



REPORT

# The Focus and Function of BWC Verification

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# The Focus and Function of BWC Verification

At the Biological Weapons Convention (BWC) Ninth Review Conference in 2022, States Parties agreed to establish a new Working Group on the strengthening of the Convention, which will operate during the current intersessional period. The agenda for the Working Group includes discussion on, among other things, compliance and verification. This is the first time in 20 years that verification has explicitly been added to the BWC agenda, initiating a new process that opens a window of opportunity for States to advance work around verification and compliance.

The first three days of compliance and verification debate in December 2023 were productive, but many States Parties seemed still to be in the “early stages of conceptual thinking” regarding BWC verification,<sup>1</sup> with differing views on its focus and function among other things. For meaningful progress to be made towards developing an appropriate mechanism that accommodates the interests of all BWC States Parties, they will require a shared conceptual understanding of verification’s scope and purpose in the context of the BWC.

This report provides conceptual insights on verification ahead of the BWC Working Group meetings in December 2024. It presents the perspectives of four experts—Dr. Ajey Lele (India), Dr. Jeremy Littlewood (Canada), Dr. Anastasia Malygina (Russian Federation), and Mr. Matthew Shearer (United States)—each of whom was invited to respond to three key questions: What do you understand by the term BWC verification? What is the purpose of BWC verification? And what do we want to verify? This report reflects the views of the respective expert and is intended to provide food for thought on the focus and function of BWC verification.

Experts’ views on the **concept of BWC verification** vary. Malygina views BWC verification as “a set of methods, tools, and procedures that have been agreed upon by consensus and are used to verify compliance of States with their obligations under the BWC” and makes a distinction between verification mechanisms and enhanced transparency measures. Lele draws from recent discussion in the context of other regimes to define BWC verification as a process collectively agreed of gathering and analysing information to enable assessment of compliance, adding that this process must not affect peaceful research. Littlewood also recognizes verification as a process; however, he argues verification can be done nationally or regionally and does not have to be reciprocal, non-discriminatory or equitable.

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1 Guthrie. R. 2023, Working Group discussions on compliance and verification. <https://www.cbw-events.org.uk/BWC23-18.pdf>.

From Shearer’s perspective, BWC verification is about ensuring that States Parties are fully and effectively implementing their treaty obligations. Notably, Shearer makes the distinction between verification and ‘compliance assessment’, with the latter focused on determining whether “specific activities are permitted or prohibited”. Moreover, Shearer’s more flexible approach and Littlewood’s suggestion that verification can be a national undertaking perhaps opens up thinking about verification at the national level and as a means for States Parties to demonstrate they are committed to implementing treaty obligations—through a range of resources and tools, some of which may already be in place—in order to provide assurance of adherence to obligations under the BWC.

Lele views the **purpose of verification**, as both ensuring the prohibition put in place by the BWC is respected and deterring biological weapons programmes by seeking to detect covert activities. Malygina is more specific, suggesting that verification serves the purpose of “strengthening the comprehensive norm of prohibition of biological weapons and preventing the re-emergence of such weapons”.

Shearer takes a broad approach, seeing the purpose as to “ensure that States Parties are implementing their treaty obligations appropriately”. In a similar manner, Littlewood suggests that the primary purpose of BWC verification is to support efforts to keep biological and toxin weapons out of the arsenals and war plans of States. However, he identifies a secondary purpose: to provide information that supports an assessment of another State’s implementation of and compliance with its obligations under the BWC with a particular focus on obligations under article IV on the grounds that “how States Parties ensure they have taken the necessary measures and how they provide information to other States Parties to assure them that such measures are implemented, may be the means by which information is provided to support assessments of compliance with all or some of the obligations of the BWC”.

Determining **what to verify** remains challenging—as Shearer notes, there is no ‘typical’ biological weapons programme. Moreover, a knowledge of past programmes will not necessarily inform the future focus of verification mechanisms. Malygina indicates that an offensive programme could be “more compact, mobile and easier to hide compared to what could have been imagined 50 or even 30 years ago”; Lele suggests determining what to verify could become more complicated in the future as biotechnology continues to advance and converge with other technologies. Littlewood suggests that answering the question of what to verify is context specific and will depend on the current and past activity in areas relevant to offensive biological weapons of the State Party in question. He reframes the question around how to verify, arguing that while there could be value to standardized reporting, “one-size-fits-all verification measures or procedures” could be more burdensome than beneficial.





# What do you understand by the term BWC verification?

## Ajey Lele

“Trust, but verify” is a Russian proverb which became famous when the then US President Ronald Reagan (1981–1989) used it in the context of discussions on nuclear disarmament. Drawing from recent conceptual thinking from the realm of nuclear weapons, specifically the work of the Group of Governmental Experts to further consider nuclear disarmament verification issues, verification of the BWC can be seen as a process driven by BWC states parties of gathering and analysing information, based on agreed technologies, methodologies and procedures, to enable assessment of compliance with relevant BWC obligations with the overarching goal of achieving and maintaining a world free of biological weapons.<sup>2</sup> Three further points are important to understand in relation to BWC verification. First, it is important to ensure that any verification mechanism is collectively agreed through a multilateral process and applied consistently across all BWC States Parties. Second, any such mechanism must be careful not affect a State’s ability to undertake legitimate biological research for “prophylactic, protective or other peaceful purposes” [article I]. Third, any mechanism must protect legitimate national security and commercial interests.

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<sup>2</sup> Paraphrased from the final report of the Group of Governmental Experts to further consider nuclear disarmament verification issues. UN. 2023. Final report of the Group of Governmental Experts to further consider nuclear disarmament verification issues. 23 June 2023, A/78/120. Paragraph 17.

## Jeremy Littlewood

BWC verification is a structured process that collects, analyses and uses information from a range of sources to make an assessment of a State Party's implementation of and compliance with its obligations under the Convention. The process may focus on one, a few, most or all obligations under the Convention: in reality, given some articles are administrative, verification can be limited to some articles and obligations of the BWC. Verification is a process: it may also be a national undertaking, a regional or like-minded approach, or an agreed set of rules, procedures and practices accepted by all States Parties to the BWC. It does not have to be reciprocal, non-discriminatory or equitable since the structured process to assess implementation and compliance of one State Party may not be the same process for another State Party. The scope and scale of activity differs widely across States Parties and while the tools or mechanisms used in any verification process may be the same or similar, how these tools or mechanisms are deployed and the extent to which they are used will differ depending on the situation—routine assessments of a State Party that has never had an offensive biological weapons programme will differ to special assessments of a State Party that is alleged to have used a biological or toxin weapon.

## Anastasia Malygina

The term 'BWC verification' refers to a set of methods, tools, and procedures that have been agreed upon by consensus and are used to verify compliance of States with their obligations under the BWC. Verification should be based on principles of reciprocity, impartiality, and objectivity, and it is important to recognize the distinction between verification mechanisms and enhanced transparency measures. While enhanced transparency may involve voluntary submission of declarations and notifications, verification requires mandatory, systematic, comprehensive, and consistent reporting. Typically, an essential part of the verification process involves checking the accuracy and completeness of information provided in national declarations. Therefore, developing a comprehensive and effective verification mechanism requires strengthening corresponding supervisory, control, and accounting capabilities at the national level. Verification needs to be credible, sufficient, and non-discriminatory. It also needs to be suitable and appropriate in terms of protecting national security and commercial proprietary information. Verification should not lead to any abuse. Verification is an important, but not the only, element in the compliance management machinery of the BWC regime.

# Matthew P. Shearer

Fundamental disagreements regarding the nature, purpose, and scope of verification—e.g., increased transparency versus concrete evidence of compliance, disarmament and non-proliferation obligations versus all obligations—have thwarted more than a quarter century of efforts to establish a protocol to the BWC, as well as an associated verification regime and institutional support. The nature of verification should, first and foremost, be rooted in identifying or providing objective evidence to establish truth or validity. Importantly, verification does not need to provide or assess evidence of compliance for all biological activities, facilities, programmes, and capabilities, but it should be based on that traditional definition of the term. If there is not something specific and concrete to verify, we need to use a different word.

Second, in the context of the BWC, the underlying purpose of verification should be ensuring that States Parties are fully and effectively implementing their treaty obligations. Crucially, this is distinct from compliance assessment, which should aim to determine the nature of biological activities, specifically relative to prohibitions established in the treaty—i.e., permitted versus prohibited activities. There are numerous ways to apply verification to the BWC—including to promote and build assurance in treaty compliance—which provides flexibility in how States Parties implement this concept. And finally, the scope of verification should apply broadly across all BWC obligations. Again, this contrasts with compliance assessment, which should be more narrowly focused on determining whether specific activities are permitted or prohibited, specifically in the context of those obligations most closely aligned with disarmament and non-proliferation (e.g., under articles I–III).



# What is the purpose of BWC verification?

## Ajey Lele

The basic purpose of BWC verification is to ensure that the prohibition put in place by the BWC is respected and build trust among the BWC States Parties. A verification mechanism should aim to detect the possibility of any covert activities conducted by State and/or non-State actors, which could lead to the development of biological weapons. In this regard, an effective verification mechanism should also serve the purpose of deterring potential bio weaponeers.

BWC verification is however difficult because of the dual-use nature of biosciences and biotechnology. Strict monitoring and regulatory measures at the national level may be required to ensure that research undertaken by organizations and other agencies, including industry, is not progressing towards weaponizing the biological agents. But verification should also serve the larger aim of promoting the peaceful use of biological science by providing States greater confidence that the biological sciences are not being misused for hostile purpose.

## Jeremy Littlewood

The basic purpose of BWC verification is to support efforts to keep biological and toxin weapons out of the arsenals and war plans of States that are party to the Convention. The BWC is, above all else, a disarmament agreement. In that regard, the primary purpose of verification of the BWC should focus on the most difficult aspects: have biological or toxin weapons been used and what types and quantities of biological and/or toxin weapons have been used? If States Parties understand that use of such weapons will be detected and confirmed (verified) the barriers to biological weapons have been elevated. Since use, or alleged use, of biological or toxin weapons is rare, the secondary purpose of BWC verification is to provide information that supports an assessment of another State's implementation of and compliance with its obligations under the BWC. The foundation of any structured process that collects, analyses and uses information is the determination of the existence or absence of "any necessary measures to prohibit and prevent the development, production, stockpiling, acquisition or retention" of biological and toxin weapons that each State Party is required to take under article IV of the Convention. Implementation of article IV allows a State Party to ensure it has taken the necessary measures to fulfil its obligations and assure others of its implementation and compliance. How States Parties ensure they have taken the necessary measures and how they provide information to other States Parties to assure them that such measures are implemented, may be the means by which information is provided to support assessments of compliance with all or some of the obligations of the BWC.

## Anastasia Malygina

The purpose of BWC verification is to facilitate the achievement of steady and irreversible progress towards general and complete disarmament, under strict and effective international control, through strengthening the comprehensive norm of prohibiting biological weapons and preventing the re-emergence of such weapons. In 1992, the States Parties to the BWC expressed their expectation that effective verification would reinforce the Convention and stimulate the improvement of its implementation. The spectrum of verification methods and procedures ranges from inspections and audits for checking correctness and completeness of submitted declarations to investigation of possible violations of the international norm on the prohibition of biological weapons. All in all, the purposes of verification are to ensure that compliance with the BWC remains consistent and coherent, and to minimize the risks of compliance with the BWC falling short of scientific and political realities.

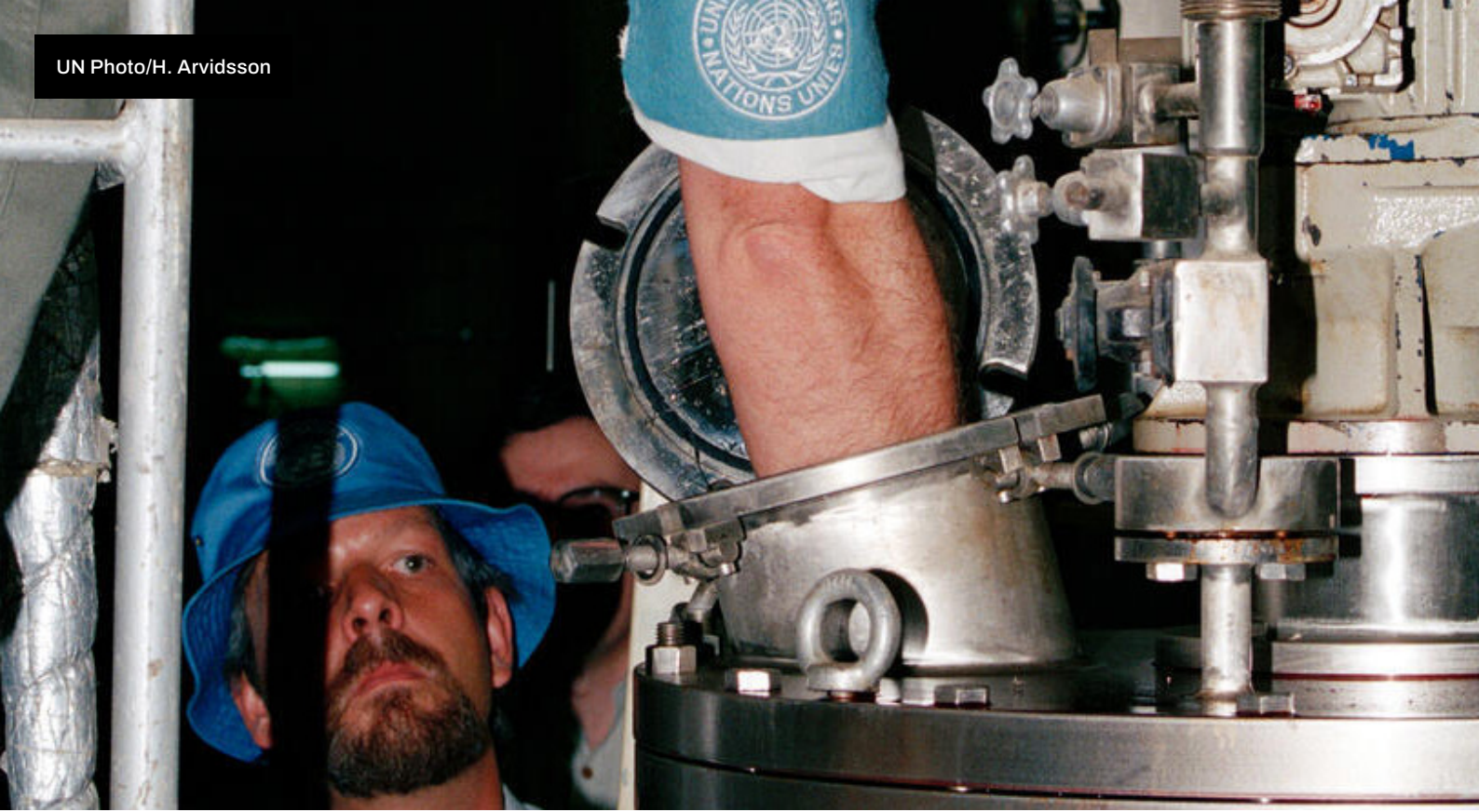
Verification is expected to strengthen accountability, transparency, and assurance about compliance with legally binding obligations under the BWC. Verification conducted by an impartial, objective, and independent authority should build trust among the State Parties. Among other things, verification will stimulate the reviewing and improvement of national export control policies and mechanisms as well as other elements of national implementation of articles I–IV of the BWC. The implementation of verification procedures can help to identify gaps in the national legislation of States Parties and weaknesses in the compliance management system of the BWC regime. Identifying these problems will encourage the search for solutions to strengthen the BWC. Given the rapid development of technology in the life sciences and related fields, it is necessary to revise a number of key provisions to be included in a legally binding protocol to codify measures for verifying compliance with the BWC, including terminology, lists of biological agents and toxins, thresholds for biological materials, criteria for including them on the lists, methods for creating lists of equipment, as well as methods of conducting inspections and investigations of alleged violations of the BWC obligations. Introducing a full-fledged verification system in the BWC regime will prompt institutional strengthening of the Convention and make the realization of science and technology review and confidence-building measures more meaningful. All this together will make the BWC regime more robust and effective.

## Matthew P. Shearer

First, and perhaps most importantly, verification and compliance assessment should be separate and distinct concepts, each with their own unique purpose and scope. If compliance assessment focuses on determining the nature of biological activities, the argument that it is impossible to cover *all* biological activities does appear valid. There is simply too much biology going on around the world, both under and outside of government control, to adequately assess *everything*, so it is not practicable to ‘verify compliance’. Even if the scope were limited to some subset of advanced biology, it would likely still not be feasible. Similar treaties, such as the Chemical Weapons Convention and the Nuclear Non-Proliferation Treaty, do not apply this kind of comprehensive standard to verification

or compliance assessment, so why should the BWC be any different? Since it is not possible to evaluate the whole of a State Party's biological activities, taking a narrower scope and focusing on individual biological activities, facilities, programmes, or capabilities could make BWC compliance assessment a more concrete and manageable task.

Verification should apply broadly to all BWC obligations, not only to disarmament and non-proliferation obligations, but also to obligations and agreements related to national implementation; international cooperation and assistance; assistance, preparedness, and response; assessed financial contributions; declarations or other required reporting; inspections or site visits; and others that would ultimately be included in a treaty protocol. We cannot possibly *eliminate* the risk of biological weapons (e.g., by definitively determining that *all* activities are peaceful), but we can *mitigate* those risks. One way to accomplish this is to ensure that States Parties are implementing their treaty obligations appropriately, which should be the purpose of verification. If a verification regime could demonstrate that States Parties (1) are committed to implementing their treaty obligations and (2) have the ability to do so, that could provide a degree of assurance—or confidence or certainty—that their biological activities are in compliance with treaty principles and prohibitions. Perhaps it is not possible to achieve a *sufficient* degree of assurance—i.e., States Parties will never be *confident enough* in each other's compliance—but this approach could strike a desirable balance between increased confidence and the effort, resources, and capabilities required to achieve it.



# What do we want to verify?

## Ajey Lele

Determining what to verify is a technical, challenging subject. Biological weapons can take many different forms and biological weapons programmes can have different footprints, including footprints that will not necessarily resemble other WMD programmes, such as nuclear weapons programs. Moreover, such programmes could theoretically be buried in a wide range of laboratories (both State-run and private) and research entities. It is therefore difficult to visualize exactly what the modern bioweapons programme would look like and correspondingly it is not always clear what to look for and how we should focus any verification-related mechanism. This could get more difficult in the future as biotechnology continues to advance and converge with other arenas of technologies such as cyber, AI, additive manufacturing, nano technologies, etc. Some of these technologies could be integrated into the biological sciences to develop modern-day bio-weapons.

Because of these difficulties, the BWC will likely need to involve looking at activities in State-run and private laboratories and production facilities, and monitor the activities related to the entire supply chain. The existing CBMs or some form of declaration could help to focus verification, as could an assessment of various regulatory frameworks related to biosafety and biosecurity (including laboratory biosafety and biosecurity). However, for the purpose of verification, both intent and capabilities of the actors need to be analysed before deriving any inference.

## Jeremy Littlewood

What we want to verify depends on the situation. The ability to verify if biological or toxin weapons have been used is the most important issue, even though use of such weapons by States is rare. This means what we want to be able to verify is something that has rarely occurred in practice; but is nevertheless imperative that we do so. If we accept that the barriers to biological weapons have lowered between 1975 and today, and will continue to be lowered in the future, the ability to detect and verify alleged use, or confirm use did not occur, is the priority for any verification.

The ability to verify if a State is developing, producing, stockpiling, acquiring or retaining biological or toxin weapons is desirable, but difficult. No State openly admits to having an offensive biological weapons programme and most States have no history of an offensive biological weapons programme. In addition, the various allegations of offensive biological weapons activity impact less than 10 per cent of the BWC's States Parties. The issue is less of a 'what we want to verify' problem and more of a 'how do we verify' problem that allows for a graduated response depending on circumstances. For most States Parties to the BWC, highly intrusive, standardized, one-size-fits-all verification measures or procedures are more likely to be burdensome than beneficial. This is not to say that there are no measures in place for some or all States Parties: some standardization of information reporting is necessary in any process of verification that a State has accepted. In reality, what we want to verify will be on a scale depending on the State Party's current and past activity in areas that are relevant to an offensive biological weapons programme. As such what we want to verify will differ depending on the situation and how we verify must allow for a flexible and graduated response that is the least intrusive necessary, but permits extremely intrusive, long-standing, and costly mechanisms and procedures to be used if the situation warrants it.

## Anastasia Malygina

Verification procedures could focus on evaluating correctness and completeness of how States report on their compliance with the prohibitive norms of the BWC. It might be reasonable to build into the design of a legally binding verification mechanism an option of staged expansion of the scope and complexity of verification activities. For example, at stage 1, no later than one year after a legally binding verification mechanism is introduced, States Parties will have to submit initial declarations. At stage 2, which starts immediately after stage 1, inspections of certain types of facilities will be conducted. Stage 3 will include comprehensive analysis of the results of the inspections which will yield data for mapping potential risks and biological threats. This will help to clarify the tasks and methods for further inspections. Stage 4, which will start five years after the launch of stage 1, will see the expansion of information included in declarations and an intensification of on-site inspections in terms of their scope and methods. Integrating continuous monitoring instruments and systems into a legally binding verification regime might be a reasonable solution.

Since the BWC entered into force in 1975, there has been significant miniaturization and improvement of laboratories and production equipment. This equipment is now standardized and widely used in educational, research, and industrial settings. There is also concern about the rise of the ‘do-it-yourself’ movement, which involves purchasing decommissioned laboratory equipment and repairing it or creating simpler but functional analogues using artisanal methods. So, a hypothetical offensive biological weapons programme in the current economic and technological environment would be more compact, mobile and easier to hide compared to what could have been imagined 50 or even 30 years ago. Due to the growing availability and affordability of relevant biological materials, methods, and technologies, there is an acute threat of non-State actors developing and using biological agents or toxins in a hostile manner against human beings, agriculture, livestock, and/or the environment. At the same time, the development, production, storage and handling of hazardous biological agents and toxins still require specific protection measures for personnel involved in such activities. Therefore, a possible indicator of the suspicious nature of the work performed could be the features of the technological solutions for engineering communications in laboratories and other facilities, as well as the range, technical specifications, and volume of protective equipment purchased against harmful factors of a chemical and/or biological nature.

## Matthew P. Shearer

Crucially, there is no prototypical biological weapons programme, no standard model against which biological programmes can be compared to determine whether they are appropriate or not. The form of an offensive biological programme would be driven by countless factors, including its purpose, resources and scale, organization, and technical complexity. Many elements of a biological weapons programme may look essentially identical to legitimate biological research, and the critical determining factor in the context of the BWC is intent—i.e., peaceful versus nefarious. To focus on any specific form in the context of BWC verification risks overlooking those programmes taking different forms. It is simply not practical—or even feasible—to assess compliance across all BWC-related activities, regardless of what a biological weapons programme looks like. But just because we cannot verify compliance, that does not mean that there is *nothing* to verify. Rather, the task becomes identifying alternatives or analogues that *are* verifiable and that help to achieve the same purpose, within the limitations of available resources and technical capabilities.

BWC verification needs something that is verifiable. The obligations, as set out in the treaty text, are not specific or concrete enough to enforce. So what *can* be verified? A treaty protocol is necessary to establish specific activities, documentation, standards, and capacities to convert the treaty text into practice.<sup>3</sup> These standards could provide concrete metrics against which to verify States Parties’ participation in, or implementation of, a specified set of activities, such as national legislation, regulatory and oversight systems, international cooperation and assistance activities, declarations or other reporting, routine inspections, and maintaining good financial standing. States

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3 As well as institutional support, resources, and other capacities and processes necessary for the functioning of the treaty.



Parties could provide concrete evidence that they are effectively implementing the designated activities, programmes, and other provisions outlined in a treaty protocol, which would serve as a proxy or analogue to compliance, by collectively demonstrating their commitment and capacity to implement their treaty obligations. Meeting a protocol's standards would demonstrate full and effective implementation of treaty obligations and, in conjunction with the associated increase in transparency, increase confidence in the compliance of States Parties' biological activities, facilities, programmes, and capacities. The resulting trust and confidence would facilitate an environment in which States Parties can leverage biology to the fullest extent for peaceful purposes, which is a core aim of the BWC.

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