM, which otherwise operated on a modest budget with very few permanent staff at its headquarters in New York City. See paragraphs 5, 7, and 9 of "Report of the Secretary-General on setting up a Special Commission (UNSCOM) to carry out on-site inspection of Iraq's biological, chemical and missile capabilities," Doc. S/22508 (New York: United Nations Special Commission, 18 April 1991). See also "Plan for the implementation of relevant parts of Section C of Security Council resolution 867 (1991), Report of the Secretary-General, Doc. S/22614 (New York: United Nations Special Commission, 17 May 1991).

of discretion in the field as to how they were to accomplish their mission, including the right to withhold from the inspectors certain particularly sensitive details of the next inspection until the team's arrival at the inspection site. The practices and leadership skills of the team leader, as well as the interpersonal skills of the other team members, can have a significant influence on how well an inspection team performs when its members have never worked together before but are required to establish positive team dynamics virtually overnight to accomplish a mission in a setting that some find quite challenging. BG16 worked collaboratively and effectively.[18] In these inspection planning meetings, the team leader usually notified the inspectors of their assignment(s) for the coming day. Each inspector's skills and qualifications were often the determining factor in their assignments, but on occasion even highly specialized technical experts were asked to perform guard duty to help secure the inspected site or to assist with other more generic inspection tasks (e.g., photography, logistics, note-taking). Otherwise, some inspectors were assigned to examine documentation, others to speak with selected personnel at the facility, others to locate and examine dual-use equipment, and still others to examine the collections of seed cultures at facilities.[19]

In these planning meetings, the chief inspector usually shared with the team data about what was expected to be found at the site,[20] and a group discussion would ensue. From that discussion, the team would devise a target list of inspection priorities. Often, there was a general expectation within the inspection team that equipment would not be found where it was supposed to be or that the inspection would uncover other misbehavior. Especially during inspections of its nuclear and biological activities, Iraq at times went to extensive lengths to hinder the inspectors. For instance, UNSCOM inspectors who discovered the blueprints for Iraq's nuclear weaponry were detained for

[18] One factor that influenced BG16's cohesiveness was the encouragement team members received from the team leader, an American with a military background, to socialize together in the evenings. Very often, various inspectors would engage in some activity together (e.g., bowling, ping-pong, dining).

[19] Because of my technical skills, my principal duties on most inspections involved examination of culture collections and of equipment.

[20] By this time, UNSCOM had an extensive database of the dual-use equipment in Iraq. A series of baseline inspections that visited over eighty sites in Iraq in 1994 to inventory, tag, and document dual-use equipment were the basis of this database, which was updated thereafter when inspectors visited the facilities. The major baseline inspections, conducted from April to September 1994, were UNSCOM 72/BW4, UNSCOM 78/BW5, UNSCOM 84/BW6, UNSCOM 86/BW7, and UNSCOM 87/BW8. Nations cooperating with UNSCOM also occasionally provided information about other pieces of equipment that Iraq may have acquired but did not declare to UNSCOM or that Iraq may have manufactured indigenously.

four days in a downtown Baghdad parking lot in September 1991 when Iraq refused to hand over the documentation.[21] New inspectors were aware of such uncooperative behavior even if they had not encountered it themselves. For their part, some veteran inspectors often assumed that the Iraqis would "misplace" keys to rooms, be unable to locate records that a facility would normally keep, claim that essential personnel were not available for interviews when the inspectors arrived, or engage in other activities that would obstruct the inspections.

The receptivity of the Iraqis to the inspection team appeared to differ according to the type of facility being inspected. When BG16 visited universities, the Iraqis were quite cooperative. The inspectors were able to enter laboratories and other facilities and to engage in professional discussions with the Iraqi scientists about the pathogens they were working with and their research objectives, methodologies, and results. When BG16 went to factories, the reception from the Iraqis was sometimes less hospitable. The Iraqi officials and the factory owners were not pleased that the inspections were interrupting factory operations. They complained that the presence of the inspectors, their tour of the facilities, discussions with facility personnel, examination of equipment and documents, and other activities interfered with their production of milk, fruit juices, and other commercial products. The tensest inspections, however, were those conducted at the sites the Iraqis declared as sensitive. For instance, when BG16, which was conducted in conjunction with a special visiting team, inspected the headquarters of the Iraqi Air Force, the size of the UNSCOM team expanded to include almost 100 inspectors. The Iraqis also sent an increased number of Iraqi security personnel. The higher number of people interacting with each other escalated the tension and also multiplied the potential for problems to occur. The inspection team spent an entire day at this site, and both the Iraqis and the inspectors were apparently worried about the outcome of the inspection of this and other sensitive sites.

Among the inspectors, there appeared to be different thresholds for suspicion about whether an isolated piece of evidence indicated that a facility may or may not have been involved in prohibited activity. Various reasons could exist for these different

[21] Paul Lewis, "Iraq Appears Ready to Yield Over U.N. Inspectors," *New York Times*, 26 September 1991; John M. Goshko, "Standoff is Over," *Washington Post*, 28 September 1991, A1.

thresholds. As noted, experienced inspectors who had previously encountered misconduct on the part of the Iraqis anticipated that the Iraqis would comport themselves poorly. Another factor influencing the threshold for suspicion was whether an inspector was truly familiar with the working conditions of the type of facility being inspected. Inspectors who had worked in a laboratory or commercial plant were likely to make informed judgments as to whether something unusual was a typical human error or was indicative of activity related to the research, development, or production of biological weapons. For example, when checking the contents of a freezer storing strains of diseases, at times the Iraqis did not have documentation for some of their vials or their vials were labeled incorrectly, with the accurate name of the bacteria but the wrong American Type Culture Collection number for that particular strain. For some inspectors, this created suspicions of misbehavior; perhaps because without having worked in a laboratory these inspectors had unrealistic expectations about how accurately laboratory staff should or can keep records. Their counterparts with laboratory experience understood that clerical errors occur in all laboratories, and if the inventory of the freezer contents uncovered only a few small errors among hundreds of vials, then it did not cause an inspector with laboratory experience any undue concerns that the Iraqis were trying in some way to hide biological weapons-related research. Conversation with the laboratory workers could usually spell out how and why the mistake(s) had been made, but if reasonable suspicions remained, additional investigatory steps, such as culturing the contents of the vial in question, could be taken to clarify the situation.

As inspectors consider whether the evidence before them should raise concerns about illicit activity, they need to be alert to differences in the level of biosafety practiced in other countries. At one facility, BG16 inspectors came across a senior scientist performing inoculations with *B. subtilis* on the bench but not wearing any protection—no mask, no gloves, no cap. The BG16 team quickly withdrew from the work area and put on appropriate personal protection gear. When asked about the normal safety precautions observed at this facility, another Iraqi scientist said that they never used such precautions for that type of procedure. In other words, the Iraqi scientists appeared to have no hesitation about working in biosafety conditions that outsiders viewed as inadequate to

protect their health and safety.[22] Two lessons for inspectors emerge from this encounter. First, as soon as possible, inspectors should assess a facility's biosafety standards to ensure that the inspectors are wearing the proper personal protection equipment. Second, in making their assessments, inspectors need to think with an open mind about what is possible in the biosafety conditions that are present. A scientist accustomed to advanced biosafety conditions might not be willing to perform certain procedures with highly infectious diseases in less stringent biosafety conditions, but that does not mean that others would not be willing to or compelled to work in those circumstances. In short, biological weapons can be researched, developed, and produced in very limited safety conditions if the scientists do not know about better biosafety, if they are forced to work in such conditions, and if political and military leaders do not understand that this activity will put at risk their personnel and the public.

Other than the visual and physical examination of facilities, one of the most useful tools at the disposal of inspectors is to speak with the facility personnel about their work. UNSCOM inspectors were able to examine carefully the set-up of a facility's fermenters, continuous centrifuges, and other equipment and to talk with the plant operators about how and why they were doing certain things. At the Al Kindi Veterinary Vaccine Production Plant, an inspector who observed their production process and engaged in technical discussion with the facility staff could understand that at this plant the Iraqis did not have sufficient knowledge of modern vaccine production techniques to make advanced vaccines. An Al Kindi senior scientist said that they were unable to use more advanced production processes because they did not have access to the internet or to recent scientific journals or the ability to travel to scientific conferences to gain such information. The taking of samples was another tool that inspectors could employ, but inspectors used sampling sparingly. For example, samples were taken of the drippings that were found on the ground beneath a holding tank on the grounds of a presidential site so that the contents of the tank could be specifically determined.[23]

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[22] Biosafety practices were strengthened considerably in the 1990s, and one reason that the Iraqis may not have kept pace with safety improvements is that after the first Gulf War they had little or no access to the outside world.

[23] Two of the reasons that sampling was used infrequently were the time and cost of sample analysis. For analysis, UNSCOM was reliant on the use of the analytical laboratories of cooperating nations. Therefore, one of the recommendations from BG16 was for UNSCOM to establish its own analytical laboratory

In the first four or five inspections that BG16 conducted, the team found all of the equipment that they expected to locate. Everything, in other words, was pretty much in order at these sites. After that, instead of beginning each new inspection with a prevailing expectation that something improper would be discovered, the mindset of new inspectors could adjust to a more reasonable barometer of suspicion. The inspectors were still very vigilant, doing whatever they could to determine if the Iraqis were employing the dual-use equipment for the legitimate purpose(s) they stated. In addition to the previously mentioned inspection activities, the team examined the videos from the inspected facilities very closely, looking at who was entering and exiting the facilities, the specific buildings where dual-use equipment was located, and at the film records of the equipment operations. They found nothing seriously out of order. So, the BG16 inspections largely confirmed the findings of previous UNSCOM teams but did not uncover any significant misconduct on the part of the Iraqis.

Considering the Adjustment of the UNSCOM Experience to a BWC Context

The UNSCOM inspections in Iraq were comparable to a major, ongoing experiment in how to monitor the ban on biological weapons. So much experience was gained, and in the end the UNSCOM inspections offered considerable proof that experienced inspectors can discern whether a facility is engaged in activities consistent with its stated purpose(s) or is covering for illicit weapons-related activities. The UNSCOM experience can be adjusted for the BWC context. To begin with, although Iraq had no rights under the ceasefire resolution to refuse UNSCOM inspection, a BWC inspection regime could use many of the same basic inspection tools and procedures as UNSCOM but the framework for the inspections would be that they unfold in a collaborative manner with the inspected state.[24] In contrast to UNSCOM, BWC inspectors would give the inspected state notice about the facilities to be visited. Advance notice of inspections could make the job challenging for BWC inspectors

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capacity. This recommendation was accepted and equipment was purchased, but before the laboratory could be created, Iraq completely stopped its cooperation with UNSCOM.

[24] The possible exception to this collaborative approach would be if a BWC inspection regime included challenge inspections similar to those of the Chemical Weapons Convention. All members of the Chemical Weapons Convention are obligated to accept a challenge inspection at any time at any place on their territory in the event that allegations of cheating arise.

because the inspected state would have many days prior to the arrival of inspectors to conceal any prohibited activities. For example, a production plant can be switched from prohibited activity to civilian drug manufacture within just 48 hours. However, much the same situation existed with UNSCOM inspections. Although Iraqi officials did not always know when and where UNSCOM inspector teams were going, they certainly understood that UNSCOM's mandate under Resolution 687 was to continue inspections at least until the inspectorate could report to the Security Council completion of the elimination of Iraq's weapons of mass destruction and their means of delivery. Iraq had ample time to hide evidence from UNSCOM inspectors, yet the inspectors still managed to uncover sufficient evidence to force Iraq to admit its covert biological weapons program.[25]

In a BWC context, one key to the success of inspections would be the assembly of inspection teams with the appropriate skills and proper preparation. Many of the individuals that nations seconded to UNSCOM were from the military or other professions that allowed them little understanding of the science and technology involved in bioweapons research, development, testing, and production. Just as the best inspection team for a facility thought to be manufacturing biological munitions would consist of engineers and military professionals knowledgeable in munitions, the appropriate inspection teams for research and commercial sites employing dual-use equipment would be comprised of professionals who have worked in laboratory and production facilities. As UNSCOM did, incoming inspectors should be provided with appropriate training to familiarize them with their duties and background information about the safety, regulatory, and cultural environment of the inspected state. This training should also inform the inspectors that host officials are likely to interact differently with various team members not only because of their respective technical skills but because of their nationalities.[26] A sound inspection strategy would take advantage of this tendency to

[25] For example, UNSCOM built its case to establish the real purpose of Al Hakam as a dedicated biological weapons production facility rather than a commercial manufacturing plant on Iraq's attempts to purchase equipment more suited to bioweapons production (e.g., specialized ventilation equipment) and its purchases of extremely large quantities of growth media. United Nations, *Report of the Secretary-General on the Status of the Implementation of the Special Commission's Plan for the Ongoing Monitoring and Verification of Iraq's Compliance with Relevant Parts of Section C of Security Council Resolution 687 (1991)*, Doc. S/1995/284 (10 April 1995), paras. 59-76.

[26] Officials that are serving as hosts to the inspection and local private citizens will interact differently with

obtain the maximum possible amount of pertinent information from host officials in a collaborative fashion.

Before going on site, BWC inspectors would be able to gather enough information even from open sources (e.g., product and capability advertisements, staff scientific publications) so that they could develop an understanding of a facility's work and equipment prior to the inspectors' arrival on site. The inspection team could outline the facility compound, identifying what they would expect for that type of facility in terms of biosafety containment areas, the distribution of buildings, and basic capacities (e.g., waste management, storage, medical support). Very soon after arrival, the inspection team would want to allow the individual(s) in charge of major buildings to introduce the building, listening closely to see if their description fits with what the inspectors expected. The inspectors should examine all of a facility's capabilities, including those that are in operation, as closely as possible. The initial tour should include all relevant parts of a site, including biosafety and other laboratory facilities, development and production facilities, pre-clinical testing (animal) facilities, air handling capabilities, storage and waste handling capabilities (e.g., incinerator). As the tour proceeds, inspectors should take the opportunity to interact with facility personnel in a collegial manner, asking questions about their recent activities, the standard operational procedures and self-protection measures for their part of the facility, the length of their employment at the facility, the different jobs they have held at the facility and prior to joining the staff, and problems that have occurred in the facility's operations and how they were resolved. From this type of site observation and discussion, as well as from examination of a facility's documents, experienced inspectors can begin to analyze whether the facility is engaged in legitimate operations. Depending on the size and complexity of the facility being inspected, additional discussion with personnel, inspection of equipment, review of documents, and perhaps even sampling may be needed for inspectors to make a judgment in which they have significant confidence.

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individual inspectors based on their perceptions, whether accurate or not, about people from different countries. Locals will be very friendly with inspectors of some nationalities (e.g., offering free taxi rides, extending invitations to dinner), but not so friendly or even confrontational and hostile with inspectors from other countries.

The success of BWC inspections will depend not just on the skill of the inspectors and the procedures and equipment at their disposal, but also on the extent to which politics take a back seat to technical facts and the informed judgments of inspectors. The reports from UNSCOM inspections stated only the technical, observable facts, such as the equipment, pathogens, and capabilities of a facility. UNSCOM inspectors did not include their analysis of the circumstances they found in the field. Such analysis could have played a more important role in the decisions taken about the frequency with which Iraqi facilities in Iraq should be inspected. Instead, politics may have influenced such decisions. While it may be impossible to subtract politics totally from treaty monitoring, decisions about the planning, execution, and outcome of inspections are best made by those with the appropriate technical expertise as opposed to those with political objectives uppermost in mind.

Concluding Observations

Although no plans currently exist to resume international efforts to draft a compliance protocol for the BWC, one cannot rule out the possibility that such negotiations could be reconvened at some point in the future. In that case, the negotiators would certainly benefit from an across-the-board understanding of UNSCOM's inspections of Iraq's dual-purpose biological facilities. Some initiatives were taken to introduce some insights from these inspections to the BWC protocol negotiations held from 1995 to 2001.[27] Moreover, some of UNSCOM's biological weapons inspectors have prepared articles and lengthier manuscripts that convey some aspects of their personal experiences with UNSCOM, and some studies by close observers of the UNSCOM inspections have been prepared.[28] UNSCOM filed numerous reports providing updates on its inspection activities, and the United Nations Monitoring, Verification, and

[27] The United Nations. "UN Special Commission BW Inspections in Iraq: Lessons for the Ad Hoc Experts' Group on Verification," United Kingdom, White Paper, BWC/CONF-III/VEREX-WP5 (Geneva: 30 March-10 April 1992).

[28] For example, see Rod Barton, *The Weapons Detective: The Inside Story of Australia's Top Weapons Inspector* (Melbourne: Black Inc. Agenda, 2006; Tim Trevan, *Saddam's Secrets: The Hunt for Iraq's Hidden Weapons* (London: HarperCollins, 1999); Ray A. Zilinskas, "Iraq's Biological Weapons: The Past as Future?" *Journal of the American Medical Association* 278, no. 5 (6 August 1997): 418-24; Graham S. Pearson, *The UNSCOM Saga: Chemical and Biological Weapons Non-proliferation* (New York: St. Martin's Press, 1999); Graham S. Pearson, *The Search for Iraq's Weapons of Mass Destruction: Inspection, Verification and Non-Proliferation* (New York: Palgrave Macmillan, 2005).

Inspection Commission has made efforts to report on these experiences.[29] However, no truly comprehensive and independent review of UNSCOM's inspections of Iraq's biological facilities has been done based on the first-person accounts of the individuals actually involved in these inspections and unfettered access to UNSCOM's internal records.

For the benefit of any future efforts to create monitoring provisions for the BWC, the international community needs to examine the experience of the UNSCOM inspections systematically. The nature of the inspection process is that each inspector is assigned certain duties and only experiences a slice of what occurs during an inspection. In addition, each inspector brings somewhat unique skill sets to the task, which also contributes to the varying experiences that inspectors have in the field. An individual's account, no matter how valuable, cannot therefore accurately capture the totality of the lessons that should be learned from the UNSCOM biological weapons inspection process.

The type of examination needed would involve a significant percentage of the UNSCOM biological weapons inspectors that either played key roles at certain junctures in the inspections or were involved in an on-going capacity in multiple inspections. Based on interviews with these individuals and supporting documentation that resides in UNSCOM's files, which are stored at United Nations headquarters in New York, a critical assessment could be made of the role that technology can play in on-site inspections and of why certain inspection procedures worked well in some circumstances and not as well in others. This appraisal would also look into the types of training and support that inspectors found most beneficial to the effective performance of their jobs and into the essential skill sets that individuals should possess to qualify as inspectors and perform well in that capacity. In addition, the inspectors' personal accounts of various experiences in the field could be incredibly instructive to individuals who may one day be called on to follow in their footsteps. Failure to capture UNSCOM's experience

[29] Note, for example, UNSCOM's successor released a compendium report in June 2006. The summary of this document was made publicly available, and approximately ten pages of it relate solely to the biological weapons inspections. This report's extensive appendices were not publicly released. Other UNSCOM and UN Monitoring, Verification, and Inspection Commission reports have also addressed various aspects of the inspections process. The United Nations. "Summary of the compendium of Iraq's proscribed weapons programmes in the chemical, biological and missile areas," Doc. S/2006/420 (New York: United Nations Monitoring, Verification, and Inspection Commission, 21 June 2006).

thoroughly would be a missed opportunity to further efforts to eliminate biological weapons, an objective that is in the utmost interests of mankind.

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