

HISTORICAL NOTES

CHALLENGING ENTRENCHED POSITIONS

Experience in biological monitoring in Iraq

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The *HISTORICAL NOTES* working paper series contains passages from an ongoing, wide-ranging research project into the history of chemical and biological warfare whose story starts out with the question when our ancestors began manipulating poison. The research project focusses less on the discussion of individual incidents than on identifying and characterising social, cultural, political and scientific trends that helped to shape narratives of chemical and biological weapon use and the control of such warfare through human and civilisational evolution. It also aims to critically review our present-day (re-)construction and understanding of past events.

Being research in progress, the working papers do not necessarily reflect future conclusions. As part of the overall effort, new sources of information may be found. Or work on other parts of the project may lead to new insights or uncover trends and linkages between historical trends. As a result, certain sections may require revision.

From this perspective, questions, comments or criticism on the *HISTORICAL NOTES* are welcomed and encouraged.

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Introduction

Following Iraq's defeat after its aggression against Kuwait, the United Nations Security Council (UNSC) established by its Resolution 687 (1991) of 3 April 1991 a formal cease-fire between Iraq and the coalition forces.¹ The resolution, adopted under Chapter VII of the United Nations (UN) Charter, also imposed several obligations relating to eliminating its chemical, biological and nuclear weapon programmes and the destruction, removal, or rendering harmless of all chemical and biological weapons (CBW) and all ballistic missiles with a range greater than 150 kilometres. The resolution also required Iraq to ratify the Biological and Toxin Weapons Convention (BTWC), which it had signed in 1972.² Iraq also had to accept international supervision over its fulfilment of all disarmament obligations. The resolution established the UN Special Commission (UNSCOM) as a subsidiary body of the UNSC and tasked it with carrying out immediate on-site inspections of Iraq's biological, chemical and missile capabilities based on Iraq's declarations and at any additional locations designated by UNSCOM. The UNSC also made the Director General of the International Atomic Energy Agency (IAEA) responsible for the nuclear area.

The UNSC further decided in the same resolution that Iraq shall unconditionally undertake not to use, develop, construct or acquire any CBW and prohibited ballistic missiles, and not to acquire or develop nuclear weapons. It tasked the UN Secretary-General and the IAEA Director General with each developing a plan for future ongoing monitoring and verification (OMV) of Iraq's compliance with these obligations in their respective areas. The UNSC approved those plans in Resolution 715 (1991).³ Later, UNSC Resolution 1051 (1996) established a mechanism for monitoring Iraq's imports and exports of dual-use items to reinforce monitoring.⁴ As with Resolution 687 (1991), the UNSC adopted these resolutions too under Chapter VII of the UN Charter. In this way implementation of those decisions became mandatory not only for Iraq but also for all states. Military and other actions by the UNSC could 'give effect' to the decisions.

Essentially, the verification activities under Resolutions 687 (1991) and 715 (1991) had two pillars: disarmament validation and ongoing monitoring. Disarmament validation sought to verify that all prohibited weapons, items, materials and facilities in Iraq were destroyed or rendered harmless. The second pillar consisted of establishing and operating OMV to continuously ascertain that Iraq did not divert non-proscribed assets to reconstitute or start prohibited activities.

Regardless of the mandatory nature of Resolution 715 (1991), Iraq initially refused to accept or act upon its obligations and the OMV plans. Only in November 1993 did Iraq formally accept Resolution 715, after which UNSCOM initiated its monitoring activities in the biological area. After completing extensive phases of baseline inspections and

interim monitoring in 1994, monitoring in the biological area finally became operational in April 1995.

Insufficient information about Iraq's proscribed biological weapons (BW) activities necessitated the preliminary steps in 1994. Iraq was actively hiding its BW programme. The Iraqi leader, Saddam Hussein, apparently considered those weapons as the most advanced and valuable military assets. In November 1990, in the midst of the Kuwait crisis, he had boasted to his advisers that 'only few in the world come to our level as far as the chemical and germ weapons superiority, maybe two, one or maybe none as far as quantity and quality'.⁵ The absolute cover-up of Iraqi BW production and weaponization continued until UNSCOM confronted Iraq in early 1995 with irrefutable evidence of concealed BW activities.

For biological monitoring to be both comprehensive and properly focused, it was essential to establish if such BW activities had existed and if so, to understand their full extent. This included the sites and facilities involved, the human and material resources deployed, and Iraq's know-how and technical achievements. UNSCOM needed this knowledge to ensure that it would properly apply the monitoring tools and that OMV would appropriately cover all dual-use facilities, activities, technologies, items and materials.

Activities carried out under biological monitoring helped to expose Iraq's past BW activities, which included the production and deployment of operational biological weapons. The monitoring team uncovered critical information about some proscribed equipment and materials that Iraq had tried to disguise under supposedly civilian activities at the sites under monitoring. For example, Iraq had imported 42 metric tonnes of growth media prior to 1991. The monitoring team found and identified an unused amount of 22 tonnes still at several sites under biological monitoring. Iraq claimed that hospitals had consumed the 'missing' 20 tonnes for diagnostic purposes. Inspectors dismissed the explanation because the types and amounts of imported growth media were not suitable for diagnostic purposes in Iraqi hospitals. Instead, the imported and consumed volumes pointed to fairly large biological production at industrial-scale facilities. Specific design features of equipment at the Al Hakam facility contradicted Iraq's declared purpose of single-cell protein production for animal feed. The former Head of the Iraqi BW programme, Nasir Hindawi revealed in an interview with CNN in 2003 that he was told to say that the Al Hakam plant was used only for peaceful purposes. However, according to him 'the inspectors were not fooled'.⁶ Iraq admitted in July 1995 that Al Hakam had been established and used solely for biological warfare agent production and weaponisation. The biological monitoring team was able to specifically identify the equipment used for BW production at Al Hakam and another site, the Foot and Mouth Disease Vaccine production facility at Daura.

UNSCOM continued its two-track activities in biological disarmament and monitoring until December 1998 when it was withdrawn from Iraq. In December 1999, the UNSC replaced UNSCOM with the UN Monitoring, Verification and Inspection Commission (UNMOVIC) and mandated it to specifically focus on reinforced monitoring and verification. UNMOVIC only began its field operations on 27 November 2002 and departed just over three months later on 18 March 2003.

This chapter focusses on the only instance of international monitoring in the BW area. It draws on my first-hand experience to launch and manage biological ongoing monitoring in Iraq from 1995 through 1998 both within the country and from UNSCOM Headquarters. I continued to address those issues as Chief of Biological Operations until 2001. Afterwards I participated in the training of UN BW inspectors.

Scope of OMV in Iraq

To establish a basis for monitoring activities, Iraq had to provide detailed information on facilities, equipment, items that could be used for R&D and production of biological warfare agents, and relevant imports or exports.

Specifically, under the OMV plan, Iraq was to declare:⁷

- any site or facility at which work with toxins or with microorganisms meeting the criteria for risk groups IV, III and II⁸ or with genetic material coding for toxins or genes derived from those microorganisms, or for the bulk storage of such toxins or microorganisms;
- any site or facility having a laboratory (unit) meeting the criteria for a 'maximum containment' or 'containment laboratory',⁹ or being constructed or modified to possess such containment capabilities;
- any site or facility at which fermentation or other means for the production of microorganisms or toxins is carried out with vessels larger than 10 litres individually or 40 litres in aggregate;
- any site or facility for vaccine production;
- any imports, other acquisition or exports of microorganisms meeting the criteria for risk groups IV, III and II, toxins and vaccines, as well as related equipment and facilities; and
- any research, development, testing or other support or manufacturing facility for equipment and other items specified in Annex III of the OMV plan.

Annex III of the OMV plan outlined specific provisions related to dual-use equipment and materials. The list of declarable dual-use items contained *inter alia*:

- biohazard containment equipment;
- equipment for the micro-encapsulation of living microorganisms; complex media for the growth of the risk groups IV, III and II of microorganisms; detection or assay systems specific for these risk groups of microorganisms and toxins;
- bio-reactors and fermentation vessels;
- recombinant DNA, equipment and reagents for its isolation, characterisation or production;
- equipment and reagents to construct synthetic genes;
- equipment for the release into the environment of biological material;
- equipment for studying the aerobiological characteristics of microorganisms or toxins;
- equipment for breeding of vectors of human, animal or plant diseases;

Iraq submitted its initial declaration and updated the information every six months. Following their receipt, UNSCOM analysed and verified them through comparative examination and on-site inspections to determine the completeness and accuracy of the data submitted and to validate the information in the declaration.

Due to these declaration requirements, a substantial number and variety of facilities, equipment, technologies and activities became relevant for monitoring by UNSCOM's biological team.

To put into practice a workable model for effective biological monitoring operations and to focus most productively its limited human and financial resources, UNSCOM considered various approaches to implementing OMV. After substantial discussions at the expert and political levels, UNSCOM adopted a multi-layered monitoring setup based on a 'checkpoint' concept consisting of baseline and routine inspections reinforced by various inspection tools. This concept relied on the identification of the most significant points to detect diversion from a declared activity and specific indicators of proscribed activities. As a result, the available inspection and monitoring resources would be focused specifically on key facilities and critical pieces of equipment and technologies. This guiding approach helped to establish the mode and frequency of monitoring inspections at declared facilities, adjustments to format and content of facility declarations, and placing monitoring tools such as inventory tags and installation of cameras and sensors. Thus, the checkpoint approach would enable UNSCOM to timely capture the most valuable information to deter and detect proscribed activities efficiently while using limited monitoring resources without compromising overall monitoring objectives.

In addition, other 'checkpoints' related to specific expertise, know-how and previous involvement of Iraqi personnel in the BW programme were used. Monitoring teams

continued to meet with these individuals to obtain information on their professional engagements.

As there was no precedent of biological monitoring and to test and practically implement the ‘checkpoint’ approach, UNSCOM conducted an initial baseline survey of multiple sites and facilities in Iraq and thoroughly evaluated technologies, activities, materials and equipment at those sites. During the subsequent interim monitoring phase, facilities with greatest capabilities to restart BW activities were identified and gradual risk categories from A to D were assigned to specify exact modalities and tools for their continuous monitoring. This risk assessment considered several factors: the site’s technical features, the ease for conversion to BW activities, and its present status and operations. For example: while all declared sites had to submit semi-annual declarations, the ones in the highest risk category A also had to provide monthly disclosures, the so-called monthly monitoring parameters. The on-site inspection frequency for the sites was also correlated with their risk categories. For example, category A sites were designated for weekly inspections, with some of them singled out for additional deployment of cameras and sensors.

Through this process, some 80 sites were placed under biological monitoring with two dozen key facilities assigned to the highest risk categories: nine, mostly production sites, in category A and fifteen in category B. Some ten cameras were installed in five production sites from category A. The number of sites under OMV increased over time due to UNSCOM inspection activities, discussions with Iraq on declaration requirements and its subsequent declaration submissions.

As already mentioned, UNSCOM introduced the more dynamic monthly monitoring parameters tailored to each key site. These were facilities for production of human/animal vaccine, biopesticides and pharmaceuticals, biotechnology R&D laboratories and one helicopter base for aerial biopesticide spraying. Depending on a specific facility, these monitoring parameters included data reporting on changes in ongoing activities, inventory of types of microorganisms, numbers and types of personnel, materials received, laboratory tests, animal usage, water and electrical power usage, and products generated. Documents had to support all declared information and be produced upon request by the monitoring teams.

UNSCOM prepared specific site protocols for all declared facilities to guide inspectors in the site-specific monitoring activities. These protocols outlined the basic site data, assessment of the dual-use capability of the facility, reasons for OMV, a description of areas, equipment, technologies and activities of interest under OMV, site diagrams, maps, imagery, database extracts and inspection procedures to be used at the site, and previous inspection reporting and findings. The biological monitoring teams continuously updated the site protocols.

The fundamental approach to ongoing monitoring focussed on the identification of deviations from the registered baseline information for each facility. This ‘abnormality

detection' required, first, the establishment and continuous update of all relevant data for each facility and thereafter, the meticulous follow-up by monitoring inspections to timely detect deviations from existing baselines and thoroughly evaluate each case's impact on compliance assessments. To carry out effective monitoring, UNSCOM established discipline-specific resident monitoring teams based at its permanent in-country base, the Baghdad Monitoring and Verification Centre (BMVC). This arrangement differed from UNSCOM disarmament inspections that were carried out by non-resident, visiting inspection teams. These 'resident inspector setup' was also an innovative approach to multilateral arms control and disarmament inspection activities.

Up to ten experts staying in-country for a period of up to six months made up the resident biological monitoring teams. Their key advantage was that they could undertake no-notice inspections daily. Due to their prolonged stay, resident inspectors also gained extensive knowledge of sites under monitoring and proficiency in carrying out UNSCOM's operational guidelines.

Inspection activities

The UN Security Council, in its resolutions and monitoring plan, established specific inspection rights and procedures to implement disarmament validation and ongoing monitoring. This unprecedented inspection toolbox included rights

- to designate for inspection any site, facility, activity, material or other item in Iraq and carry out such inspections, at any time and without hindrance;
- to conduct unannounced and short-notice inspections and to inspect any number of declared or designated sites or facilities simultaneously or sequentially;
- to designate for aerial overflight any area, location, site or facility in Iraq;
- to request, receive, examine, copy and remove any record, data, information or documentation and to verify inventories;
- to mark, tag or otherwise identify any material or other item;
- to examine, retain, move or photograph, including by videotaping, any activity or item;
- to conduct interviews with any personnel at a site or facility under inspection, or with any Iraqi official;
- to install containment, surveillance and other equipment and devices and to construct facilities for inspection, observation, testing, verification or monitoring activities;

- to take samples of any kind and perform on-site analyses of the samples using its own equipment; and to remove and transfer samples outside Iraq for analysis; and
- to use its own instrumentation to collect data during inspections and aerial overflights, including photographic, video, infrared and radar data.

The strong feature of the OMV plan were Iraq's specific obligations mirroring UNSCOM inspection rights. For example, UNSCOM's right to carry out inspections, at any time and without hindrance, was matched by Iraq's obligation to accept unconditionally the inspection of any site, facility, activity, material or other item declared by Iraq or designated by UNSCOM and to provide immediate and unimpeded access to any site, facility, activity, material or other item to be inspected. Ambassador Rolf Ekéus, the first UNSCOM Executive Chairman, introduced this approach.

Besides the obligations corresponding to UNSCOM rights, Iraq was thus required to not obstruct aerial overflights or take concealment measures at any area, location, site or facility designated by UNSCOM for inspection or overflight. It also had to accept unconditionally the inspectors and all other personnel designated by UNSCOM.

The scope and intrusiveness of the inspection rights given to UNSCOM were unprecedented in the history of arms control and disarmament, including the rights to conduct unannounced inspections at any site; conduct aerial overflights of any area in Iraq; examine any record, data, information or documentation; conduct interviews with any personnel; install containment and surveillance equipment; take samples of any kind, perform on-site or out-of-country analyses. This also remains unmatched up to now. One can also benefit from UNSCOM's experience as a 'field laboratory' by assessing the practical effectiveness and applicability of various inspection tools in the biological, chemical and missile areas and draw lessons.

The extensive inspection rights placed heavy responsibilities on UNSCOM to implement its disarmament and monitoring tasks in the most efficient and credible manner.

On-site inspections

As envisaged by the UN Security Council, the main monitoring 'toolbox' included on-site inspections. The resident monitoring teams conducted them practically daily. They did not announce the inspections, yet for logistical purposes, they notified Iraq's representatives the day before an inspection without informing them of the site or the inspection's purpose. In practice, the monitoring or inspection team led the way to a site with Iraqi escorts following. Within a maximum of two hours, the monitoring teams could reach any site in Iraq by car or helicopter from its BMVC. This is probably the closest one could ever come to 'no-notice', 'surprise' inspections.

During on-site inspections, the biological monitoring team surveyed the facility to verify recent declarations and detect any changes since the last inspection. If required by the facility protocols, the team inspected identified checkpoints, examined the integrity of the tags and verified that tagged equipment had not been moved or put to a different function. If the team noticed any modification to equipment or processes, it would generate records of the changes, take photos and videos and, when deemed useful, samples.

The most important part of on-site inspections were the discussions with Iraqi personnel. Such meetings would take up most of the time of an on-site visit and were conducted after completion of the checkpoint inspections. Those discussions focused on recently declared or identified changes and on ongoing activities. If discrepancies could not be fully reconciled on-site, they were raised with the Government Liaison Office, the National Monitoring Directorate (NMD) in follow-up meetings. Unresolved discrepancies could trigger additional inspection and investigation activities.

Although Iraq over time provided extensive declarations and other information on its dual-use assets, the most critical information for verification activities came from UNSCOM's own monitoring activities. On-site inspections were the most valuable tool in the biological area.

Discussions and interviews

UNSCOM was given the right to conduct interviews with any personnel at the site or facility under inspection or with any Iraqi official. This was and probably remains a unique inspection tool granted to an international agency.

Detailed information on ongoing site activities came from discussions with the facility managers, technicians and other personnel. It was most valuable to receive information from those directly involved in the activities at a site rather than from designated government officials interacting with UNSCOM who were not actually knowledgeable about details of a site's activities. Usually, these discussions proceeded in the spirit of cooperation as good working relations developed over time between site personnel and resident inspectors. In principle, there were no limits on the scope, extent, and number of questions during these discussions. UN interpreters stationed at the BMVC worked alongside the teams.

Because of Iraq's history of concealing its BW activities, UNSCOM established a special type of interaction, the so-called 'interviews'. These interviews mostly served disarmament validation and were not part of routine monitoring activities. Prior arrangements needed to be made with Iraq to ensure attendance of the person requested for such interview. A government representative could observe but had no right to interfere in the interview. At the end, however, the observer could comment on or clarify certain points if required. Although UN inspectors understood that the government would pre-brief any invited Iraqi personnel, the interview, if skilfully conducted, could still yield previously

unknown information. Interviews required detailed subject knowledge by the interviewers and a carefully prepared plan detailing the questions to be asked and how to pursue revealed information. The interview process was made even more difficult as it was not always possible to ensure instantaneous exact translation of statements made. Techniques for interviewing by international inspectors were not well known or developed at that time and interview outcomes varied according to an individual inspector's skills and even personality.

The resident team also held regular meetings at the NMD. These discussions specifically sought to clarify discrepancies between findings at a site and official government declarations. They also provided a regular forum for addressing issues related to overall monitoring activities or settling specific incidents.

Another type of official interaction with Iraq were the Executive Chairmen's frequent visits to Baghdad. They involved high-level political discussions on major issues about Iraq's implementation of relevant UNSC resolutions, including OMV.

Inventory of dual-use equipment

Biological monitoring rested on establishing and maintaining a comprehensive and accurate inventory of dual-use equipment and items in Iraq. Based on Iraq's declarations and provisions of the OMV Plan, the monitoring team continuously recorded information on dual-use items, including specific location, history of acquisition, use and other descriptive details.

Initial inventorying consisted of attaching a tamper-indicating barcoded tag to a piece of equipment. The barcode was scanned during on-site inspections and tagged equipment was checked to confirm and update information in a database. Any movement or modification of tagged equipment required a prior 30-day notification by Iraq on a non-objection basis.

By the end of monitoring operation in 1998, the UNSCOM database contained over 1,300 items. Tagging served as an efficient and reliable tool to maintain proper inventories of dual-use equipment and facilitated on-site activities of monitoring teams.

Sampling

UNSCOM had the right to take any kind of samples and perform on-site analyses using its own equipment or to remove samples outside of Iraq for analyses. Sampling was a powerful technical tool to obtain forensic evidence of prohibited or undeclared activities. For example, sampling allowed UNSCOM to specifically identify the BW agents produced and weaponised by Iraq at Al Hakam and Daura facilities. Sampling by the monitoring team was triggered when there were indicators of possible proscribed activities.

A biological room was installed at the BMVC for processing, packaging and shipping biological samples for laboratory analysis outside of Iraq. Various national institutions of

UN members provided laboratory support. Later, UNMOVIC established a network of eleven internationally recognised biological laboratories to analyse its samples.

Results of sampling and laboratory analysis are usually considered scientific evidence with a strong influence on decision-making. Although from a technical viewpoint, sampling has its limitations and may sometimes even be counterproductive, on a political level all parties involved considered the actual analytical results as indisputable. They thus accepted the findings as the ultimate proof of the nature of ongoing or past activities under investigation.

Authorisation to sample, even if infrequently used, increased the possibility of detection and thus served as a valuable deterrent.

Examination of site records

Documents in hard copy or digital format at a site are a valuable source for information or evidence. UNSCOM had received the unprecedented right to examine, copy and remove any record, data, information or document.

Examination of documents and computer records was time consuming and required laborious and prolonged efforts. Browsing through extensive documentation or computer files at a facility called for specific skills to search for and identify on the spot information that could point directly or indirectly to undeclared or proscribed activities. It also required highly skilled linguists since the data and files were in Arabic. Therefore, this tool was applied only occasionally at key sites after discovery of serious discrepancies in submitted declarations. During baseline inspections 'document audits' were conducted mainly for familiarisation with types and formats of documentation available at a specific site. Overall, examination of documentation during biological monitoring did not become a key tool to achieve the monitoring objectives.

Remote sensors and cameras

UNSCOM had the right to install containment, surveillance and other equipment and devices and to construct facilities for inspection and observation. It used such tools as part of its checkpoint approach, for example, video cameras to monitor ongoing activity at five category A sites. To enhance their operational value, cameras were paired with other sensors such as motion detectors and temperature sensors. Surveillance data were recorded on videotape, and the operational status of the cameras and sensors could be checked remotely.

This monitoring process was laborious because the biological team had to dedicate staff to the review of many hours of surveillance tapes. In the biological area, data from cameras and sensors was not sufficient to determine remotely and conclusively whether proscribed activities were taking place at a facility or not. Thus, they were only used as a tool for triggering an on-site investigation if unusual activity was detected in real-time or

on tape. Overall, while serving only as a secondary tool in biological monitoring, camera systems help to deter illicit activities.

Aerial overflights

Besides tools used during on-site inspections, UNSCOM had the right to designate for aerial overflight any area, location, site or facility in Iraq.

UNSCOM used aerial surveys extensively in support of its disarmament and monitoring activities. This was then a pioneering approach to international arms control and disarmament verification and monitoring. Aerial surveillance was conducted through several platforms at different altitudes. Initially US U-2 high-altitude reconnaissance aircraft conducted these on behalf of UNSCOM and were later supplemented with French Mirage aircraft for mid-altitude aerial missions. UNSCOM also operated in-country based helicopters, initially provided by Germany and later Chile, for aerial surveillance. UN member states also occasionally supplied overhead imagery from satellites.

Both, UNSCOM and UNMOVIC had dedicated units for collecting and analysing overhead imagery. Aerial surveillance data were useful to ascertain the status of facilities, the sites' layout, perimeter, access roads, significant modifications to structures or new construction. For biological monitoring, such information had limited utility as aerial surveillance alone could not detect tell-tale indicators of proscribed or undeclared activities. Nevertheless, information from aerial imagery was instrumental for operational planning of on-site inspections.

Inspector skills and training

The success of disarmament and monitoring inspections in Iraq depended ultimately on the expertise and skills of the inspectors. For biological monitoring, diverse technical expertise covered various aspects of microbiology and involved practical experience in biological R&D, production and bioprocess engineering. UNSCOM's training for its non-resident inspectors consisted of brief pre-deployment sessions. For the resident teams it was essentially on-the-job training.

UNMOVIC introduced and institutionalised its own multi-layered inspector training programme as a pre-requisite for deployment to Iraq. UNMOVIC-conducted training primarily aimed to supplement existing technical knowledge of government-nominated experts with specific skills required for preparing, planning and conducting international on-site inspections. The training programme included basic training to understand how to conduct inspections under UNSC mandates in Iraq and follow-up courses focussing on specific types of inspection and monitoring activities. Basic training ran for up to four weeks and follow-up courses lasted up to two weeks. Overall, UNMOVIC held seven basic training courses and ten follow-up courses for biological inspectors. The final roster of UN trained and certified experts in all non-nuclear disciplines comprised around 400

persons from 59 countries, of which over 100 from 35 countries were trained in the biological area.

Training was conducted at sites and facilities offered by UN members. These sites included production plants for sera, vaccines, pharmaceuticals, biopesticides and various laboratories that resembled types of Iraqi facilities. The training programme incorporated subject-oriented lectures related to technologies of Iraq's proscribed weapons systems, dual-use capabilities and classes on specific monitoring and verification methods and procedures. It also encompassed both technical and relevant health and safety procedures, as well as cultural matters such as the importance of understanding national sensitivities. During the training, numerous practical drills, table-top exercises and mock on-site inspections were held to include practices of site exploitation, recognition of dual-use equipment, sampling, tagging and interviews. An additional benefit of the training was that potential inspectors could work together as a UN team before entering Iraq. Even a short-term in-country experience of UNMOVIC showed the benefits of having a cadre of well-trained inspectors.

As one instance of specific lessons learned from the UNSCOM/UNMOVIC experience, the Norwegian Institute for International Affairs highlighted in a study conducted in 2012 the importance of dedicated skill training and presented valuable ideas for developing specialised training for WMD inspections.¹⁰

UNSCOM/UNMOVIC and the BTWC draft protocol

To address the recognised lack of verification in the BTWC, the States Parties at the Third Review Conference in 1991 established an Ad Hoc Group of Governmental Experts (VEREX) to identify potential verification measures. Thereafter, in 1994, a Special Conference decided to establish an Ad Hoc Group of the states parties with the mandate "to consider appropriate measures including possible verification measures, and draft proposals to strengthen the Convention, to be included, as appropriate in a legally binding instrument to be submitted for the consideration of the states parties." These negotiations ran in parallel with monitoring and verification activities in Iraq. Many experts involved in UNSCOM biological disarmament and monitoring inspections participated in the Geneva talks as part of their national delegations. During these negotiations, a draft protocol that included verification measures and foresaw the establishment of an international organisation, among other things, evolved in a rolling text.¹¹ However, in 2001 just months before the Fifth BTWC Review Conference, negotiations ended abruptly by the United States. All discussions on BTWC verification measures came to a standstill and have not resumed since then.

Consideration of verification tools for the BTWC began after the negotiations for the Chemical Weapons Convention (CWC) concluded in 1992. The CWC's verification

structure and methods influenced the AHG's work and the rolling text borrowed many verification procedures and the organisational structure from the CWC.

The envisaged annual declarations included reporting the production of listed pathogens, vaccines and maximum biological containment units. It would also include information on national biological defence programs including a summary of the research and development conducted. However, there was no final agreement on the scope and specific details of such declarations.

The rolling text also provided for on-site activities: transparency visits and in-country investigations to address non-compliance concerns and alleged BW use.

The rolling text limited the total annual number of transparency visits to declared facilities. When the talks collapsed, the negotiators had not yet agreed on the scope and types of facilities for such visits, but the draft protocol text mentioned biodefence and highest containment facilities. They also still had to determine the precise objectives of such visits. One idea proposed to confirm, in cooperation with the state party to be visited, that the facility declarations were accurate and complete. An alternative idea for such visits was envisaged to just enhance transparency of declared facilities and their activities.

As envisaged in the rolling text, a party to the protocol could request a field or facility investigation if it suspects/ed non-compliance by another party. Procedures for facility investigations were similar to the challenge inspections under Article IX of the CWC. They included consideration of a request by the projected Executive Council, detailed conditions to be met for initiating an investigation, and timelines between receiving the request and launching in-country activities. It also incorporated the 'managed access' approach to protect national security and commercial proprietary information. Under such modalities, sampling and access to documents would be at the discretion of a state party under investigation.

While the core verification concepts in the Protocol's rolling text were similar to those applied by UNSCOM/UNMOVIC, both requiring initial and (regular) consecutive declarations and on-site activities, they differed in scope, intensity and operational applications.

Besides the required 'full, final and complete disclosures' of past BW activities, Iraq provided initial and semi-annual monitoring declarations on a wider range of dual-use facilities and activities. For some key sites, it even produced mandatory monthly reports. Declaration requirements were much broader to include facilities for bulk storage of microbial agents and equipment manufacturing plants. Under the UNSC resolutions, UNSCOM and UNMOVIC were specifically tasked to verify Iraq's declarations using the full scope of their inspection rights.

While 'transparency' visits may seem similar to biological baseline inspections by UNSCOM in 1994 to familiarise itself with Iraqi facilities, those baseline activities were

still full-fledged on-site inspections that included searches for indicators of proscribed or undeclared activities.

Undoubtedly, UNSCOM on-site inspections were much more intrusive and intensive than the protocol's foreseen investigations. The UNSCOM monitoring regime relied on the continuous presence of skilled and experienced inspectors in-country and on the right to conduct no-notice inspections at anytime and anywhere. In rare cases, the protocol included elements of UNSCOM on-site inspection procedures; it incorporated rather intrusive provisions for 'interviews' resembling those put in practice by UNSCOM. Although the rolling text included similar types of inspection tools, in practically all cases their application would have been restricted. Some UNSCOM inspection tools were not included in the rolling text such as routine aerial overflights anytime and anywhere, use of sensors and surveillance cameras, tagging of equipment for inventories. Interestingly, the protocol does not even use the terms 'inspection', 'inspection teams' or 'inspectors' in its procedures.

Although the draft protocol tried to follow the successful example of the CWC, it had not reached the level of UNSCOM inspection and monitoring regime. Without extensive rights and their rigorous application by UNSCOM, it would not have been possible to achieve the objectives of biological monitoring in Iraq.

Conclusions

The first-ever international monitoring in the BW area was based on strong and unambiguous UN Security Council resolutions, adopted under Chapter VII of the United Nations Charter. The overall effectiveness of this pioneering system was continuously assessed at all stages - during the drafting of the OMV plan, the establishment of the OMV operations in Iraq and through several years of practical application. In retrospect, ongoing monitoring proved more effective in deterring Iraq from rearmament than originally expected for the biological area.

In its report of 10 April 1995¹² on the launching of fully operational biological monitoring, UNSCOM asserted that it was uncertain whether biological monitoring was comprehensive in coverage and properly focused. However, three and a half years later when operations ended in December 1998, experience-wise UNSCOM concluded that 'the monitoring system substantially increases the risk to Iraq that proscribed biological activity can be detected' and 'monitoring in the biological area can be at best a deterrent at sites undergoing inspections.' UNSCOM further observed that 'the Commission has designed a monitoring system of many related parts. Each part could not provide high confidence in detection of infractions, but collectively, over time, the Commission believes the system is able to provide adequate and credible monitoring' and that 'while making

use of technology and sensors as much as possible, it is also important to note that the essence of the system is the presence of knowledgeable inspectors.’¹³

In its assessment of the monitoring system in the biological area, UNSCOM also noted that ‘the effectiveness of the monitoring system is proportional to Iraq’s cooperation and transparency, to the number of monitored sites, the number of inspectors, quantity and capability of inspection support elements.’

In its Compendium published in 2006, UNMOVIC also assessed positively that ‘it was possible to develop a comprehensive monitoring and verification system in Iraq that covered multiple areas of WMD and delivery means’.¹⁴ UNMOVIC concluded that ‘despite much scepticism by some member states, the UN verification system was able to deter the resumption of proscribed activities by Iraq after 1991.’

It is also interesting to note views of Iraqi high officials on the effectiveness of the inspection and monitoring system. In its Compendium, UNMOVIC reported that ‘during interviews with Lt. General Hussein Kamel¹⁵ and other senior Iraqis who interacted with the UN inspectors, it was revealed that the inspection system was a deterrent to the resumption of proscribed activities.’ As evidenced from a document published by UNMOVIC, Hussein Kamel¹⁶ said at his meeting with UNSCOM Executive Chairman Rolf Ekéus in Jordan in 1995, ‘you have an important role in Iraq, you should not underestimate yourself. You are very effective in Iraq.’¹⁷ Furthermore, Hussein Kamel reported to Saddam Hussein in mid-1995 that ‘there are no doubts that their monitoring is working efficiently.’¹⁸ Even Saddam Hussein acknowledged its effectiveness as according to those who interrogated him after his captivity in 2003 ‘Hussein stated that the UN weapons inspections had achieved its objectives of disposing Iraq of its WMD. Iraq does not have WMD and not for some time.’¹⁹

In the aftermath of the 2003 Iraq war and the occupation of Iraq by the US-led coalition, the Iraq Survey Group (ISG) was established by the Director of Central Intelligence as a fact-finding mission to collect information on WMD activities in Iraq. In the 2004 Comprehensive Report of the Special Advisor on Iraq’s WMD programmes (Duelfer Report), the ISG noted ‘that Iraq’s actions between 1991 and 1996 demonstrated that Iraq intended to preserve its BW capability and return to a steady, methodical progress toward a mature BW program when and if the opportunity arose.’ The ISG assessed that ‘a BW capability is technically the easiest WMD to attain and that after 1996 Iraq still had a significant dual-use capability—some declared—readily useful for BW if the regime chose to use it to pursue a BW programme.’ The ISG concluded that ‘UN monitoring of dual-use facilities up to the end of 1998, made their use for clandestine purpose complicated and risk laden.’²⁰

Expert post-factum assessments of the effectiveness of UNSCOM biological monitoring experience were also favourable. For example, in his book ‘The Search for Iraq’s Weapons of Mass Destruction, Inspection, Verification and Non-Proliferation’, Graham

Pearson, former Head of the Chemical and Biological Defence Establishment at Porton Down, UK, concluded that ‘the ongoing monitoring and verification regime devised by UNSCOM including the export/import mechanism were shown to be effective in implementing the Security Council decision that Iraq ‘unconditionally undertake not to use, develop, construct or re-acquire any of the items specified’ which, regarding CBW, were specified as being ‘all CBW and all stocks of agents and all related subsystems and components and all research, development, support and manufacturing facilities.’ Pearson even went further asserting that ‘Whilst the United States has suggested that the Biological and Toxin Weapons Convention cannot be verified and that the sort of regime that works for chemical weapons under the CWC is inappropriate for BW, there is no evidence to support this from the work of UNSCOM in Iraq.’²¹

In its 1998 fact sheet, SIPRI came to a similar positive conclusion that ‘the world, and particularly the UN, has learned a great deal about how to set up and run an effective intrusive inspection and monitoring regime...’²²

From 1995 to 1998, UNSCOM established and operated an effective biological monitoring system that deterred Iraq from re-starting proscribed activities. Although it was the first one ever, UNSCOM succeeded in achieving the objectives of its monitoring mandate as no evidence has ever been uncovered of any prohibited biological activity in Iraq during the period of monitoring.

UNSCOM/UNMOVIC had extensive inspection rights granted by the Security Council which allowed for the application of a broad set of tools thus laying the foundation for credible compliance assessments and reporting as well as for the overall effectiveness of biological monitoring. UNSCOM’s formula to focus its monitoring on the most important facilities, equipment and technologies through the ‘checkpoint’ concept together with its ‘deviation detection’ approach proved to be a valuable blueprint to efficiently manage the whole range of biological monitoring issues.

The monitoring and verification experience in Iraq illustrates that in-country verification, especially through on-site inspections could generate more timely and more accurate information than from any other source and could also serve as the strongest deterrent to proscribed activities. Unannounced on-site inspections by knowledgeable inspectors were the most powerful tool that was greatly reinforced by the deployment of resident teams inside Iraq. Such inspections credibly increased the probability of timely detection of proscribed activities at any site in Iraq. The success was ultimately due to the commitment, knowledge, skills and dedication of the people who carried out inspection and monitoring activities.

Way forward

Disarmament and monitoring in Iraq succeeded in achieving their objectives as they were set up and implemented under a stringent verification regime imposed and backed by the Security Council. In this single country case, it demonstrated that on-going biological monitoring could be a strong deterrent to proscribed activities. If in the future, the Security Council considers a similar regime, the experience from biological monitoring in Iraq can provide good guidance. However, in a multilateral treaty-based setting this specific experience cannot be used as a blueprint for disarmament and monitoring implementation measures globally.

The BTWC Protocol negotiations also revealed that simply mirroring the CWC pattern did not present a workable approach for the BTWC future. The CWC is a so-called disarmament treaty whose primary focus is essentially the destruction of declared chemical weapons stockpiles and production facilities under international verification. The strongest CWC verification tool of non-compliance, the challenge inspection, has never been used. Industry monitoring under the CWC relies on declarations and infrequent on-site inspections to declared facilities. The states parties, with input from the OPCW Scientific Advisory Board, are continuously assessing how to improve the industry verification regime.

Thus, neither the BTWC Protocol approach nor UNSCOM's practical monitoring experience offers clear-cut ways forward towards strengthening the BTWC. Against this background, an innovative approach to reach this objective is suggested. It would require a substantive shift of focus from routine monitoring of declared facilities and activities to building a multitool and multifaceted mechanism to address non-compliance concerns. I outlined the idea first in an article published in the *Non-Proliferation Review* in February 2021.²³

It is suggested that the BTWC states parties develop measures and procedures to use, individually or collectively, in case of specific non-compliance complaints. Proposed measures would not be legally-binding or encoded in a legal instrument and instead they would be compiled into a "catalogue of cases" with a related "menu of options" supported by a relevant "toolbox." This suggested roadmap of actions will be available in the event a non-compliance case is brought by a state party in the future.

Based on the general prohibitions of the BTWC not to develop, produce, stockpile, or otherwise acquire or retain prohibited biological agents/toxins and weapons/delivery means, possible categories of activities violating these prohibitions could be identified. They could include, for example, development of agents for weaponization, BW munition tests, experimental or mass production of BW agents; storage and deployment of biological and toxin weapons etc. Using historical examples and experts' assessments, specific possible cases of compliance concerns could be further identified under each category.

For example, alleged BW use in local conflicts, in urban environment, criminal use; non-endemic or unusual outbreaks of disease, bioagent release from a laboratory or industrial facility; specific features of an ammunition storage facility etc. For each possible scenario under specific categories and cases, several paths to resolve each could be thoroughly examined to design appropriate effective means to address and resolve each of them. To consider various specificities of each anticipated non-compliance category or case alternative options could be presented and evaluated.

While designing the different procedures, and identifying the various categories and cases, a variety of resources and options can be raised and discussed to resolve specific non-compliance concerns. Among states parties, these might include bilateral and plurilateral consultations, expert discussions and panels, visits or even inspections upon invitation. Beyond intergovernmental interactions or any other possible future BTWC capabilities, involvement of other actors could be suggested in specific cases. These are for example international bodies (e.g. the World Health Organisation or the World Organisation for Animal Health), non-governmental entities, international expert groups, industry associations and academia.

This ongoing process would yield the “menu of options” for states parties to choose from and decide what they would accept in a real-life event to address and resolve a non-compliance concern. This “menu of options” would also incorporate a variety of tools to be used to achieve desired objectives including, as required, inspection/investigation activities. The “toolbox” could contain, depending on the circumstances, an outline of mandate requirements, terms of on-site activities, timing and extent of such activity, inspection equipment to be used, opportunities and methods of sampling, interview modalities, requirements for access to documents, a team’s composition and expertise, reporting requirements and regulations etc.

Throughout this development process, it would be important to practically test the procedures and tools under consideration to assess their applicability and effectiveness. States parties could conduct national, bilateral and multilateral tabletop and field exercises, share their experiences and observations so as to contribute to ongoing refinement of parts of the “menu of options” and the “toolbox.” States parties could also launch training courses for technical experts or diplomatic staff to be involved in addressing non-compliance events. They should be encouraged to organize and conduct such training not only nationally but also on regional and international levels and involve multiple relevant actors. Such ongoing joint or parallel trial and training activities would also contribute to increased interaction and dialogue between states parties at various levels of their respective bureaucracies and entities responsible or involved in the implementation of the BTWC.

The existing BTWC Confidence Building Measures (CBM) regime could also be re-focused to support this newly proposed process. National CBM submissions could be

adjusted to focus on information that a state party is willing to disclose voluntarily and preemptively to avert misinterpretation and possible concerns. This could, for example, include disclosures of specific past or ongoing “borderline” projects for BW defense or sensitive dual-use activities such as “gain-of-function” research. States parties could make voluntary presentations of their CBM reports through appropriate channels and at interactive expert forums where participants would have the opportunity to seek and receive additional clarifications. In the pursuit of enhanced transparency, confidence-building and demonstrating goodwill, annual national CBM submissions could then incorporate invitations for visits on a bilateral/plurilateral or multilateral basis, offers of training courses, familiarization visits, peer reviews, table-top exercises etc.

The suggested types of engagement would offer multiple opportunities for states parties to continuously work on the identification of possible best remedies for non-compliance issues and prepare for their practical application. Through this ongoing process they would elaborate more purpose-built procedures with a growing number of more effective tools to achieve desired objectives. The process itself would already greatly strengthen the BTWC.

This new platform would enable BTWC states parties to apply any of the suggested procedures and tools at any stage of their development to resolve a specific concern. Any of the parties involved would always have several options and tools at hand to address any case whose exact scope will obviously be known only at the time it is being raised. All this will not preclude states parties to design and apply additional tools or adjust existing ones to accommodate specific circumstances to achieve their objectives.

The new approach would relieve states parties of the burden of prolonged and laborious negotiations, that if successful, may yield only one or two types of legally binding verification procedures which in practice could be ineffective in addressing the whole spectrum of possible future non-compliance concerns. One of UNSCOM’s valuable lessons is that a multitool approach offers far more reliability and credibility in real-life situations than dependency on only a limited number of options, however powerful each of them may have been perceived during the negotiation stage as it happened with “challenge inspections” under the CWC.

The clear advantage of this proposed “way forward” is that every state party, would have full knowledge of the methods, procedures and tools that might be turned to in specific non-compliance cases. Thus, a BTWC strengthened in this way would offer states parties well-considered and even practically tested procedures and tools to address and resolve compliance concerns and alleged treaty violations. This process would be in the letter and spirit of the BTWC Article V under which the states parties have already undertaken to consult one another and to co-operate in solving any problems which may arise in relation to the objective of, or in the application of the provisions of, the Convention.

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