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CTBT: SCIENCE AND TECHNOLOGY CONFERENCE

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A Comparison of Portioning Samples under the CTBT, the OPCW, and the IAEA

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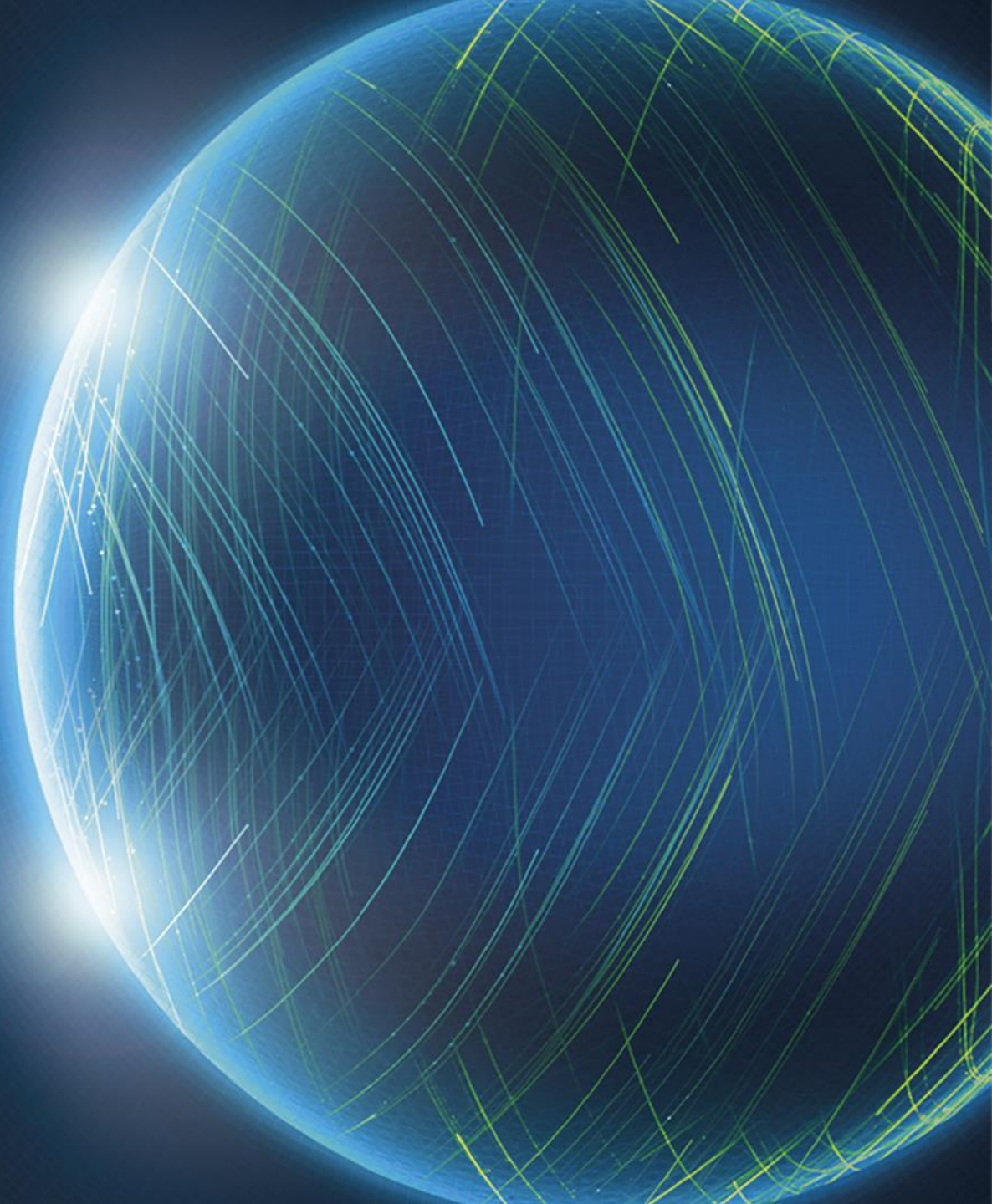


Comprehensive Nuclear-Test-Ban Treaty

From the Treaty (Protocol, Part II, para. 99):

The inspected State Party shall have the right to retain portions of all samples collected when these samples are analysed and may take duplicate samples.

Working Group B (WGB) On-Site Inspection (OSI) Manual Sessions have struggled to reach a common understanding of how to implement this:

-What does “portion…when analysed” mean? Before, After, During?
-Can the portioning occur significantly before the hand over to the Inspected State Party (ISP), such as in the field?
-What is the role of the duplicate samples vs. the portioned samples?

Chemical Weapons Convention

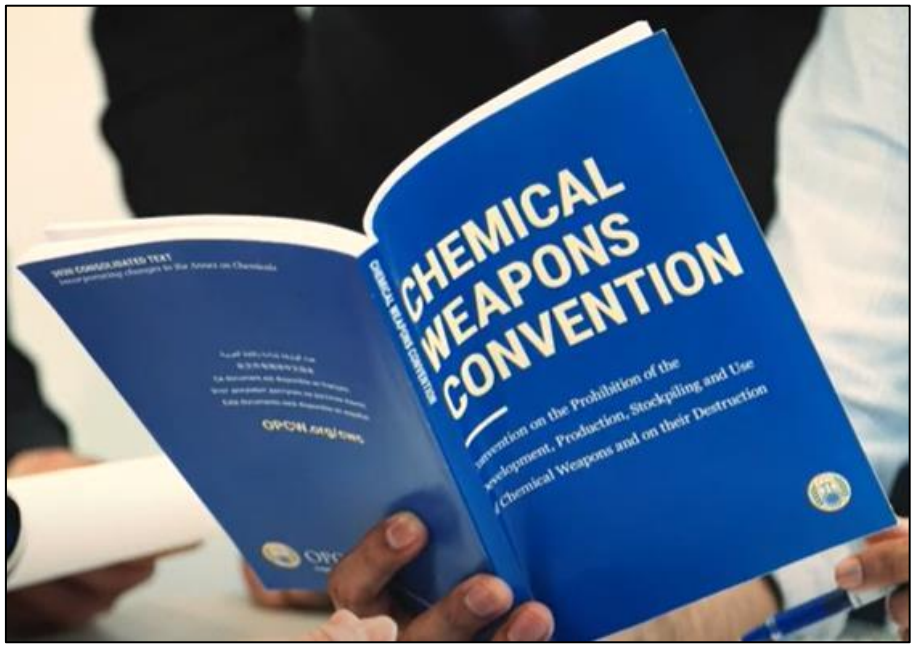
-Like the CTBT, the CWC involves inspections and taking samples

-CWC was negotiated and drafted just a few years prior to CTBT, involving many of the same diplomatic negotiators

-CTBT's language on sampling appears to be inspired by CWC's

CWC Verification Annex Part II, para. 54:

The inspected State Party has the right to retain portions of all samples taken or take duplicate samples and be present when samples are analysed on-site



CTBT vs. CWC

CTBT:

The inspected State Party shall have the right to retain portions of all samples collected when these samples are analysed and may take duplicate samples.

CWC:

The inspected State Party has the right to retain portions of all samples taken or take duplicate samples and be present when samples are analysed on-site

Two key differences:
-CWC uses “or” between portions and duplicates, CTBT uses “and”
-”when samples analysed” clause is in different location, and does not affect portioning in CWC text

Has a quick, bad transcription from CWC to CTBT led to a lengthy issue for WGB to work through?

Inspections by the Organisation for the Prohibition of Chemical Weapons (OPCW)

OPCW implements the CWC

But first a word about types of OPCW inspections….

- *routine inspections* of CW-related facilities and “dual-use” industrial facilities
- *challenge inspections* called on short notice in one State Party due to concerns by another
- *investigations of alleged use (IAU)*

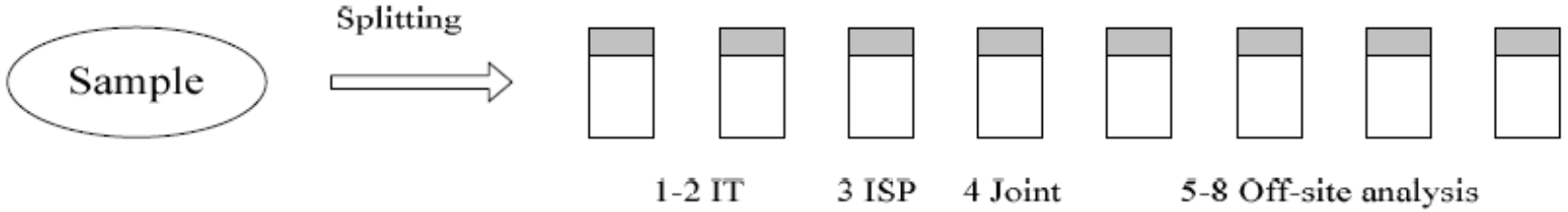
The latter two, are much like a CTBT OSI in that there is a Requesting State Party, and Executive Council vote, quick launch to a Point of Entry, inspection area boundaries, and time limits, etc.

Neither have ever been requested. Instead investigations in Syria were under new mechanisms called Declaration Assessment Teams and Fact-Finding Missions.

Sample “splitting” by the OPCW during Routine Inspections

Samples (solid, aqueous, material extracted from wipes) are split on site into eight portions

- 2 are for on site analysis by the Inspection Team
- 1 is chosen by the ISP for retention
- ISP may request to retain 1 portion under joint custody at site
- Remaining 4-5 are for off-site analysis if it occurs



Sample “splitting” by the OPCW

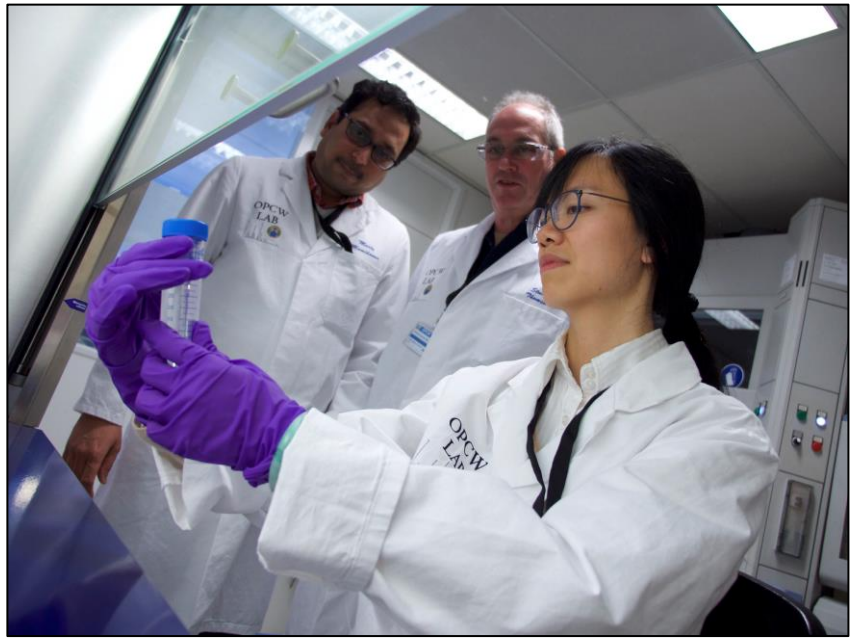
-Chemical degradation is problematic so reproducibility of analyses performed at different times is a big problem

-Routine industrial inspections rarely involve samples & analysis and then are *always* done on site

-Chemical weapons destruction samples have been analysed on-site by ISP under OPCW observation

-The “non-routine” inspections in Syria have resulted in samples that were not split but instead just brought back to the OPCW to further split them and send them to multiple labs that are part of international network.

-Duplicate samples were sometimes taken by the ISP in Syria



Inspections by the IAEA

IAEA on-site inspections under comprehensive safeguards agreements (CSA)

- ***Ad-hoc inspections:*** to verify a State's initial report of nuclear material, and changes including nuclear materials involved in international transfers,
- ***Routine inspections:*** carried out within nuclear facilities, other locations holding nuclear materials or through which nuclear materials are expected to flow,
- ***Special inspections:*** made if information by a State and obtained from routine inspections are not adequate under the safeguards agreement *(e.g. Complementary Access)*.

Sample portioning by the IAEA

Safeguards measures include bulk nuclear material samples to verify the ***correctness*** and environmental samples to verify the ***completeness*** of a State's declarations.

- A nuclear material bulk sample involves a single sample packaged by the State for the IAEA. Any portioning is done in Seibersdorf by the IAEA to allow for multiple analyses and retention of portion until verification is confirmed.

- Environmental sampling (at a facility) involves taking swipe samples 90% of the time, plus occasional solid, water, etc. samples. Archived samples are kept indefinitely by the IAEA.

Sample portioning by the IAEA

A standard swipe sampling kit comprises 6 swipes

- at least 4 must be returned to the IAEA
- 1 may be left with the facility operator

Notes:
- IAEA does not split swipes due to time and contamination concerns and has found taking multiple replicates at the same point or in the same general area to be adequate
- The IAEA does not leave samples under “joint custody” but does sometimes leave samples that cannot be hand-carried under seal (ex.: hot cell sample) until a carrier picks them up
- The view is a State can always take a duplicate sample.

Standard ES Kit

Observation from other Treaties

-Portioning for the ISP in other Treaties is done at or soon after collection, before IT analysis
-The IAEA accomplishes portioning for the ISP by taking multiple similar samples, while the OPCW does perform actual “splitting”
-The ability of the ISP to take duplicate samples is understood
-Other Treaties have established practices for keeping sample portions under joint custody or seal in the ISP