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Letter dated 27 February 2024 from the Secretary-General addressed to the President of the Security Council

I have the honour to transmit herewith the report entitled "Fourth report by the OPCW Investigation and Identification Team pursuant to paragraph 10 of decision C-SS-4/DEC.3, 'Addressing the threat from chemical weapons use': Marea (Syrian Arab Republic) – 1 September 2015" (see annex).

The issue of the use of chemical weapons in the Syrian Arab Republic is one of which the Security Council has been seized since 2013. As any use of chemical weapons poses a serious threat to international peace and security, I believe that it is appropriate for the report to be shared with the members of the Council, as was the case with the first report, which was shared on 15 April 2020; the second report, on 14 April 2021; and the third report, on 1 February 2023.

The fourth annex to the report, entitled "Redacted paragraphs", has been classified as "OPCW highly protected". Consistent with the Agreement concerning the Relationship between the United Nations and the Organisation for the Prohibition of Chemical Weapons, the Director General has requested the United Nations to ensure appropriate protection in respect of such confidential information. Consequently, in the coming days, individual copies of the annex will be circulated to all members of the Security Council by the Security Council Affairs Division of the Department of Political and Peacebuilding Affairs.

I would be grateful if you could bring this matter to the attention of the members of the Security Council.

(*Signed*) António **Guterres**

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Annex

[Original: Arabic, Chinese, English, French, Russian and Spanish]

I have the honour to provide to you, for your perusal, the report entitled “Fourth report by the OPCW Investigation and Identification Team pursuant to paragraph 10 of decision C-SS-4/DEC.3, ‘Addressing the threat from chemical weapons use’: Marea (Syrian Arab Republic) – 1 September 2015” (see enclosure).

The report is the fourth one and is regarding the sixth incident investigated by the Investigation and Identification Team. It was prepared in accordance with paragraph 10 of decision C-SS-4/DEC.3, dated 27 June 2018, which was adopted by the Conference of the States Parties. Consistent with paragraph 10 of this decision, the report has already been provided to the Executive Council of the Organisation for the Prohibition of Chemical Weapons (OPCW) for its consideration.

I also wish to inform you that some of the annexes to the report contain confidential information classified as “OPCW highly protected” and will be provided to you through the appropriate means.

Consistent with the Agreement concerning the Relationship between the United Nations and the Organisation for the Prohibition of Chemical Weapons, I would kindly ask that the United Nations ensure the appropriate protection in respect of such confidential information, in accordance with its constituent instrument and policies on confidentiality.

Also in line with decision C-SS-4/DEC.3 dated 27 June 2018, I would kindly request you to ensure that the documents are provided to the Security Council, for the consideration of its members, as documents of the Council.

(*Signed*) Fernando **Arias**
Director General of OPCW

Enclosure

[Original: Arabic, Chinese, English, French, Russian and Spanish]

Note by the Technical Secretariat of the Organisation for the Prohibition of Chemical Weapons

Fourth report by the OPCW Investigation and Identification Team pursuant to paragraph 10 of decision C-SS-4/DEC.3, “Addressing the threat from chemical weapons use”: Marea (Syrian Arab Republic) – 1 September 2015

EXECUTIVE SUMMARY

1. The Director-General of the OPCW Technical Secretariat established the Investigation and Identification Team (IIT) pursuant to the decision by the Conference of the States Parties entitled "Addressing the Threat from Chemical Weapons Use" (C-SS-4/DEC.3, dated 27 June 2018). The IIT began its work in June 2019, focusing on certain incidents for which the OPCW Fact-Finding Mission in Syria (FFM) had determined that use or likely use of chemical weapons on the territory of the Syrian Arab Republic occurred and for which the OPCW-United Nations Joint Investigative Mechanism had not reached a final conclusion.

2. The IIT is not a judicial body with the authority to assign individual criminal responsibility, nor does the IIT have the authority to make final findings of non-compliance with the Convention. The mandate of the IIT is to establish the facts.

3. This fourth report of the IIT sets out the findings of the investigation conducted in the period between January 2023 and February 2024, focusing on the incident in Marea (Aleppo Governorate), the Syrian Arab Republic, on 1 September 2015. On the basis of all the information obtained and its analysis, the IIT concludes that there are reasonable grounds to believe that, on 1 September 2015, between 09:00 and 12:00 (UTC+3), during sustained attacks aimed at capturing the town of Marea, units of the Islamic State in Iraq and the Levant (ISIL) deployed sulfur mustard, using one or more artillery guns.

4. The IIT identified several impact locations across the town of Marea, with no discernible targeting pattern. All of the remnants and munitions observed at these sites were conventional artillery projectiles, of a 122-mm calibre, modified to disperse a liquid payload. Upon impact, at least six projectiles leaked a black, viscous substance with a "pungent" and "garlic-like" smell. At least 11 named individuals who came into contact with the liquid substance experienced symptoms consistent with exposure to sulfur mustard.

5. The IIT established that the chemical payload was deployed by artillery from areas under the control of ISIL, and that no entity other than ISIL possessed the means, motives, and capabilities to deploy sulfur mustard as part of an attack in Marea on 1 September 2015.

6. The IIT reached its conclusions on the basis of the degree of certainty of "reasonable grounds", which is the standard of proof consistently adopted by international fact-finding bodies and commissions of inquiry. In reaching its conclusions, the IIT carefully assessed the information obtained from the FFM, States Parties, and other entities, coupled with interviews conducted by the IIT and analyses of samples, computer modelling, satellite imagery, front-line maps, authenticated videos and photographs, primary documentation, as well as advice from experts, specialists, and forensic institutes, together with other relevant materials and sources. The IIT reviewed 20,492 files, amounting to 1 terabyte, obtained and assessed 29 witness statements, and considered data related to 30 samples. The IIT assessed this information holistically, scrutinising carefully its probative value through a widely shared methodology in compliance with best practices of international fact-finding bodies and commissions of inquiry. In so doing, the IIT adhered to applicable OPCW procedures, including with respect to chain of custody, supplemented as appropriate. The conclusions in this report are based on the combination, consistency, and corroboration of all of the information gathered as a whole.

7. The IIT is grateful for the ample support received during its investigation from States Parties, other entities, and individuals.

8. The IIT welcomes a note verbale from the Syrian Arab Republic (dated 11 December 2023) in response to a request for information relevant to the incident from the Technical Secretariat. However, the IIT regrets that no answers to the specific queries it raised were provided in the note verbale. The IIT further regrets that an earlier request for cooperation under Article VII of the Convention, addressed to the Syrian Arab Republic on 14 February 2023, remained unanswered.

9. The IIT was nevertheless able to proceed in its investigation and reach its findings based on all the information available to it, and in accordance with its standard of proof.

10. Decision C-SS-4/DEC.3 by the Conference of the States Parties requires the Technical Secretariat to provide the reports on the IIT investigations to the OPCW Executive Council and to the United Nations Secretary-General for their consideration, and to preserve and provide information to the mechanism established by the United Nations General Assembly in resolution 71/248 (2016), as well as to any relevant investigatory entities established under the auspices of the United Nations.

11. Accordingly, the IIT has endeavoured to compile this report and its related records and findings in a manner suitable for future use by these bodies. This also means that the IIT has carefully considered, in reaching its conclusions, that the information used in this report may be assessed and used by other such bodies in the future.

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I. MANDATE

1. ESTABLISHMENT OF THE INVESTIGATION AND IDENTIFICATION TEAM

1.1 This report is submitted pursuant to paragraph 10 of the decision adopted by the Conference of the States Parties (the Conference) at its Fourth Special Session entitled "Addressing the Threat from Chemical Weapons Use" (C-SS-4/DEC.3, dated 27 June 2018), and covers investigations conducted by the Investigation and Identification Team (IIT) in the period from January 2023 to February 2024.

1.2 In decision C-SS-4/DEC.3, the Conference recalled its own responsibility under paragraph 20 of Article VIII of the Chemical Weapons Convention (the Convention) to oversee its implementation, to act in order to promote its object and purpose, and to review compliance with it.[1]

1.3 In paragraph 10 of decision C-SS-4/DEC.3, the Conference specifically decided that the Technical Secretariat (the Secretariat):

> shall put in place arrangements to identify the perpetrators of the use of chemical weapons in the Syrian Arab Republic by identifying and reporting on all information potentially relevant to the origin of those chemical weapons in those instances in which the OPCW Fact-Finding Mission in Syria determines or has determined that use or likely use occurred, and cases for which the OPCW-UN Joint Investigative Mechanism has not issued a report; and … that the Secretariat shall provide regular reports on its investigations to the [Executive] Council [of the OPCW] and to the United Nations Secretary-General for their consideration.

1.4 As stated in the "First Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-SS-4/DEC.3 'Addressing the Threat from Chemical Weapons Use', Ltamenah (Syrian Arab Republic), 24, 25, and 30 March 2017" (S/1867/2020, dated 8 April 2020) (hereinafter the "First IIT Report"),[2] and consistent with the standards applied by international fact-finding missions and commissions of inquiry, the IIT's mandate is to identify—on the basis of a sufficient and reliable body of information (i.e., the "reasonable grounds" standard)—individuals, as well as entities, groups, and governments (i.e., non-State and State actors) directly or indirectly involved in the use of chemical weapons in the incidents within the scope of the IIT's investigations.

[1] See preambular para. 6 of C-SS-4/DEC.3.

[2] Also reiterated in para. 1.4 of the "Second Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-SS-4/DEC.3 'Addressing the Threat from Chemical Weapons Use', Saraqib (Syrian Arab Republic), 4 February 2018" (S/1943/2021, dated 12 April 2021) (hereinafter the "Second IIT Report"), and in para. 1.4 of the "Third Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-SS-4/DEC.3 'Addressing the Threat from Chemical Weapons Use', Douma (Syrian Arab Republic), 7 April 2018" (S/2125/2023, dated 27 January 2023) (hereinafter the "Third IIT Report").

2. THE TASKS OF THE IIT

2.1 The IIT is not a judicial body with the authority to assign individual criminal responsibility, nor does the IIT have the authority to make final findings of non-compliance with the Convention. The IIT is rather meant to facilitate the work of other mechanisms such as (a) primarily, the OPCW policy-making organs in their determinations of non-compliance and related consequences for a State Party in accordance with the Convention;[3] and (b) through the International, Impartial, and Independent Mechanism (IIIM), courts or tribunals, whether at the domestic, regional, or international level, having jurisdiction over the conduct investigated by the IIT. The IIT's support to the work of the latter is foreseen by decision C-SS-4/DEC.3, which specifically reaffirms the principle that "those responsible for the use of chemical weapons should be held accountable"[4] and stipulates that the Secretariat shall, inter alia, "provide information to the investigation mechanism established by the United Nations General Assembly in resolution 71/248 (2016)", (namely, the IIIM)[5] "as well as to any relevant investigatory entities established under the auspices of the United Nations".[6]

2.2 The IIT aims to fulfil these tasks by establishing the facts relevant to the identification of perpetrators of the use of chemical weapons in the incidents in the Syrian Arab Republic under its purview.

2.3 The factual findings of the IIT relate to the process of gathering, analysing, and reporting on facts relevant to the imputation of a specific human conduct to an individual or an entity. These factual findings are intrinsically different from legal findings, which instead relate to any wrongfulness of that conduct under the applicable legal framework and its legal consequences (i.e., liability).[7] The latter findings are not within the purview of the IIT. Nonetheless, since the factual findings of the IIT may provide the initial grounds for further legal action, it is important for the IIT to adopt an information-gathering and review methodology which is consistent with future endeavours in this respect.

2.4 The IIT therefore endeavours to compile its records and factual findings in a manner suitable for future use by the OPCW policy-making organs, as well as the IIIM and any other relevant investigation body that may request material from the IIIM.

[3] See para. 11 of C-SS-4/DEC.3.

[4] See preambular para. 5 of C-SS-4/DEC.3.

[5] The IIIM has the primary mandate to "consolidate, preserve and analyse evidence of violations of international humanitarian law and human rights violations and abuses and to prepare files in order to facilitate and expedite fair and independent criminal proceedings, in accordance with international law standards, in national, regional or international courts or tribunals that have or may in the future have jurisdiction over these crimes, in accordance with international law". See United Nations General Assembly resolution 71/248 (21 December 2016), para. 4.

[6] See para. 12 of C-SS-4/DEC.3.

[7] *Cf.*, for example, United Nations General Assembly resolution 46/59 (1991), Declaration on Fact-Finding by the United Nations in the Field of the Maintenance of International Peace and Security, UN Doc. A/RES/46/59 (9 December 1991), para. 17, which notes that the report of a fact-finding body "should be limited to a presentation of findings of a factual nature". See also, among others, G. Arangio-Ruiz, State Responsibility Revisited. The Factual Nature of the Attribution of Conduct to the State, Quaderni della Rivista di Diritto Internazionale 6, Volume C-2017, pp. 3 and 110.

2.5 Details on the mandate and methods of work of the IIT can be found in the First IIT Report,[8] as well as in three Notes circulated by the Secretariat, respectively EC-91/S/3 (dated 28 June 2019),[9] EC-92/S/8 (dated 3 October 2019), and S/1918/2020 (dated 27 November 2020).

II. INVESTIGATIVE ACTIVITIES

3. APPROACH AND CHALLENGES IN THE INVESTIGATION

3.1 Referring to the findings of the FFM as a starting point,[10] the IIT conducted an impartial, objective, and independent examination of all available information concerning the use of chemical weapons in the incident in the town of Marea (Syrian Arab Republic) on 1 September 2015, with a view to collecting, comparing, and analysing further information in order to identify the perpetrators, as described above. This incident is included in the list of incidents on which the IIT decided to focus its investigative work, and which was made available to States Parties by the Secretariat in Annex 2 to Note EC-91/S/3. In selecting this incident from that list for further investigation, the IIT applied the criteria elaborated on in the First IIT Report concerning, inter alia: (a) the severity of the incident; (b) the amount and apparent reliability of the information already available on the incident; and (c) the type of chemical substance(s) detected. The IIT also took into account patterns of similar incidents, and the credibility and reliability of persons who allegedly witnessed the events.[11]

3.2 The approach to the investigation of the incident in Marea of 1 September 2015 undertaken by the IIT is consistent with that described in the First,[12] the Second[13] and the Third[14] IIT Reports. In particular, the IIT conducted the following activities: (a) it analysed the information received from the FFM; (b) it requested information from States Parties, including the Syrian Arab Republic, and upon receipt reviewed this information; (c) it assessed the statements previously provided by witnesses, and conducted interviews itself with persons of interest; (d) it obtained videos, documents, and other material from various sources; (e) it was able to access a substantial body of primary documentation pertaining to possible perpetrators, including materials such as letters, receipts, statements, and command orders; (f) it engaged in research on the dark web—that is, a section of the Internet that is not indexed by standard search engines and is often associated with anonymous and encrypted activities. The IIT did so considering the dark web's relevance in sourcing critical information related to the use of chemical weapons by one of the alleged perpetrators it considered in its investigation, namely the Islamic State in Iraq and the Levant (ISIL or Islamic State). This information included statements and discussions relating to the manufacturing and development of chemical weapons, as well as records, videos, and photographs documenting relevant military activities by ISIL; (g) it requested analytical data underlying the FFM Report,[15] as well as supplementary analyses for two relevant FFM samples by OPCW designated laboratories, and technical assessments from a number of

[8] See First IIT Report, paras 1.1 to 3.7 and Annexes 1 and 2 (and references therein).

[9] In the preparation of the present report, the composition of the IIT has included personnel from all five regional groups.

[10] See "Report of the OPCW Fact-Finding Mission in Syria Regarding the Incidents of the Alleged Use of Toxic Chemicals as a Weapon in Marea, Syrian Arab Republic, on 1 and 3 September 2015" (S/2017/2022*, dated 24 January 2022) ("FFM Report on Marea, 1 and 3 September 2015"), paras 1.14, 1.15, 8.10, and 8.11.

[11] See First IIT Report, paras 3.4 and 3.5.

[12] See First IIT Report, paras 4.1 to 4.10, and Annexes 1, 2, and 3 (and references therein).

[13] See Second IIT Report, paras 3.1 to 3.11 and Annexes 1, 2, and 3 (and references therein).

[14] See Third IIT Report, paras 3.1 to 3.22 and Annexes 1, 2, and 3 (and references therein).

[15] FFM Report on Marea, 1 and 3 September 2015.

specialists; (h) it requested analytical data relating to three samples collected by a third party in Marea eight days after the incident, namely, on 9 September 2015, including data mining for specific chemicals from a third OPCW designated laboratory; (i) it considered information included in the initial and subsequent declarations of the Syrian Arab Republic in accordance with the Convention in relation to sulfur mustard; (j) it requested and analysed satellite imagery,[16] maps, and 3D models; (k) it collected information from open sources; (l) it reviewed notes from the OPCW-United Nations Joint Investigative Mechanism's archives, to which it was granted access by the United Nations; and (m) it consulted experts.

3.3 For the specific purposes of this investigation, the IIT took into account the fact that similar incidents of use of sulfur mustard were reported to have taken place in both the Syrian Arab Republic and in neighbouring Iraq within the same, or very close, time frames. Therefore, the IIT reviewed, and considered as appropriate, available analytical data, official documents, reports, and open-source information relating to incidents of use of sulfur mustard carried out in the region between 2015 and 2016, in order to identify similarities with the incident under review, to establish possible patterns of use, and to find elements useful in identifying the perpetrators. These included FFM[17] and OPCW-United Nations Joint Investigative Mission[18] reports, as well as reports from technical assistance visits undertaken by the OPCW at the request of Iraq pursuant to subparagraph 38(e) of Article VIII of the Convention.[19] The IIT did so, however, fully cognisant of the mandate entrusted upon it by the Conference "to identify the perpetrators of the use of chemical weapons in the Syrian Arab Republic."[20]

3.4 Similarly, in its assessment of the potential perpetrators, in particular when reviewing the possible involvement of non-State actors in the incident, the IIT examined the activities of ISIL, which extended across the national borders of the Syrian Arab Republic and Iraq. This cross-border dynamic presented unique challenges, considering, as noted in the previous paragraph, that the mandate of the IIT is limited to incidents that occurred within the Syrian Arab Republic.[21] However, the transnational nature of ISIL necessitated an investigative approach that encompassed obtaining information and materials relating to activities carried out by the group in both the Syrian Arab Republic and in Iraq. This allowed the IIT to assess the full scope of ISIL's operations and chain of command, which were not confined to the territorial boundaries of a single State.

[16] As noted below (see "The origin of the munitions" Section), in contrast to previous reports, the IIT faced challenges in obtaining satellite imagery from the period surrounding the incident under review. This limitation stemmed from several factors, including the scarcity of imagery of specific locations on multiple dates and the area of interest from which the artillery may have been fired, exceeding 15 km.

[17] See "Report of the OPCW Fact-Finding Mission in Syria Regarding the Incident of 16 September 2016 as Reported in the Note Verbale of the Syrian Arab Republic Number 113 Dated 29 November 2016" (S/1491/2017, dated 1 May 2017) ("FFM Report on Um-Housh").

[18] See "Seventh Report of the Organisation for the Prohibition of Chemical Weapons-United Nations Joint Investigative Mechanism" (S/2017/904, dated 26 October 2017).

[19] See technical assistance visits final reports TAV/03/15, TAV/04/15/6365/22, TAV/02/16/6461/010 (on file with the Secretariat). See also Executive Council National Paper "Iraq: National Paper on the Chemical Weapons Used in the Kurdistan Region of Iraq" (EC-81/NAT.5, dated 10 March 2016). The Secretariat has secured the necessary authorisation to quote or reference both the National Paper and the relevant technical assistance visit reports in the present report, for which it remains grateful.

[20] See para. 10 of C-SS-4/DEC.3.

[21] Ibid.

3.5 In carrying out the activities listed above, the IIT relied on the same methods and procedures it had applied during its previous investigations, as described in the First IIT Report,[22] including with regard to (a) its approach to obtaining and securing information, including chain of custody, handling of information, security of witnesses, and sampling and analysis by designated laboratories; (b) its information and case management systems; and (c) the degree of certainty applied to the identification of perpetrators.

3.6 The IIT proceeded in a manner consistent with the Convention, relevant decisions of the policy-making organs,[23] and best practices of international fact-finding bodies and commissions of inquiry, especially when collecting information, such as witness statements, and assessing their relevance, sufficiency, and credibility, including by corroboration through separate sources.

3.7 As mentioned above, the collection of information in respect of the Marea incident of 1 September 2015 involved reaching out to States Parties, international and non-governmental organisations, and individuals, as well as a number of internationally recognised forensic, research and academic institutes, and experts and other relevant entities. Since the IIT is not judicially empowered to compel the submission of information and material, it relied, once again, on the voluntary cooperation of all these parties. In particular, regarding States Parties, the IIT requested them to provide access to relevant information and locations consistent with paragraph 7 of Article VII of the Convention.

3.8 Against this background, over the past months, the IIT has held several bilateral meetings with States Parties and other entities. It has also reviewed 20,492 files, amounting to 1 terabyte; obtained and assessed statements from 29 witnesses, including two women;[24] and requested and obtained analysis results and additional data for five samples related to this investigation. These included two samples collected and analysed by the FFM.

3.9 In order to ensure the independence of its analysis, the IIT obtained examination results and technical assessments from a variety of experts and specialists from different nationalities and working at different institutions. In addition to the two designated laboratories used by the FFM for their analyses, the IIT reached out to a third designated laboratory for further studies, as well as to an independent expert in chemistry. Assessments of prevailing meteorological conditions were obtained from separate sources. A toxicologist with expertise in chemical incidents—but who had not previously been involved in any assessment of the incident in Marea on 1 September 2015—was consulted to complement the analyses carried out by the FFM on the basis of the information obtained by the Secretariat. One munitions specialist provided an assessment of the projectiles considered by the IIT during its investigation. One ballistics expert, who had not worked on the incident before, was consulted for the purpose of assessing whether the projectiles observed at the relevant locations could be identified as the source of the chemical agent, and in order to make a determination as to the method of their delivery. Almost 11 trajectories were simulated. A military expert complemented the IIT's own internal analytical capacity. The IIT

[22] See First IIT Report, paras 1.1 to 3.7 and Annexes 1 and 2 (and references therein), EC-91/S/3, and EC-92/S/8.

[23] In addition to C-SS-4/DEC.3, see the decision by the Conference entitled "Sampling and Analysis during Investigations of Alleged Use of Chemical Weapons" (C-I/DEC.47, dated 16 May 1997), which was applied mutatis mutandis by the IIT to its investigations. See Annex 2 below for details on these methodologies.

[24] As noted in "The context of the military activities in the area" Section below, most women and children had fled Marea by the time that the incident occurred.

further engaged two specialists in geolocation and open-source research, as well as a separate forensic institute for the extraction and analysis of metadata to assist in verifying the authenticity and reliability of digital material, including videos and photographic material, obtained through various sources.

3.10 Overall, the IIT engaged a total of seven experts and specialists from three different regions to ensure the highest degree of objectivity, impartiality, and independence of its investigation, the thorough corroboration of the information and evidence it gathered, and the overall solidity and consistency of its findings.

3.11 The IIT assessed the information obtained, including by corroboration through other sources, in order to determine its sufficiency, relevance, and reliability. With specific regard to videos and photographs, the IIT conducted or obtained forensic analyses aimed at verifying their authenticity through geolocation, metadata assessment, and other techniques. The IIT will provide this information to the IIIM as required by paragraph 12 of decision C-SS-4/DEC.3 and in accordance with applicable OPCW confidentiality rules and protocols.

3.12 During the investigation of the incident in Marea on 1 September 2015, the IIT encountered issues similar to those mentioned in the First,[25] Second[26] and Third[27] IIT Reports, especially with regard to (a) the lack of direct engagement with representatives of the Syrian Arab Republic; (b) the impossibility to access the sites of the incident, as the IIT continues to be denied entry to the Syrian Arab Republic; and (c) the lapse of time between the date of the incident and the IIT investigation.

3.13 In particular, it should be recalled that the incident under review in the present report occurred in the town of Marea on 1 September 2015, or eight years prior of the launch of the IIT's investigation in January 2023.[28] Furthermore, eleven days earlier, that is on 21 August 2015, another sulfur mustard attack had occurred in the same town, as reported by both the FFM[29] and the OPCW-United Nations Joint Investigative Mechanism.[30]

3.14 The combination of these two factors understandably presented a challenge for some of the witnesses, and this had a bearing on the recollections of individuals interviewed by the IIT when recalling their whereabouts and exact date of exposure.[31] The IIT took these challenges into consideration when assessing the probative value of the relevant witness statements and materials, and made a significant effort—including through the authentication of metadata and available medical records—to unambiguously link the testimonies, videos and photographs that

[25] See First IIT Report, paras 4.1 to 4.10.

[26] See Second IIT Report, paras 3.5 to 3.11.

[27] See Third IIT Report, paras 3.9 to 3.15.

[28] The IIT is mandated to identify the perpetrators (and thus undertake the relevant investigations) once the FFM has determined that the use or likely use of chemical weapons occurred (and the OPCW-United Nations Joint Investigative Mechanism has not issued a report). The FFM Report on Marea, 1 and 3 September 2015, establishing that "a vesicant chemical substance from 1.A.04 scheduled chemicals under [the Convention] was used as a weapon" in the incident under review, was issued on 24 January 2022.

[29] "Report of the OPCW Fact-Finding Mission in Syria Regarding Alleged Incidents in Marea, Syrian Arab Republic, August 2015" (S/1320/2015, dated 29 October 2015) ("FFM report on Marea, 21 August 2015").

[30] "Third Report of the Organisation for the Prohibition of Chemical Weapons-United Nations Joint Investigative Mechanism" (S/2016/738, 24 August 2016), Annex X, pp. 93-98.

[31] Illustrative of these challenges is the case of a witness whose house was impacted on both dates.

it collected to the 1 September incident. The IIT remains grateful to all the witnesses and sources that have contributed, through the provision of information and evidence, to its investigation.

3.15 The IIT also developed a three-step approach to distinguish between the munitions, locations, and affected individuals related to the incident of the 21 August 2015 and those related to that of 1 September 2015. The IIT collected, verified, and geolocated primary digital evidence from both incidents, in the form of images and videos, in order to identify all relevant locations where a projectile, impact crater or substance is observed. Additionally, the team analysed medical and hospital records to determine the date on which affected individuals were exposed to a chemical substance. Lastly, witness testimonies were used to identify locations in which those affected individuals first came into contact with a chemical substance. All data points were triangulated to determine and confirm the locations impacted on 1 September 2015.

3.16 On 14 February 2023, the Secretariat addressed a note verbale [32] to the Permanent Representation of the Syrian Arab Republic to the OPCW, attaching a note by the IIT which invited the Syrian Arab Republic, inter alia, to submit any concrete information with respect to the incident in Marea on 1 September 2015. The note further reiterated the IIT's availability to meet with representatives of the Syrian Arab Republic at their convenience and at a location of their choosing. The purpose of this meeting would have been to discuss the progress of the investigation and the provision of any information and access to relevant locations that the authorities of the Syrian Arab Republic may have been able to facilitate. As at the date of this report, the Secretariat had not received a response from the Syrian Arab Republic.

3.17 On 21 November 2023, the Secretariat addressed a second note verbale to the Permanent Representation of the Syrian Arab Republic to the OPCW,[33] attaching a further note by the IIT. In line with a previous request addressed by the Coordinator of the IIT to the Permanent Representation,[34] the note welcomed information that the Syrian Arab Republic may provide on any criminal investigation and/or proceedings undertaken in relation to the use of chemical weapons within its territory, and in particular in relation to the incident under investigation, as well as on the relevant penal legislation applicable to such case. Once more, the note reiterated the IIT's availability to receive such information in any setting or format that the Syrian Arab Republic may have deemed feasible.

3.18 On 11 December 2023, the Permanent Representation of the Syrian Arab Republic to the OPCW, through a note verbale, classified as "protected", transmitted the response of the Syrian National Authority to "the Technical Secretariat's request regarding the Marea incident 2015". On 8 February 2024, the Secretariat addressed a further note verbale to the Syrian Arab Republic, which to date it has not responded to.

3.19 Copies of the above-mentioned Secretariat's notes verbales (when unclassified), and of the notes attached thereto, are enclosed in Annex 3 to this report.

3.20 The IIT decided not to draw any inference, for the purpose of its substantive conclusions, from this lack of cooperation. While direct access to certain locations and individuals in the Syrian

[32] NV/ODG-359/23, dated 14 February 2023.
[33] NV/ODG-487/23, dated 21 November 2023.
[34] See L/IIT/22059319, dated 2 September 2019.

Arab Republic could have been helpful, the IIT was able to proceed in its investigation without such access, based on all the information available.

3.21 The IIT considered and analysed information provided by the Syrian Arab Republic to the OPCW policy-making organs, as well as other communications and statements issued by the Syrian Arab Republic and other States Parties that it deemed to be potentially relevant to its investigation, and duly took relevant information and leads into account.

3.22 The IIT further reached out, through notes verbales and other means, to other States Parties which, based on public documentation and open sources, it assessed to be privy to or in possession of information and materials relevant to its investigation. The classified nature of some of the relevant documentation, and the fact that national judicial proceedings against persons of interest to the IIT were ongoing at the time of the investigation, resulted at times in limitations to the IIT's capacity to access the relevant information. Nevertheless, the IIT remains grateful for the assistance obtained.

3.23 The IIT received valuable cooperation from relevant United Nations entities.

3.24 The IIT also faced a number of challenges specific to the incident under investigation.

3.25 The devastating earthquakes which hit south-eastern Türkiye and the north-western part of the Syrian Arab Republic on 6 February 2023 severely impacted the IIT's capacity to reach out to, and engage with, witnesses, sources, and other relevant interlocutors in the immediate aftermath of the disaster. Engagement gradually resumed in April 2023, with no overall major impact on the IIT's capacity to secure information and evidence in accordance with its methodology and standard of proof.

3.26 As noted above, the investigation of the incident under review required extensive research on the dark web, where one of the alleged perpetrators considered by the IIT, namely ISIL, had posted crucial information relating to its military activities, including the alleged manufacture and development of chemical weapons. Recognising the inherent risks associated with accessing these digital spaces, a robust and secure methodological framework was developed and implemented to maintain the integrity of the investigation and the safety of the IIT personnel involved. This included the development and use of virtual machines, which provided a controlled and isolated environment for navigating the dark web, effectively reducing the risk of malware infection and data compromise of the IIT network. Furthermore, additional safety measures for maintaining anonymity and securing data transmission, such as the use of virtual private networks (VPNs) and secure, anonymising browsers, were integrated into the methodology of the IIT investigation.

3.27 In connection with the above, it should be highlighted that, as with its previous investigations, the IIT considered it imperative to ensure the necessary degree of care during its gathering and assessment of the information, including its consultations with experts in various disciplines. In line with a consistent methodology, the IIT also employed best practices aimed at ensuring the safety, security, and well-being of the persons with whom it interacted. This included protecting the privacy of individuals, and using only information for which informed consent was provided. Whenever, in the course of the investigation into the incident and subject to a thorough case-by-case risk assessment, the IIT had reasonable grounds to believe that a potential witness would

be endangered as a result of their engagement with the IIT, it refrained from approaching them, in line with the "do-no-harm" principle, which is a key component of its methodology.

3.28 Despite these constraints, the IIT was able to carry out its investigatory activities as described above, and to secure information and evidence in accordance with its methodology and standard of proof.

4. SCENARIOS

4.1 In preparing its investigation plan for the incident in Marea on 1 September 2015, the IIT first outlined working hypotheses as to (a) how this incident may have occurred; (b) who the alleged perpetrator(s) may have been; (c) how the substance used by the perpetrator(s) came into their possession; and (d) how the substance was employed. The IIT then proceeded to develop concrete scenarios based on all the available information, and attempted to outline those scenarios taking into account the narratives presented by both the witnesses and States Parties, bearing in mind the challenges mentioned above with respect to State Party information.

4.2 Additionally, in its assessment of the alleged perpetrator, the IIT sought to identify an actor or actors within the context of the incident with the motivation, history, means, expertise, and capability to manufacture and employ a weapon with a chemical payload.

4.3 Throughout the course of its investigation, the IIT did not receive any information or allegations of "staging" at the incident sites.[35] Therefore, moving forward, the IIT excluded the scenario that "staging" had occurred.

4.4 The IIT also took specific note of allegations that toxic chemicals originating from the stockpile of the Syrian Arab Republic had been seized by a non-State actor operating in the area where the incident occurred. Specific locations of where this stockpile was found or transferred were brought to the attention of the IIT, but the IIT could not identify any supporting evidence which would have linked toxic chemicals originating from the Syrian Arab Republic stockpile to the substance used in the incident discussed in this report.[36]

4.5 In light of the above, the scenarios developed for this investigation can be briefly summarised as follows:

(a) The chemical weapons at the site(s) of the incident were deployed by a State actor engaged in hostilities in the Syrian Arab Republic.

(b) The chemical weapons at the site(s) of the incident were deployed by a non-State actor operating in the area, possessing the means and expertise to employ weapons with a chemical payload.

(c) The chemical weapons originated from a state stockpile, which was later seized and used by a non-State actor.

[35] The term "staging", which would point to the use of chemical weapons (though not in the ordinary sense of using weapons to militarily attack the adversary), is also used as a synonym of "false-flag" chemical attacks and "fabrication" of chemical weapons use for the purposes of this report.

[36] See also "Chemical analyses" Section below.

(d) A State actor directly provided a chemical payload/chemical weapons to a non-State actor.

4.6 For each of these scenarios, the IIT considered that the operation to deploy chemicals, or weapons with a chemical payload, could have been organised through the chain of command of a formal or de facto structure, or that "rogue" units or individuals could have carried out these attacks independently of any command and superior control responsibility.

4.7 For the incident under investigation, the IIT specifically considered information related to the following six areas of inquiry, as appropriate:

(a) the context of the military activities in the area during the relevant time period, and the meteorological conditions;

(b) accounts and assessments of the munitions found and identified, their delivery, and their impact;

(c) other information related to any delivery system that could have delivered the munitions, and their trajectory;

(d) the effects of the chemical weapons, namely, the symptoms of the persons affected;

(e) remnants found at the site and their possible origin; and

(f) chemical analyses and their comparison with other relevant analyses of samples collected in the Syrian Arab Republic and in the region, for the purposes of establishing possible patterns of use of the same chemical agent.

III. THE INCIDENT OF 1 SEPTEMBER 2015 IN MAREA

5. BACKGROUND

The findings of the Fact-Finding Mission

5.1 As noted above, the IIT is mandated to investigate those instances in which the FFM has determined that the use or likely use of chemical weapons occurred, and for which the OPCW-United Nations Joint Investigative Mission did not reach findings as to the perpetrators.

5.2 The FFM determined in its report that there were "reasonable grounds to believe that a vesicant chemical substance from 1.A.04 scheduled chemicals to the Convention was used as a weapon" [37] on 1 September 2015 in Marea.

5.3 Witnesses interviewed by the FFM "described two substances involved in the incidents, both having a 'very bad', 'unpleasant', 'disgusting', and 'pungent' odour: a black to brown oily liquid and a yellow powder. Reportedly, both substances dispersed from projectiles upon impact".[38]

5.4 The FFM stated that on the day of the incident "over 100 projectiles" fell on Marea, "among which approximately 20 were reported to be filled with toxic chemicals." [39] A number of FFM witnesses confirmed that "approximately 20 projectiles filled with chemicals fell in various locations and neighbourhoods in Marea, mostly in residential areas",[40] while "few projectiles fell in empty areas or in agricultural areas".[41] "Several witnesses indicated that projectiles were fired from the eastern side of Marea where most villages were under the control of ISIL". [42]

5.5 The analysis of samples collected from the splatter of a black substance that persisted at several contaminated locations in Marea revealed the presence of thiodiglycol (TDG) and thiodiglycol-sulfoxide (TDG-SO).[43]

5.6 Based on "the description of the black substance by witnesses and its odour, and the development of blisters in a number of casualties, [and] the presence of thiodiglycol and its oxidation product", the FFM established that those compounds "are the degradation products of 1.A.04 scheduled chemicals." [44]

5.7 As the FFM did not obtain samples from locations where witnesses had seen the yellow powder, it was not in a position to identify the chemical composition of this powder.[45]

[37] FFM Report on Marea, 1 and 3 September 2015, paras 1.14 and 8.10.
[38] FFM Report on Marea, 1 and 3 September 2015, para. 1.10.
[39] FFM Report, 1 and 3 September 2015, para. 7.4. See also para 7.14 ("According to witness testimonies, at approximately noon on 1 September 2015, the town of Marea was subjected to shelling with both conventional munitions and projectiles filled with chemicals. …").
[40] FFM Report, 1 and 3 September 2015, para. 7.15.
[41] Ibid.
[42] FFM Report, 1 and 3 September 2015, para 7.14.
[43] FFM Report on Marea, 1 and 3 September 2015, para. 1.12.
[44] FFM Report on Marea, 1 and 3 September 2015, para. 1.13.
[45] FFM Report on Marea, 1 and 3 September 2015, para. 1.13.

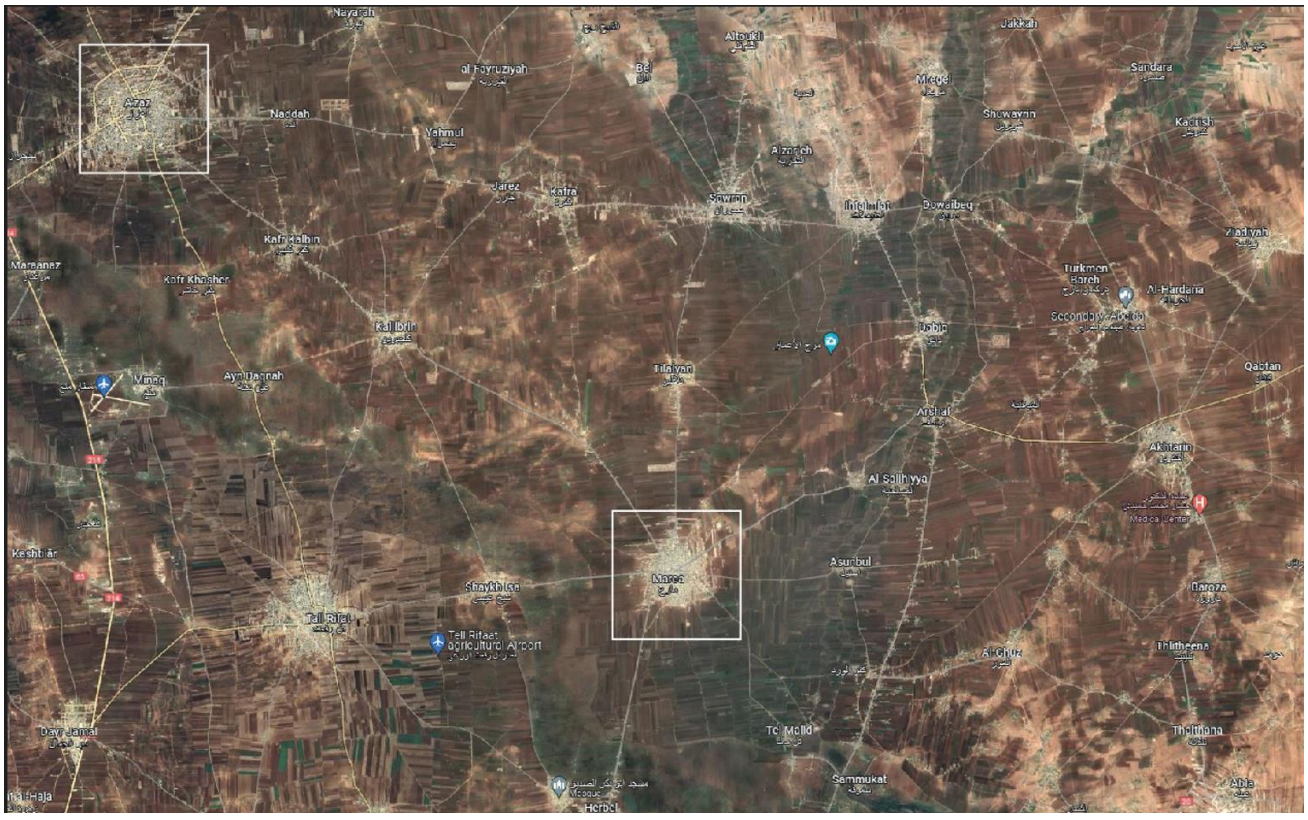
General situation in the area

5.8 Prior to the outbreak of the civil unrest in the Syrian Arab Republic in March 2011, Marea, situated 35 km north of Aleppo, in the northern Aleppo countryside, was an agricultural community with a population of approximately 40,000. The livelihoods of its inhabitants and its local economy were largely centred on farming and small-scale trade.

5.9 Marea's location at the heart of the Azaz corridor—a crucial land bridge extending from the city of Azaz at the border with Türkiye down to Aleppo, the country's former commercial hub—underpinned its importance.

5.10 The Bab Al-Salam border crossing, located at the northern end of the Azaz corridor and 25 km north of Marea, further reinforced the town's geographical significance. Throughout the conflict, this border crossing served as a critical lifeline for armed opposition groups and civilians alike, facilitating the flow of military supplies and humanitarian aid, which accounted for more than 60% of cross-border assistance into northern Syria.[46]

FIGURE 1: MAP OF MAREA (CENTRE) AND AZAZ (TOP LEFT)



[46] United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA), Syria Sitrep Update, 10 June 2015, available at: https://reliefweb.int/report/syrian-arab-republic/syria-aleppo-update-10-june-2015.

5.11 Marea had long been an opposition stronghold in north-western Syria, being one of the first towns in northern Aleppo that armed opposition groups, fighting under the Free Syrian Army banner, took control of. As part of the military efforts by the Syrian Arab Republic and allied militias to regain control of the town, frequent and widespread attacks were carried out against the residents of Marea, as documented by United Nations human rights bodies.[47]

5.12 After its formation in April 2013, the so-called Islamic State in Iraq and Levant (ISIL) posed the largest threat to Marea as part of the battle for control of the Azaz corridor and the northern Aleppo Governorate as a whole. Intermittent interventions by the Syrian Arab Republic, the Russian Federation, and Türkiye—predominantly shelling or airstrikes—further complicated the security situation in the corridor as a whole.

5.13 In this context, Marea was a key town for the defence of the corridor. Additionally, Marea is thought to have taken on a special symbolism for ISIL, being the town in which Samir Abd Muhammad al-Khlifawi, known as Haji Bakr—a senior ISIL leader, heading the group's Military Council and its operations in the Syrian Arab Republic—was killed in January 2014 during clashes between ISIL and Syrian armed opposition groups.

5.14 In October 2013, the Syrian Government launched "Operation Northern Storm", a major offensive aimed at recapturing northern parts of Aleppo city and its outskirts from armed opposition groups. In the meantime, by January 2014 ISIL held Al-Bab, Manbij, and Jarablus in the north-east of the Aleppo Governorate.

5.15 In June 2014, following ISIL's declaration of a "Caliphate" across the Syrian Arab Republic and Iraq, the Aleppo Governorate experienced a significant increase in violence, with ISIL launching major military operations, frequently targeting Marea and other key locations. From July 2014 onwards, ISIL was able to take control of many of the villages surrounding Marea.

5.16 In August 2014, ISIL launched an offensive against Marea, and Sawran, which lies to the north of Marea. Although the offensive was unsuccessful, the threat to Marea remained into 2015.

[47] Human Rights Council, fourth Report of the Independent International Commission of Inquiry on the Syrian Arab Republic (A/HRC/22/59, dated 5 February 2013), paras 32-34, pp. 92 and 93.

6. INCIDENT IN MAREA, 1 SEPTEMBER 2015

6.1 The FFM determined in its report that there were "reasonable grounds to believe that a vesicant chemical substance from 1.A.04 scheduled chemicals to the Convention was used as a weapon" [48] on 1 September 2015 in Marea.

6.2 In fulfilment of its task to identify perpetrators, and taking into account the constraints under which the IIT works,[49] it examined a number of scenarios,[50] including various avenues of inquiry regarding the origin of the chemical agent used in the incident.

6.3 The IIT therefore focused in this case on two main scenarios: (a) that the chemical weapons at the site(s) of the incident were deployed by a non-State actor operating in the area, possessing the means and expertise to employ weapons with a chemical payload, or having seized chemical weapons that originated from a State stockpile; or (b) that the chemical weapons at the site(s) of the incident were deployed by a State actor engaged in hostilities in the Syrian Arab Republic.

6.4 At the same time, the IIT remained open to other hypotheses that could explain what happened in Marea on 1 September 2015.

The context of military activities in the area

6.5 With regard to the military activities in the area of Marea in the months leading up to the incident of 1 September 2015, the IIT made its assessments based on witness accounts, expert reports, and technical data, comparing the information obtained with open-source information, and through consultations with external entities and subject-matter experts, as necessary.

6.6 As noted above, Marea was a strategically important military target, given its proximity to Azaz and the Bab Al-Salam border crossing.[51]

6.7 In August 2015, Marea was located on the front line between ISIL and Syrian armed opposition fighters, also known as the "Marea line". At the time, the region around Marea was controlled by various factions, the primary actors being the Syrian Arab Armed Forces (SAAF) of the Syrian Arab Republic; ISIL; a number of armed opposition groups, including *Jabhat al-Shamiyah*, *Thuwar al-Sham*, *Sultan Murad*, *Liwa al-Fatah*, *Faylaq al-Sham*, *Jayash al-Mujihideen*, *Tajma'u Fastaqim*, *Nur al-Din al-Zinki*, the 13th Division, *Suqour al-Zawiyah*, *Jabhat al-Nusra*, and *Ahrar al-Sham*; and the Syrian Democratic Forces.

6.8 *Jabhat al-Nusra*, which was primarily engaged in fighting against ISIL and the SAAF in the northern Aleppo countryside, withdrew from Marea to Azaz, 18 km north-west of Marea, on 9 August.

6.9 Earlier, in July 2015, two opposition coalitions, *Fatah Halab* and *Ansar al-Sharia*, had launched a major offensive against the SAAF in the west of the city of Aleppo. ISIL took advantage of

[48] FFM Report on Marea, 1 and 3 September 2015, paras 1.14 and 8.10.
[49] See "Approach and challenges in the investigation" Section above; *cf.* First IIT Report, Section II.4.
[50] See "Scenarios" Section above; *cf.* First IIT Report, Section II.5.
[51] See "General situation in the area" Section above.

the operation to continue advancing westwards from their strongholds in Raqqa, capturing territory around Manbij and Al-Bab.

6.10 Several sources and witnesses confirmed to the IIT that, by early August 2015, ISIL was largely controlling territory east, north-east, and south-east of Marea, including the villages of Asunbul and Tal Malid, which are located 4.5 km and 5.6 km to the east, respectively.

6.11 On 8 August, ISIL captured the village of Um-Housh, 5 km south-east of Marea. Subsequently, several opposition factions moved troops, including the 101st Infantry Brigade, to Marea to counter ISIL's westward advance, resulting in heavy clashes in the area until mid-August.

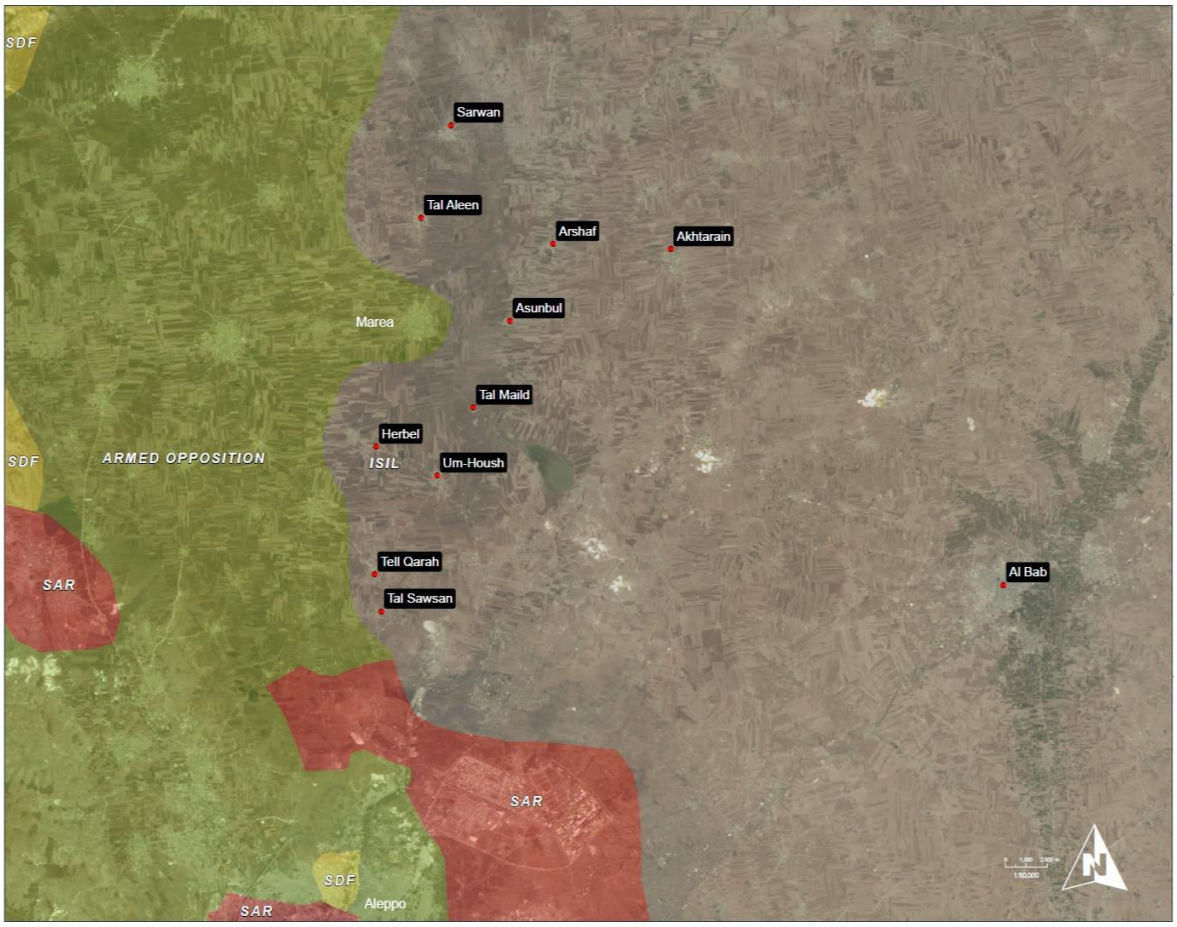
6.12 At that time, *Ahrar al-Sham* and *Faylaq al-Sham* began a major offensive against ISIL, while Fatah Halab launched several attacks on Government positions in Handarat, near Marea, and western Aleppo. Marea thus found itself at the centre of the fight for the region, as a key point of access for taking Aleppo and the Governorate.

6.13 In late August 2015, as Syrian opposition forces intensified their focus on the fight for the city of Aleppo, ISIL continued its months-long advance towards Marea. Their intent to capture the town and to move further west is described in a series of videos posted online by the group.

6.14 During the two weeks prior to the 1 September 2015 attack, there were several suicide attacks by ISIL on Marea, as well as conventional shelling, and at least one chemical attack, subsequently attributed to ISIL by the OPCW-United Nations Joint Investigative Mechanism. On the night of 20 to 21 August 2015, ISIL launched an artillery barrage on Marea. While reports on the number of projectiles fired vary from dozens to over one hundred, several projectiles were later confirmed by the FFM to have contained a chemical payload of sulfur mustard.

6.15 By 26 August, following intense clashes, ISIL captured Herbel, 5 km south of Marea, and encircled Marea on three sides, to the north, east, and south, effectively besieging the town.

FIGURE 2: MAREA – RELEVANT FRONTLINES (1 SEPTEMBER 2015)



6.16 ISIL's advance towards the town resulted in a massive displacement of civilians —mostly women and children—seeking refuge from the escalating security threats and worsening humanitarian conditions.[52] Those who fled relocated northwards towards internally displaced persons camps in Bab Al-Salam. Those who remained behind, mostly young males with no particular military or political allegiances, found themselves drawn into the conflict and took up arms to protect the town.

6.17 In the late morning of 1 September 2015, media reported that ISIL had again started shelling the town of Marea with a barrage of rockets and artillery. In a press briefing that day, the head of the local council in Marea officially declared the town a disaster area due to the worsening security situation.

Meteorological conditions

6.18 Sunrise on 1 September 2015 was at around 03:02 UTC (06:02 EEST); sunset was at 16:00 UTC (19:00 EEST).[53] The IIT established the meteorological conditions in the area of Marea, the Syrian Arab Republic, during the day of 1 September 2015 using official reports by the World

[52] Witnesses estimated that in early August 2015, Marea had a population of 20,000, whereas by the time of the 1 September attack, only about 1,000 inhabitants had remained.

[53] At the time, the Syrian Arab Republic observed daylight savings, Universal Time Coordinated (UTC) is three hours behind Eastern European Summer Time (EEST).

Meteorological Organization (WMO), its specialised meteorological centres, witness accounts, publicly available historical weather data, and other sources of information. The IIT acknowledges that meteorological conditions may vary slightly depending on the weather station closest to Marea, therefore the conditions noted below are indicative of the forecast in the general area within a 67 km radius of the town, rather than the exact weather conditions at the exact locations, at the time the incident occurred.[54]

6.19 According to the WMO data analysed by the IIT, between 12:00 and 16:00 the area experienced a temperature high of 37.0º C and a low of 34.9º C (with a possible margin error of about 2º C) and maximum of 20% relative humidity at 2 m above ground. Wind speed (measured to reflect an average within a 60-minute margin) at the time of the attack was estimated at 3 m/s (i.e., 3.6 km/h) from a north-western to a western direction. Models of the area show that wind direction and speed over the course of the day remained between 1 m/s and 5 m/s from a western to a north-western direction.

6.20 The conditions noted at the time are considered permissive for the use of sulfur mustard. Typically, the vapour pressure of pure sulfur mustard is moderate (0.11 mm Hg) at 25º C and sulfur mustard deposited on surface soil will evaporate within 30 to 50 hours. Warm temperatures and stronger winds reduce the time residual sulfur mustard would remain. However, in the chemical incident in Marea, in which sulfur mustard of a lower purity was used, the evaporation rate of the agent is lower than that of a pure agent.

Chemical analyses

6.21 At the time of its investigation, the FFM was unable to visit the site(s) in Marea allegedly targeted with toxic chemicals on 1 September 2015 due to security and safety reasons.[55]

6.22 However, the FFM became aware—based on witness accounts—that the splatter of a black substance reportedly linked to the incident could still be seen at multiple locations, for example on walls in several houses and on the asphalt in the street[56] (see Figure 3).

6.23 In its report, the FFM noted[57] that, while in some of the contaminated locations in Marea a black to brown, oily liquid[58] was observed, in others, a yellow powder was observed.[59] The witnesses interviewed by the FFM described the two substances as both having a "very bad", "unpleasant", "disgusting", and "pungent" odour.[60] Reportedly, both substances dispersed from projectiles upon impact[61]

[54] The closest weather station with the most reliable data is LTAJ (Gaziantep Oguzeli International Airport), situated approximately 67 km north-east of Marea.
[55] See FFM Report on Marea, 1 and 3 September 2015, para. 6.4.
[56] See FFM Report on Marea, 1 and 3 September 2015, para. 7.36.
[57] See FFM Report on Marea, 1 and 3 September 2015, para. 1.3.
[58] See FFM Report on Marea, 1 and 3 September 2015, paras 1.10 and 8.9.
[59] See FFM Report on Marea, 1 and 3 September 2015, paras 7.20 and 7.22.
[60] See FFM Report on Marea, 1 and 3 September 2015, para. 1.10.
[61] See FFM Report on Marea, 1 and 3 September 2015, para. 8.6.

FIGURE 3: BLACK, OILY LIQUID SUBSTANCE ON THE ROOF OF A BUILDING IN MAREA, 1 SEPTEMBER 2015



6.24 Once the FFM verified this information, samples of the black substance were collected from relevant locations in Marea by a volunteer organisation of first responders [62] on 28 July 2021. The collection and the sealing of the samples were documented through video and still photography, using equipment capable of recording Global Positioning System (GPS) data (see Figure 4 below).

6.25 On 24 September 2021,[63] the FFM received a total of 12 samples collected from the inside and outside walls of impacted buildings, and asphalt samples from the pavement of a street, in addition to information and details regarding the sampling points. [64] The documentation, including digital photos and videos, was subsequently assessed and enabled the FFM to corroborate the sampling time points and locations.[65]

[62] See FFM Report on Marea, 1 and 3 September 2015, paras 7.37 and 7.39, Syria Civil Defence (SCD).
[63] See FFM Report on Marea, 1 and 3 September 2015, Table 1, p. 8.
[64] See FFM Report on Marea, 1 and 3 September 2015, para. 7.41 and Table 4, p. 18.
[65] See FFM Report on Marea, 1 and 3 September 2015, para. 7.39.

FIGURE 4: SAMPLING OF SPLATTER OF BLACK SUBSTANCE ON INDOOR WALLS IN MAREA



6.26 On 25 September 2021, the FFM samples were transferred to the OPCW Laboratory in accordance with the relevant OPCW policies, procedures, and quality documents, including in relation to the chain of custody.[66] Two OPCW designated laboratories performed the analysis of the black substance samples and identified the presence of thiodiglycol (TDG) and its oxidation product thiodiglycol-sulfoxide (TDG-SO).[67]

6.27 On this basis, the FFM concluded in its report that all the information it had obtained and analysed provided reasonable grounds to believe that a vesicant chemical substance from 1.A.04 scheduled chemicals (i.e., sulfur mustards) under the Convention was used as a weapon on 1 September 2015 in Marea.[68] Schedule 1.A.04, annexed to the Convention,[69] includes sulfur mustards such as sulfur mustard, sesquimustard, O-mustard, and other toxic mustard analogues.

6.28 Sulfur mustard (also known by its scientific name of bis(2-chloroethyl)sulfide) is a chemical warfare agent with powerful vesicant properties. In its pure state, sulfur mustard is a colourless, odourless oily liquid while, as an industrial product, it appears yellow to dark brown due to the impurities it contains.[70]

6.29 The persistency of sulfur mustard in the environment is dependent on weather conditions, with the released agent gradually disappearing via evaporation. Evaporation depends on both

[66] See FFM Report on Marea, 1 and 3 September 2015, para. 7.42 and Table 1, p. 8.
[67] See FFM Report on Marea, 1 and 3 September 2015, paras 1.12 and 8.8.
[68] See FFM Report on Marea, 1 and 3 September 2015, paras 1.14 and 8.10.
[69] See Annex on Chemicals to the Convention, Schedule 1.A. Toxic Chemicals, (4) Sulfur mustards.
[70] See D. Steinritz and H. Thiermann (2017). "Sulfur Mustards", in J. Brent et al. Critical Care Toxicology, Springer, Cham, available at: www.doi.org/10.1007/978-3-319-17900-1_149.

temperature and wind strength, and is the main process of sulfur mustard clearance.[71] At 25° C, sulfur mustard droplets deposited on soil evaporate within 30 to 50 hours. Persistence from 36 hours to several days at ambient temperatures has also been reported and, in order to increase the persistency, thickeners can be added.[72]

6.30 Sulfur mustard degrades by hydrolysis to produce TDG.[73] TDG has a high persistence, but converts into TDG-SO and subsequently into thiodiglycol-sulfone (TDG-S) as a result of its chemical reactions with oxygen in air.

6.31 The IIT took a number of steps to clarify and deepen its understanding of the FFM's finding that a vesicant chemical substance from Schedule 1.A.04 under the Convention was used as a weapon.[74]

6.32 The IIT assessed relevant analytical chemistry data underlying the FFM report,[75] as provided by the two OPCW designated laboratories used by the FFM to analyse the samples collected. In addition, further analysis of four FFM samples was carried out in order to gain a better understanding of the environmental fate of the chemical agent released, and potential chemical forensic information related to its production. All four samples—namely, two samples from indoor walls selected based on their reported content of sulfur mustard degradation products, and two asphalt samples—had reportedly been stained by the black substance.

6.33 In addition, the IIT considered relevant videos and pictures that it and the FFM had obtained, as well as open-source material, in order to gain further understanding of the sampling sites and their layout. In taking such steps, the IIT also considered the comment made by the FFM that both substances reportedly dispersed from projectiles upon impact.[76]

6.34 The IIT was also granted access, and was able to review, analytical data from samples collected on 9 September 2015 (i.e., only eight days after the chemical incident) from an impacted building in Marea and subsequently retrieved by a third party and analysed at an OPCW designated laboratory. Based on relevant testimonies and authenticated videos and images, the IIT was able to reconstruct the chain of custody from the date of sample collection to the date on which the samples were analysed by the OPCW designated laboratory (i.e., 9 December 2015). From a total of six samples collected, the IIT considered three samples to be of relevance to the investigation. The samples consisted of soil from the floor, a metal sheet, and a cigarette lighter, all contaminated by a black, tar-like substance.

6.35 The IIT engaged a leading chemist with specific expertise in the analysis of sulfur mustards (not previously involved in the analysis, assessment, and interpretation of samples from Marea) as an expert to assist the investigation in relation to the results of sample analyses and their significance. The expert researched relevant scientific literature and consulted other chemists

[71] See e.g., N. B. Munro et al. (1999). "The Sources, Fate and Toxicity of Chemical Warfare Agent Degradation Products", in Environmental Health Perspectives, Vol. 107, pp. 933-974; C.A.S. Brevett et al. (2009). "Evaporation rates of chemical warfare agents measured using 5 cm wind tunnels II. Munitions grade sulphur mustard from sand", in ECBC-TR-699, Edgewood Chemical Biological Center, Aperdeen Proving Ground, MD, US.

[72] See e.g., R. Malhotra et al. (1999). "Chemistry and toxicology of sulphur mustard – A review", in Defence Science Journal, Vol. 49, Issue 2, pp. 97-116.

[73] See R. Malhotra et al. (1999). op. cit.

[74] See FFM Report on Marea, 1 and 3 September 2015, paras 1.14 and 8.10.

[75] See FFM Report on Marea, 1 and 3 September 2015.

[76] See FFM Report on Marea, 1 and 3 September 2015, paras 1.10 and 8.6.

and specialists, as appropriate. The chemist also reviewed FFM and IIT witness statements on the characteristics of the two types of chemical payloads released, e.g., the black, oily liquid and the yellow powder, and selected video recordings of the collection of samples relevant to this investigation.

6.36 Starting from an analysis of the FFM findings, the expert was asked, inter alia, to consider whether, at the relevant sites: (1) further findings could be reached as to the specific sulfur mustard from Schedule 1.A.04 used as a weapon in Marea on 1 September 2015; (2) based on the above, any conclusions could be drawn as to the production route of the identified chemical agent which, in turn, may provide elements useful to the identification of the perpetrator(s) of the attack; and (3) based on the chemical data, any linkages could be established with other incidents in which similar substances were reported.

Verification of sulfur mustard use in Marea on 1 September 2015

6.37 As discussed above, the IIT requested two OPCW designated laboratories to independently perform the chemical analysis of four FFM samples. Two samples (M1 and M7) were collected from the splatter of black substance present on indoor concrete walls, while two samples (SLS14F1 and SLS14F2) consisted of asphalt from the street pavement, stained by the black substance. The resulting analytical data unambiguously[77] confirmed the presence of TDG and TDG-SO (i.e., the two chemicals reported by the FFM) in the samples collected on indoor walls (see Table below). In sample M7, TDG-S was also identified. No chemicals of relevance to the investigation were found in the two asphalt samples.

6.38 The dry weather conditions in Marea on 1 September 2015[78] would have allowed most of the sulfur mustard that was released to evaporate from the sites where it had deposited. This explains the limited degradation of sulfur mustard and the low levels of TDG, TDG-SO, and TDG-S observed in the Marea samples.

6.39 The chemical findings based on the FFM samples were corroborated by the analytical data relating to the samples collected from an impacted building in Marea on 9 September 2015 that were subsequently retrieved by a third party and sent for analysis to an OPCW designated laboratory. The laboratory found low levels of sulfur mustard and its degradation product 2-chloroethyl vinyl sulfide in two extract samples from soil, and a gas lighter, respectively. Both had been contaminated by a black substance on the day of the attack. In the soil sample from the floor of the impacted building, the degradation products TDG and TDG-SO were also identified.

6.40 The IIT assessed authenticated videos of the sample collection. The recordings confirmed the chemical agent as a thick, oily substance (Figure 5).

[77] All chemicals identified by OPCW designated laboratories in the samples considered by the IIT were analysed by methods meeting OPCW and laboratory quality system requirements.

[78] See “Meteorological conditions” Section above.

FIGURE 5: SAMPLING OF SOIL CONTAMINATED BY BLACK, OILY SUBSTANCE IN AN IMPACTED BUILDING IN MAREA ON 9 SEPTEMBER 2015 (LEFT); SPLATTER OF THE BLACK LIQUID ON THE WALL OF THE IMPACTED BUILDING (RIGHT)



6.41 The high viscosity of the agent is consistent with the fact that sulfur mustard and other volatile components of the crude chemical agent would have evaporated almost completely during the eight days that had elapsed between the chemical incident and the sample collection. The fact that levels of sulfur mustard were nonetheless detected can be explained by the high viscosity of the sample, which would increase the persistence of the agent.[79]

6.42 The identification of sulfur mustard, 2-chloroethyl vinyl sulfide, TDG, TDG-SO, and TDG-S in the samples collected in Marea provide strong evidence that sulfur mustard was used as a chemical weapon in the chemical attack of 1 September 2015.

Sulfur mustard production methods

Two main routes of sulfur mustard production

6.43 Sulfur mustard can be manufactured via multiple routes. The two main routes used for large-scale production of the agent are the Meyer and the Levinstein methods.[80] The identification of a sulfur mustard production route can provide key insights into the origin of an unknown sample, as well as the technical skills of the manufacturers.

6.44 In the Meyer route, TDG is produced from chloroethanol and potassium sulfide as an intermediate product. In a second, subsequent chemical reaction, sulfur mustard is produced by chlorination of TDG, which can be performed through different chlorination methods.[81] All these methods within the Meyer route result in sulfur mustards of high purity (>90%).

[79] Compare with properties of thickened sulfur mustard. See R. Malhotra et al. (1999). op. cit.

[80] See, for example, D. Steinritz and H. Thiermann (2017). op. cit.; R. Malhotra et al. (1999), op. cit.

[81] Chlorination of TDG can be performed: by phosphorous trichloride (V. Meyer (1886). "Weitere studien zur kenntnis der thiophengruppe", in Chemische Berichte. Vol. 19, pp. 628-632); by hydrochloric acid (H. T. Clarke (1912). "Synthesis of 4-alkyl-1,4/thiazans", in Journal of the Chemical Society, Vol. 101, pp. 1583-90); or by thionyl chloride (W. Steinkoff et al. (1920). "Uber das Tiodiglykolchlorid und einige ankommlinge desselben", in Chemische Berichte. Vol. 53, pp. 1007-1012).

6.45 The Levinstein route[82] uses liquid sulfur monochloride (S_2Cl_2) and ethylene for the production of sulfur mustard. In contrast to the Meyer sulfur mustards, Levinstein sulfur mustard is crude and it is characterised by a high content of sulfur and sulfur-containing chemicals as impurities. The excess of such impurities in Levinstein sulfur mustard makes it release hydrogen sulfide and other volatile sulfide compounds, producing a very bad odour described as being akin to that of rotten garlic or horseradish.[83]

6.46 As the chemical impurities found in the Meyer and Levinstein sulfur mustards differ significantly, it is possible to identify the production method of a sulfur mustard sample of unknown origin retrospectively.[84]

Production route of sulfur mustard used in Marea on 1 September 2015

6.47 In light of the above, the IIT sought, as a matter of priority, to identify the production route of the sulfur mustard used in Marea.

6.48 At the IIT's request, an OPCW designated laboratory conducted a screening for sulfur mustard chemical markers in FFM sample M7 in order to assess whether the substance had been produced via a Meyer or a Levinstein production route. The polysulfide mustards HS_2 and HS_3 were unambiguously identified in the sample, with HS_3 being a chemical marker for the Levinstein route (see Table below). In addition, the marker 1,2,3,4-Tetrathiane was also unambiguously identified. This chemical is a specific degradation product of the higher sulfur mustard polysulfides (HS_4-HS_7), which are only present in Levinstein sulfur mustard.[85]

6.49 The above results were corroborated by the identification of 1,2,3,4-Tetrathiane, HS_2 and HS_3 in the Marea samples retrieved by the third party mentioned above and analysed at an OPCW designated laboratory (See Table below). The HS_3/HS_2-ratios in both the FFM and the third-party samples were significantly higher[86] than the values below 0.01 which characterise sulfur mustard produced via a Meyer route.[87]

6.50 The production of sulfur mustard via the Levinstein method can be performed on an industrial level or by using improvised means of production.

Industrial Levinstein sulfur mustard production

6.51 The industrial Levinstein production method was developed during World War I.[88] It is a technically advanced process, in which an excess of dry, concentrated ethylene gas is bubbled

[82] See R.C. Fuson et al. "Levinstein mustard gas. VI. The mode of formation", in Journal of Organic Chemistry, 1946a, Vol. 11, Issue 5, pp. 504-509.

[83] See "Agent Information Quick Reference, Appendix A: Sulfur mustard", in: Chemical Agent Identification Sets (CAIS) Information Package, U.S. Army Program Manager for Chemical Demilitarization, November 1995, available at: www.bulletpicker.com/pdf/CAIS.pdf [Accessed 20 October 2023].

[84] See K. Hojer Holmgren et al., "Synthesis route attribution of sulfur mustard by multivariate data analysis of chemical signatures", in Talanta (2018), Vol. 186, pp. 615-621.

[85] See National Research Council, op. cit. (2005); R. Macy et al., op. cit. (1947); R.C. Fuson et al., op. cit. (1946B).

[86] See Table below, row 8.

[87] See K. Hojer Holmgren, et al. op. cit. (2018).

[88] See, for example, C. M. Pechura and D. P. Rall (eds.), "History and Analysis of Mustard Agent and Lewisite Research Programs in the United States, in Veterans at Risk" in The Health Effects of Mustard Gas and Lewisite, National Academy Press (1993), available at: www.ncbi.nlm.nih.gov/books/NBK236079/, [Accessed 10 November 2023].; R. Macy et al. "The Polysulfides in Levinstein Process Mustard Gas", in Science (1947), Vol. 106, No. 2755, pp. 355-359.

into liquid sulfur monochloride (S_2Cl_2) at a slow rate, under agitation and with external cooling.[89]

6.52 The purity of the starting material is essential to the performance of the process, as highlighted in scientific publications.[90] Hence, the sulfur monochloride produced from sulfur and chlorine gas would be routinely purified by distillation prior to use, in order to remove impurities such as sulfur dichloride (SCl_2).

6.53 In order to maximise the amount of sulfur mustard produced, careful control of the chemical reaction is required.[91] Nevertheless, Levinstein sulfur mustards produced through this process would still contain approximately 30% of impurities, including polysulfide mustards (such as bis(2-chlorethyl)disulfide (HS_2), bis(2-chlorethyl)trisulfide (HS_3), and higher polysulfide mustards HS_4-HS_7).[92] Levinstein sulfur mustard can be purified by distillation to improve its chemical stability.

Improvised Levinstein sulfur mustard production

6.54 An improvised production of Levinstein sulfur mustard would rely on chemicals that are commonly available and that are not subject to trade restrictions.[93] This is the case with both elemental sulfur (S_8)[94], a solid, yellow, crystalline substance, and chlorine, which is used to produce sulfur monochloride (see Figure 6–A below).

6.55 The latter is commercially available in liquefied, compressed form, but can also be generated from the acidification of sodium hypochlorite solutions, such as bleach.[95] A benefit of sodium hypochlorite—commercially available both as an aqueous solution and as solid tablets—is that it is easier to transport and store than liquefied, compressed chlorine gas.

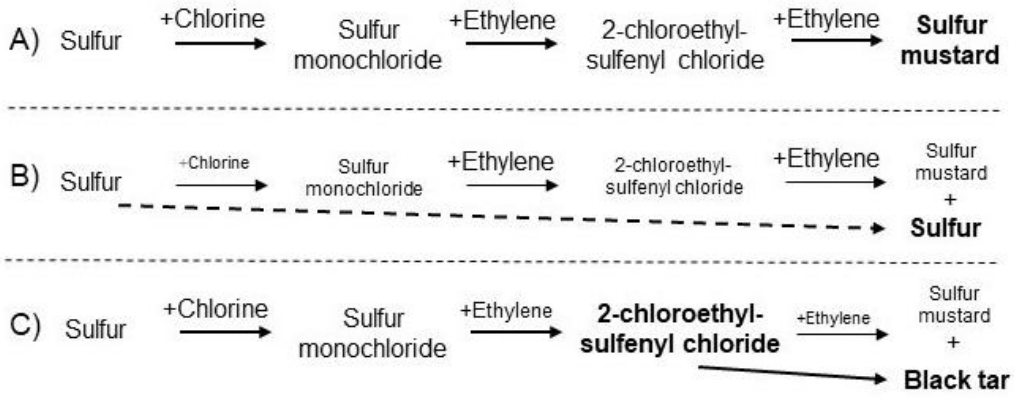
6.56 It is important to note that the chlorination of sulfur results in a mixture of sulfur monochloride and sulfur dichloride at a ratio dependent on the amount of chlorine added.

6.57 The other gas required for the production of Levinstein sulfur mustard is ethylene. Ethylene can be produced by treating dry ethanol with concentrated sulfuric acid.[96] However, a shortage of ethanol of sufficient quality would limit the performance of this process. The lack of equipment to dry, concentrate, and store the ethylene gas produced, and to purify the intermediate sulfur monochloride, would also significantly reduce the performance of a small-scale batch

[89] See M. Sartori “Sulphur compounds, 1. Dichloroethyl Sulphide (Mustard Gas)”, in The War Gases: Chemistry and Analysis (1939).
[90] See M. Sartori, op. cit. (1939); C. S. Gibson and J. Pope, “β,β’-Dichloroethyl sulphide”, in Journal of the Chemical Society (1920), Vol. 117, pp. 271-277.
[91] See M. Sartori, op. cit. (1939).
[92] See R.C. Fuson et al. “Levinstein Mustard Gas. IV. The bis(2-chloroethyl) polysulfides”, in Journal of Organic Chemistry, Vol. 11, Issue 5, pp. 487-498.
[93] See The Australia Group, Export Control Lists: Chemical Weapons Precursors, available at: www.dfat.gov.au/publications/minisite/theaustraliagroupnet/site/en/precursors.html [Accessed 10 December 2023].
[94] For the purposes of the present report, the term “sulfur” will be used in lieu of “elemental sulfur”. Sulfur is widely available as a mineral in the region. For example, the Mishraq State Sulfur Mine, in Iraq, is home to 59% of the world’s total sulfur reserves (see www.zawya.com/en/projects/projects-iraq-likely-to-offer-sulphur-mines-to-investors-hiipsgw0 [Accessed 2 October 2023].
[95] See J. Ledgard (2003). “The Preparatory Manual of Chemical Warfare Agents (2003), Vol. 1, 3rd ed.
[96] See M. Sartori, op cit. (1939).

production method.[97] Either limitation—which would be quite typical of an improvised production—would result in a Levinstein sulfur mustard of poor quality, characterised by a low ratio of sulfur mustard as compared to its impurities.

FIGURE 6: (A) THE LEVINSTEIN PRODUCTION METHOD FOR SULFUR MUSTARD; (B) SHORTAGE OF CHLORINE LEADS TO A FAILURE TO ACTIVATE MOST OF THE SULFUR ADDED. SULFUR BYPASSES THE PRODUCTION ROUTE AND REMAINS IN THE FORM OF A YELLOW POWDER; (C) SHORTAGE OF ETHYLENE GAS RESULTS IN THE PRESENCE OF BLACK TAR.



Note: Arrows represent reactions with the chemical named above. Font size and the thickness of arrows correspond to the concentrations of chemicals and the significance of chemical reactions, respectively.

Origin of the Levinstein sulfur mustard used in Marea on 1 September 2015

Black, oily Levinstein sulfur mustard

6.58 The Levinstein sulfur mustard used in Marea on 1 September 2015 was described as a thick, black liquid or tar, similar to used engine oil.[98] The tarry component of the agent would remain on the surface after the evaporation of its volatile components.

6.59 This is clearly visible in the video recordings of the sampling of the Levinstein sulfur mustard in Marea on 9 September 2015.[99] The video footage shows how the evaporation of sulfur mustard and other volatile components, in the eight days that had elapsed since the chemical incident, resulted in black tar of high viscosity (see Figure 5 above). This also indicates that the perpetrator(s) of the attack had not purified the Levinstein sulfur mustard prior to its use.

[97] See J. Ledgard, op cit. (2003).

[98] This is confirmed by photographs and videos taken at the scene on the day of the incident, corroborated by the description of the substance provided by witnesses to the FFM (FFM Report on Marea, 1 and 3 September 2015, paras 1.3, 7.19, 7.20, and 8.6), as well as by witness statements independently collected by the IIT. See also FFM Report on Marea, 1 and 3 September 2015, Figure 6, p. 17.

[99] See Figure 5 above.

6.60 The oligomers[100] present in the black tar[101] would be very persistent, which corroborates witness recollections that the splatter of the black, tarry liquid was very difficult to wash away with water.[102]

6.61 The extensive formation of black tar in the production of Levinstein sulfur mustard has been linked—in scientific literature—to the use of insufficient amounts of ethylene gas (see Figure 6–C above).[103] As noted above, this limitation is typical of an improvised Levinstein production. Scientific data shows that industrial Levinstein sulfur mustard contains 1% black tar.[104] The visibly higher presence of the tarry component in the sulfur mustard deployed in Marea thus provides further evidence that the agent was produced through improvised means.

Chemical markers of an improvised Levinstein production route

6.62 The improvised nature of the Levinstein sulfur mustard used in Marea was further confirmed by the identification of very high levels of polychlorinated sulfur mustard[105] and sesquimustard species[106] in the third-party samples.[107] These chemicals are produced by the chlorinating action of sulfur chlorides on sulfur mustards.[108]

6.63 The polychlorinated sulfur mustard and sesquimustard species are present at low levels in all Levinstein sulfur mustards.[109] In the Marea samples, they were present at higher concentrations than those characterising Levinstein sulfur mustards produced using an excess of ethylene gas, for example in industrial production.

6.64 A Levinstein sulfur mustard produced under improvised conditions, with a shortage of ethylene, will contain an excess of sulfur chlorides as impurities, resulting in the extended exposure of sulfur mustards to sulfur monochloride.

6.65 Accordingly, the presence of elevated concentrations of polychlorinated chemicals in sulfur mustard—as was the case in the third-party samples—provides a further strong indication of improvised production.

[100] Oligomers are defined as short polymers (2-5 monomer units). The black tar of Levinstein sulfur mustard is produced when the reactive 2-chlorosulphenyl chloride polymerises to produce black tar of high viscosity.

[101] See P. Norman (1998). "3. Composition of 'Tarry Mustard'", in Arsenic and Old Mustard: Chemical Problems in the Destruction of Old Arsenical and Mustard Munition. Eds: J. F. Bunnet and M. Mikolajczyk, NATO ASI Series, Vol. 109, pp. 105-114, Springer, Dordrecht.

[102] See FFM Report on Marea, 1 and 3 September 2015, paras 7.21 and 7.36.

[103] See J. B. Conant et al. (1920). "The mechanism of the reaction between ethylene and sulfur chloride", in Journal of the American Chemical Society, Vol. 42, pp. 585-595.

[104] See A. M. Kinnear and J. Harley-Mason (1948). "The composition of mustard gas made by the Levinstein process", in Journal of the Society of Chemical Industry, Vol. 67, Issue 3, pp. 107-110.

[105] See T.P. Dawson and W. E. Lawson (1927). "Chlorination of β,β-Dichloro-ethyl Sulfide II", in Journal of the American Chemical Society, Vol. 49, pp. 3125-3129.

[106] See J. W. C. Philips et al. (1929). "Observations on the Chlorination Products of β,β'-Dichlorodiethyl Sulphide. II", in Journal of the Chemical Society, pp. 535-549.

[107] See Table below, rows 10 and 11.

[108] See F. G. Mann and W. J. Pope (1922). "Production and reaction of β,β'-dichlorodiethyl sulphide". Journal of the Chemical Society, Transactions. Vol. 121, pp. 594-603.

[109] The polychlorinated sulfur mustard is in some sulfur mustards difficult to detect but the polychlorinated sesquimustard species are reliable markers of Levinstein sulfur mustard.

6.66 Assessed in its totality, the chemical data decisively points to the use of an improvised Levinstein route for the production of the sulfur mustard used as a weapon in Marea on 1 September 2015.

The yellow powder

6.67 Thirteen of the IIT and FFM witnesses reported having seen a yellow powder at some of the locations targeted on 1 September 2015 in Marea.[110] No traces of yellow powder were present when the relevant locations were sampled six years after the incident took place.[111] Nevertheless, the IIT still took into consideration descriptions of the yellow powder, as provided by witnesses, to develop hypotheses as to its linkage to the black substance.

6.68 Notably, the IIT considered that the particulate, dusty texture of the yellow powder, as observed by witnesses, could, prima facie, match the crystalline nature of sulfur. Based on this hypothesis, the "yellow powder" observed at some of the affected locations in Marea could have been attributable to the very high sulfur content of the chemical payload released at the relevant locations on 1 September 2015.

6.69 As previously discussed, in an attempt to indigenously produce sulfur mustard, a shortage of ethylene gas would result in an overproduction of the black tar associated with the Levinstein production method[112] (see Figure 6–C above). Similarly, a shortage of chlorine gas would result in a failure to convert the sulfur into sulfur monochloride, which is required for the production of sulfur mustard.

6.70 In such a case, a significant amount of the sulfur added to the reaction vessel would remain as such, with the final product being a mix of sulfur and the Levinstein sulfur mustard synthesised in the process (see Figure 6–B above). The fact that several witnesses described both the black tar and the yellow powder as having a very bad odour further corroborates the release, at the relevant locations, of Levinstein sulfur mustard mixed with the yellow powder.[113]

Sulfur powder aerosols

6.71 Visual analysis of images and videos of munitions carried out in the course of the IIT investigation suggests, as a hypothesis, that the munitions possibly associated with a chemical payload of yellow powder used in the Marea attack burst upon impact.[114] The impact power of artillery projectiles is known to produce soil aerosols of ultrafine particles when the projectiles hit the ground.[115] Similarly, a payload of dusty sulfur powder would produce an aerosol of particles as a result of the ballistic impact power of the related chemical munitions.

[110] See FFM Report on Marea, 1 and 3 September 2015, para 8.6.

[111] As noted above in this Section, the IIT assesses that, during the operations to sanitise the affected locations in the aftermath of the incident, it would have been significantly easier to remove traces of a dusty powder compared to a sticky, oily substance (such as the black substance also reported by witnesses). This explains why no remains of yellow powder were present and available for collection at the time of sampling, i.e., almost six years after the incident occurred.

[112] See A. M. Kinnear and J. Harley-Mason (1948). "The composition of Mustard Gas made by the Levinstein process", in Journal of the Society of Chemical Industry, Vol. 67, Issue 3, pp. 107-110.

[113] FFM Report on Marea, 1 and 3 September 2015, para. 1.10.

[114] See "The origin of the munitions" Section below.

[115] See M. Campagna, et al. (2017). "Ultrafine Particle Distribution and Chemical Composition Assessment during Military Operative Trainings", in International Journal of Environmental Research and Public Health, Vol. 14, p. 579.

6.72 In line with the above, one witness recounted how the yellow "powder spread and remained suspended in the air for a period of time after the impact of the projectile".[116] "Other witnesses described projectiles filled with a greenish yellow powder that spread after the impact of the munition", and another witness "estimated the diameter of the yellow substance spread at 2 metres, with the yellow powder being more concentrated the closer it got to the impact point".[117] This would be expected, as the speed of sedimentation of particles with a diameter above 100 µm is very high, while smaller particles may remain airborne for longer.

6.73 Scientific literature illustrates how a semi-volatile organic compound, such as sulfur mustard, can be transported on airborne particles indoors, exposing humans via inhalational and dermal pathways.[118] Therefore, ultrafine sulfur particles could potentially create an airborne dust that would carry particle-bound sulfur mustard for significant distances.

6.74 This hypothesis may explain how some of the victims of the 1 September 2015 attack described symptoms consistent with sulfur mustard exposure at locations where no presence of a black, oily liquid was reported.

The olfactory characteristics

6.75 Following the attack of 1 September 2015, a very unpleasant odour spread across Marea.[119] Witnesses described the odour of both the black liquid and the yellow powder found at the impact locations as "bad, pungent, and/or disgusting".[120]

6.76 Levinstein sulfur mustard has been frequently associated with the characteristic and extremely unpleasant odour described.[121] The even larger content of impurities present in Levinstein sulfur mustard produced by improvised means would make its bad odour even more acute. Therefore, the olfactory characteristics of the Levinstein sulfur mustard used in Marea further support the conclusion that the agent had been produced through improvised means.

Other sulfur mustard incidents in the region from 2015 to 2017

6.77 In addition to the analytical data relating to the incident under review in the present report, the IIT has accessed, reviewed, and compared the chemical data of seven incidents of use of sulfur mustard carried out in temporal (2015 to 2016) and/or geographical proximity to the 1 September 2015 chemical attack in Marea. In all seven incidents, the use of sulfur mustard as a chemical weapon was confirmed by OPCW fact-finding missions and technical assistance visits, and the relevant findings were often publicly reported.

[116] See FFM Report on Marea, 1 and 3 September 2015, para. 7.23.
[117] See FFM Report on Marea, 1 and 3 September 2015, para 7.22.
[118] See C. J. Weschler and W. W. Nazaroff (2008). "Semivolatile organic compounds in indoor environments", in Atmospheric Environment, Vol. 42, pp. 9018-9040; C. J. Weschler and W. W. Nazaroff (2008). "SVOC exposure indoor: fresh look at dermal pathways", in Indoor Air, Vol. 22, pp. 356-377.
[119] See FFM Report on Marea, 1 and 3 September 2015, para 7.25.
[120] See FFM Report on Marea, 1 and 3 September 2015, para 7.24.
[121] "Agent Information Quick Reference", in Chemical Agent Identification Sets (CAIS) Information Package, U.S. Army Program Manager for Chemical Demilitarization, November 1995, p.35 available at: www.bulletpicker.com/pdf/CAIS.pdf [Accessed 20 October 2023].

6.78 A payload of sulfur mixed with sulfur mustard was reported in relation to a chemical attack carried out in Sultan Abdullah, Iraq, on 11 August 2015,[122] that is, only three weeks prior to the Marea incident on 1 September 2015. In statements reviewed by the IIT, witnesses recalled the release of a "thick, persistent, yellowish cloud of smoke/vapour" and large, dark, oily droplets released from mortar projectiles upon impact.[123] Witnesses further described the substance's smell as one akin to that of rotten garlic, apples, or eggs.[124]

6.79 Sulfur mixed together with sulfur mustard was identified alongside TDG, HS_2, and HS_3 in two samples extracted from mortar fragments and in two soil samples,[125] while sulfur mustard exposure was verified in biomedical samples.[126]

6.80 Two further incidents of use of sulfur mustard took place in Eski Mosul and Shamsa, also in Iraq, prior to the Sultan Abdullah incident. Two powder samples collected respectively from a mortar and a rocket body were identified as elemental sulfur.[127]

6.81 Of particular note is another attack involving sulfur mustard which occurred in Marea on 21 August 2015, that is, 11 days prior to the incident addressed in the present report. The use of sulfur mustard as a chemical weapon was confirmed by the FFM, based on the analysis of chemical markers for sulfur mustard exposure in biomedical samples taken from members of a family affected by the attack.[128]

6.82 In its report, the FFM notes that the family was exposed to sulfur mustard following the impact of an artillery munition that landed in a room of their house.[129] In interviews conducted by the FFM and reviewed by the IIT, one of the affected individuals stated that "after the explosion, a yellow gas filled their living room."[130] The witness further stated that after running out of the house they felt like there was "gunpowder in our heads".[131]

6.83 No splatters of a black, thick liquid were present on the walls of the affected room.[132] This could indicate that the projectile that struck the building had a chemical payload of yellow powder. The dusty texture of powdery sulfur mixed with a low concentration of sulfur mustard would

[122] See Technical Assistance Visit Final Report, TAV/04/15/6365/22, II.2.2 Second Visit (TAV/03/15), Incident: 11 August 2015, pp. 6-10.
[123] See EC-81/NAT.5, p. 12. The IIT obtained the necessary permission to quote the document in the present report.
[124] See EC-81/NAT.5, p. 12.
[125] TAV/04/15/6365/22, pp. 7-10, Analysis Results, samples 6, 8, 10, and 11, on file with the Secretariat.
[126] Biomedical samples were collected from affected victims and analysed by a State Party. The relevant analytical results, as reviewed by the IIT, confirmed the exposure to sulfur mustard, further corroborated by the symptoms developed by those affected.
[127] TAV/04/15/6365/22, pp. 7-10, Analysis Results, samples 5 and 12, on file with the Secretariat.
[128] See FFM Report on Marea, 21 August 2015, para. 3.30.
[129] See FFM report on Marea, 21 August 2015, para. 3.8.
[130] See "MSF treats patients with symptoms of exposure to chemical agents", Press release, 25 August 2015, Médecins Sans Frontières, available at: www.msf.org/syria-msf-treats-patients-symptoms-exposure-chemical-agents [Accessed 9 November 2023].
[131] Quote from an FFM witness. Gunpowder contains charcoal, saltpeter, and sulfur.
[132] See video "Home Damaged in Chemical Attack: A video taken by a Syrian man after his home in Marea was struck by a chemical shell believed to have been fired by the Islamic State on Aug. 21", in "What an ISIS Chemical Strike Did to One Syrian Family", The New York Times, 6 October 2015, available at: www.nytimes.com/2015/10/07/world/middleeast/syrian-familys-agony-raises-specter-of-chemical-warfare.html [Accessed 7 November 2023].

explain the witnesses' description of the incident and the symptoms that they reported, which the IIT hypothesises were caused by airborne sulfur particles carrying sulfur mustard.[133]

6.84 The 21 August 2015 attack was subsequently investigated and reported on by the OPCW-United Nations Joint Investigative Mechanism in its Third Report.[134] As the report describes, the leakage of a dark liquid from shells, and the use of two types of chemical munitions (i.e., filled with a black, oily liquid and yellow powder, respectively), as observed in Marea on 1 September 2015, cannot be excluded.

6.85 Black, oily Levinstein sulfur mustard was further used as a chemical weapon in two incidents that occurred in Taza (Iraq) and in Um-Housh (Syrian Arab Republic) on 8 March 2016 and 16 September 2016, respectively.

6.86 In Taza, the village was targeted by 11 rockets with a chemical payload of a black liquid which, after release, spread the characteristic bad odour of rotten garlic.[135] Several victims of the attack were affected by blisters and burns to their bodies. Exposure to sulfur mustard was confirmed by the analysis of biomedical samples. A technical assistance visit was undertaken by the OPCW at the request of Iraq, and 18 environmental samples, collected by chemical, biological, radiological, and nuclear (CBRN) teams of the Iraqi Civil Defence and the Iraqi Army, were transferred to the OPCW for chemical analysis.

6.87 The Um-Housh chemical incident was reported by the FFM. A black, oily[136] Levinstein sulfur mustard[137] was sampled from a mortar initially collected by a CBRN team, and the samples were then transferred to the OPCW for chemical analysis.

6.88 The sulfur mustard used as a chemical weapon in Taza and Um-Housh had a very similar chemical profile to the one used in Marea on 1 September 2015, indicating a similar method of production.[138]

6.89 However, the presence of certain unique chemicals in the Um-Housh sulfur mustard[139] is also significant in understanding the evolution of the improvised Levinstein production method.

6.90 The findings summarised above highlight a clear pattern of use of Levinstein sulfur mustard as a chemical weapon in several attacks carried out in the region (Syrian Arab Republic and Iraq) on dates close to the Marea incident of 1 September 2015.

[133] See FFM report on Marea, 21 August 2015, paras 3.30 and 4.6. See also S. Sezigen, et al. (2019). Victims of chemical terrorism, a family of four who were exposed to sulfur mustard, in Toxicology Letter, Vol. 303, pp. 9-15.
[134] See Third Report of the OPCW-United Nations Joint Investigative Mechanism (S/2016/738).
[135] See Technical Assistance Visit Final Report, TAV/02/16/6461/010 , p. 27.
[136] See FFM Report on Um-Housh, subpara. 5.14(b).
[137] See FFM Report on Um-Housh, paras 6.3 and 6.4.; Seventh Report of the OPCW-United Nations Joint Investigative Mechanism (S/2017/904), para. 21.
[138] For comparison, see Table below.
[139] See FFM Report on Um-Housh, Annex 11.

Yellow powder vs. black tar: a chemical interpretation of observed patterns

6.91 As noted above, building on its assessment of the analytical data relating to the 1 September 2015 incident in Marea, the IIT was able to access, review, and compare chemical analytical data from multiple incidents of confirmed use of Levinstein sulfur mustard as a weapon.

6.92 The chemical analysis of the samples from Sultan Abdullah[140] confirmed the presence of Levinstein sulfur mustard mixed with significant amounts of sulfur. In Eski Mosul and Shamsa, sampled munitions essentially contained pure sulfur powder.[141]

6.93 In the final report of the relevant OPCW technical assistance visits, as well as in a national paper from Iraq,[142] witnesses to the above-mentioned incidents consistently describe yellow powder, dust, or smoke as having been released at the sites of the incidents. Similar statements were provided by the witnesses of the two incidents that occurred in Marea on 21 August and on 1 September 2015, respectively. Consistent with this pattern, a yellowish smoke was also reported by witnesses to a confirmed sulfur mustard attack carried out in Al-Abbasiyah, Iraq, on 27 February 2016.[143]

6.94 The IIT chemistry expert assessed that the incident in Marea on 1 September 2015 marked the start of a new pattern of observations of predominantly black, oily chemical payloads in confirmed incidents of use of Levinstein sulfur mustard as a weapon. This pattern includes the chemical incidents that occurred in Taza on 8 March,[144] and in Um-Housh on 16 September 2016.[145]

6.95 As with the black, oily sulfur mustard used in Marea on 1 September 2015, the chemical agent deployed in Taza and Um-Housh contained a polychlorinated sulfur mustard species, which is indicative of an improvised Levinstein production method.

6.96 The chemical substance used in Um-Housh also contained a larger number of highly polychlorinated mustard species.[146] This suggests that the improvised production method used by the perpetrators had—by then—evolved, through the implementation of a more efficient conversion of sulfur into its sulfur chlorides, causing an extensive over-chlorination to produce sulfur dichloride, instead of sulfur monochloride.

6.97 In line with this hypothesis, only a "black engine oil type of substance" was observed at the scene of the incident in Um-Housh, according to witness statements.[147] The improved production method would explain why the deployment of chemical payloads containing sulfur powder with a low sulfur mustard content had become rarer by 2016.

[140] See "Technical Assistance Visit Final Report – Republic of Iraq", TAV/04/15/6365/22, and II.2.2 Second Visit (TAV/03/15), pp. 6-10

[141] See "Technical Assistance Visit Final Report – Republic of Iraq," TAV/04/15/6365/22, pp. 7-9.

[142] See EC-81/NAT.5, p. 12.

[143] See "Technical Assistance Visit Final Report – Republic of Iraq", TAV/02/16/6461/010, pp. 25 and 26.

[144] See "Technical Assistance Visit Final Report – Republic of Iraq", TAV/02/16/6461/010, pp. 26-28.

[145] See FFM Report on Um-Housh, subpara. 5.14(b).

[146] See Table below, rows 12-14; FFM Report on Um-Housh, Annex 11.

[147] FFM Report on Um-Housh, subpara. 5.14(b).

6.98 The two patterns observed suggest and are consistent with an evolution of the perpetrators' capacity to produce Levinstein sulfur mustard by improvised means over time. The fact that no yellow powder was observed in the later incidents of use of Levinstein sulfur mustard documented in both Iraq and the Syrian Arab Republic, namely, in Taza and Um-Housh, considered by the IIT, indicates that the perpetrators had improved the method used for converting sulfur into its sulfur chlorides. The black, tarry appearance of the sulfur mustard used as a chemical weapon in March and April 2017 in Mosul, Iraq,[148] however, still indicates a limited capacity to produce sufficient amounts of ethylene gas, showing persisting limitations in the perpetrators' capabilities as compared to an industrial production of Levinstein sulfur mustard.

Sulfur mustard in State chemical weapons programmes

6.99 As highlighted above,[149] the IIT considered several scenarios as to the origin of the sulfur mustard used in Marea on 1 September 2015. In its assessment of alternative hypotheses, the IIT explored the possibility that the substance may have originated from a State stockpile. In particular, the IIT considered the scenarios—reported in open sources—that a non-State actor may have seized control of the sulfur mustard stockpiled by the Syrian Arab Republic, or recovered the agent from disposed chemical munitions manufactured as part of the Syrian Arab Republic's chemical weapons programme, or of former chemical weapons programmes in the region.

6.100 The IIT assessed the feasibility of both hypotheses, bearing in mind that the sulfur mustard used as a weapon in Marea on 1 September 2015 originated from a Levinstein production route.

6.101 According to the initial declaration of the Syrian Arab Republic to the OPCW and its subsequent amendments, sulfur mustard was included in its chemical weapons programme and was produced via a Meyer production route. Analytical data relating to the Syrian stockpile[150] shows that the agent contained significant amounts of oxygen sulfur mustard, which is a major impurity of Meyer sulfur mustard, in particular when stockpiled for extended periods of time.

6.102 The sulfur mustard included in the Syrian Arab Republic's stockpile also contained the sulfur mustard polysulfide HS_2 and trace amounts of HS_3, resulting in a HS_3/HS_2 ratio of only 0.015. This small value is consistent with an identity of the agent as Meyer sulfur mustard. Furthermore, the total absence of two polychlorinated sesquimustards,[151] which constitute Levinstein-specific markers, provides further confirmation that the sulfur mustard stockpiled by the Syrian Arab Republic was not produced via the Levinstein route.

6.103 Therefore, the composition of chemical impurities of samples from the Syrian Arab Republic's stockpiled sulfur mustard confirms that it was produced via a Meyer production route, as stated in the initial declaration of the Syrian Arab Republic declaration to the OPCW and its subsequent amendments.

[148] See "Report of the Technical Assistance Visit to Iraq". (S/1559/2017, dated 6 December 2017), pp. 3 and 4.
[149] See "Scenarios" Section above.
[150] On file with the Secretariat.
[151] 1,1,2-Trichloro-2-[[(2-[(2-chloroethyl)thio]ethyl]thio]ethane and a second isomer with a very similar, but currently unknown exact chemical structure.

6.104 The IIT also considered the hypothesis whereby the sulfur mustard used in Marea may have originated from disposed chemical munitions originating from former chemical weapons programmes in the region.

6.105 However, having established that the sulfur mustard used in Marea on 1 September 2015 was produced via the improvised Levinstein route, the IIT assesses the possibility that the chemical attack under review may have been carried out using sulfur mustard originating from a State's stockpile as extremely unlikely.

Conclusions

6.106 Based on the chemical data relating to the incident that occurred in Marea on 1 September 2015, the IIT concludes that sulfur mustard was used as a weapon and that this chemical agent was produced via an improvised Levinstein method.

6.107 Based on the analysis of the two types of chemical payload documented in the chemical incident—i.e., a black, oily Levinstein mustard and a yellow sulfur powder (mixed with Levinstein sulfur mustard)—the IIT has reasonable grounds to believe that the Levinstein sulfur mustard used in the attack was produced at an improvised facility or facilities with a large variation in performance.

6.108 The improvised nature of the production route—as confirmed by the chemical data—is inconsistent with a State-level production, indicating instead production by a non-State actor.

6.109 As noted above, the use of black, oily sulfur mustard was documented and established in a series of chemical attacks carried out in both the Syrian Arab Republic and in Iraq between 2015 and 2017. In particular, the IIT has reviewed the composition of the chemical impurities present in the sulfur mustard used in Taza (Iraq) and Um-Housh (Syrian Arab Republic) on 8 March 2016 and 16 September 2016, respectively, finding that they were very similar to the sulfur mustard used in Marea on 1 September 2015. This, in turn, indicates a common improvised Levinstein production route across the attacks mentioned above.

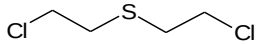
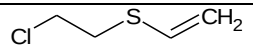
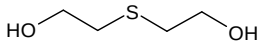
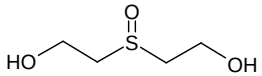
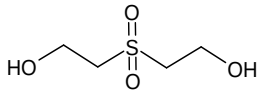
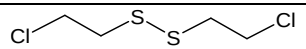
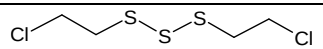
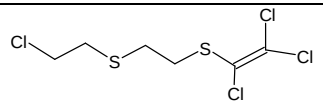
6.110 Chronologically, the attack under review in the present report marked the first incident in this pattern of use of black, oily Levinstein sulfur mustard as a chemical weapon across the region, as publicly reported on by international and national investigative and/or fact-finding bodies and mechanisms. In a pattern of earlier chemical attacks carried out in Sultan Abdullah, Mosul, Shamsa, and Al-Abbasiyah (Iraq), and in Marea (Syrian Arab Republic) on 1 September 2015, the release of yellow-coloured dust, powder, or gas were observed. However, such observations became rarer in the following months and years, which is consistent with an evolution in the perpetrators' capacity to convert sulfur into sulfur chloride for the production of crude Levinstein sulfur mustard of low quality.

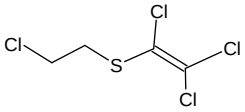
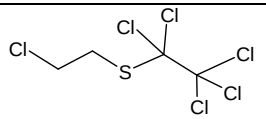
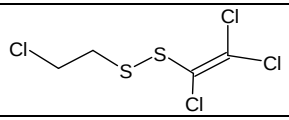
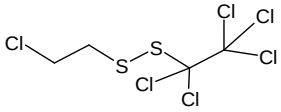
6.111 It should be recalled that the verified uses of sulfur mustard in Marea on 21 August 2015—just a few days before the 1 September 2015 attack on the same town—and in Um-Housh (also in the Aleppo Governorate) on 16 September 2016, were both attributed to ISIL by the OPCW-United Nations Joint Investigative Mechanism.[152] Investigations conducted by Iraq into the use of sulfur mustard in Sultan Abdullah also identified Da'esh (ISIL) as the perpetrator.[153]

[152] Third and Seventh Reports of the OPCW-United Nations Joint Investigative Mechanism (S/2016/738 and S/2017/904).
[153] See EC-81/NAT.5, pp. 1 and 2.

6.112 Chemical data relating to the sulfur mustard stockpiled by the Syrian Arab Republic confirms it was produced (as declared) via the Meyer route, i.e., a different route than that used to produce the sulfur mustard used in Marea on 1 September 2015. Similarly, the IIT considered a scenario whereby disposed chemical munitions from the now-dismantled chemical weapons programme of Iraq may have been the source of the sulfur mustard used in Marea as unlikely, as a Meyer route was also used in that programme for the production of sulfur mustard. Therefore, the IIT assesses the possibility that the chemical incident in Marea may have been carried out using sulfur mustard originating from a State stockpile, rather than indigenously produced by a non-State actor, as extremely unlikely.

TABLE 1: CHEMICALS IDENTIFIED IN SAMPLES RELATED TO THE CHEMICAL INCIDENT IN MAREA ON 1 SEPTEMBER 2015; ANALYTICAL DATA OF (A) FFM SAMPLES ANALYSED BY TWO OPCW DESIGNATED LABORATORIES (DL) UPON IIT INSTRUCTIONS,[I] AND (B) SAMPLES COLLECTED BY A THIRD PARTY AND ANALYSED BY A THIRD DESIGNATED LABORATORY[II]

No.	Chemicals, Trivial Names Used in the Report	Chemicals, IUPAC or Other Names	Chemical structure	IIT analysis of FFM Marea Samples[i]		Third Party Marea Samples[ii]	Taza Samples	Um-Housh Samples
				DL02	DL03	DL	OPCW	OPCW
1	Sulfur mustard	Bis(2-chlorethyl)sulfide		-	-	Soil, lighter	Soil, metal	Mortar
2	2-Chloroethyl vinyl sulfide	2-Chloroethyl vinyl sulfide		-	-	Soil, lighter	Soil, metal	Mortar
3	Thiodiglycol (TDG)	Bis(2-hydroxyethyl)sulfide		M1, M7	M1, M7	Soil	Soil, metal	Mortar
4	Thiodiglycol-sulfoxide (TDG-SO)	Bis(2-hydroxyethyl)sulfoxide		M1, M7	M1, M7	Soil	Soil, metal	Mortar
5	Thiodiglycol-sulfone (TDG-S)	Bis(2-hydroxyethyl)sulfone		-	M7	-	Soil, metal	Mortar
6	HS_2	Bis(2-chloroethyl)disulfide		-	M7	Soil, metal, lighter	Soil, metal	Mortar
7	HS_3	Bis(2-chloroethyl)-trisulfide		-	M7	Soil, metal, lighter	Soil, metal	Mortar
8	HS_3/HS_2-ratio[iii]	-			0.5	1.7[iv]	-[vii]	0.5[v]
9	1,2,3,4-Tetrathiane	1,2,3,4-Tetrathiane		-	M7	Soil, metal, lighter	-[vii]	Mortar[v]
10	Polychlorinated sulfur sesquimustards[vi]	1,1,2-Trichloro-2-[[(2-[(2-chloroethyl)thio]ethyl]thio]ethane		-	-	Soil, metal, lighter	-[vii]	Mortar[v]

11	Polychlorinated sulfur mustard, Cl_4	1,1,2-Trichloro-2-[(2-chloroethyl)thio]ethene		-	-	Soil, metal, lighter	Soil	Mortar
12	Polychlorinated sulfur mustard, Cl_6	1,1,1,2,2-Pentachloro-2-[(2-chloroethyl)thio]ethane		-	-	-	-[vii]	Mortar
13	Polychlorinated HS_2, Cl_4	Disulfane, 1-(1,2,2-trichloroethenyl)-2-(2-chloroethyl)-		-	-	-	-[vii]	Mortar
14	Polychlorinated HS_2, Cl_6	1,1,1,2,2-Pentachloro-2-[(2-chloroethyl)dithio]ethane		-	-	-	-[vii]	Mortar

[i] Two samples collected from indoor walls in Marea by the FFM.

[ii] Three samples—from soil, a metal fragment, and a cigarette lighter, respectively—collected by a third party and all contaminated by a black, oily liquid.

[iii] HS_3/ HS_2-values above 0.1 are linked to Levinstein sulfur mustards.

[iv] Average of data from two samples.

[v] Identified following analytical data mining.

[vi] Two isomers, the second of which with a very similar, but currently unknown chemical structure.

[vii] Analytical data mining not performed.

Symptoms of affected persons

6.113 Sulfur mustard, often termed "mustard gas", is a powerful vesicant agent.[154] The severity and onset of symptoms following exposure to sulfur mustard is dependent on the dose of exposure as well as factors such as age, gender, and medical history of an affected individual.

6.114 Sulfur mustard acts upon multiple body systems, and predominantly manifests in the integumentary,[155] ocular, and respiratory systems, inducing a wide spectrum of pathologies. Dermal (cutaneous) contact with sulfur mustard results in pronounced erythema (reddening), pruritus (itching), and vesication (blistering).[156] In severe cases, tissue necrosis occurs.

6.115 Upon contact with the ocular system, sulfur mustard manifests as redness, swelling, lacrimation and, at a later stage, transient blindness.[157] In the respiratory system, the agent inflicts damage upon the upper airways, manifesting as a sore throat, hoarseness, inflammation, coughing, and shortness of breath.[158] These symptoms may occur either in isolation or simultaneously in affected individuals.

6.116 Furthermore, sulfur mustard is capable of inducing alterations in the DNA. This may lead to long-term carcinogenic risks, particularly within the respiratory epithelium.[159]

6.117 There is a distinct latency in the clinical manifestation of symptoms following exposure to sulfur mustard.[160] The typical dermal manifestations, i.e., reddening and blistering, may appear 2 to 24 hours later, depending on the dose and route of exposure.[161]

6.118 The formation of blisters is contingent upon contact between the skin and the substance, in combination with factors such as humidity, moisture,[162] and temperature. Blisters are commonly observed in areas of the body where folds occur, as sulfur mustard gets "trapped" in the skin folds.[163]

[154] Annex on Chemicals to the Convention, Schedule 1. See also "Chemical analyses" Section above.

[155] The integumentary system comprises the skin and its derivatives, i.e., hair, nails, and sebaceous and sweat glands.

[156] See e.g., Ghanei M., Poursaleh Z., Harandi A. A., Emadi S. E., Emadi S. N. "*Acute and chronic effects of sulfur mustard on the skin: a comprehensive review.*" Cutan Ocul Toxicol. 2010 Dec;29(4) pp. 269-77.

[157] See e.g., Panahi Y., Roshandel D., Sadoughi M. M., Ghanei M., Sahebkar A.. "*Sulfur Mustard-Induced Ocular Injuries: Update on Mechanisms and Management.*" Curr Pharm Des. 2017;23(11) pp. 1589-1597; Soleimani M., Momenaei B., Baradaran-Rafii A., Cheraqpour K., An S., Ashraf M. J., Abedi F., Javadi M. A., Djalilian A. R. *"Mustard Gas-Induced Ocular Surface Disorders: An Update on the Pathogenesis, Clinical Manifestations, and Management."* Cornea. 2023 Jun 1; 42(6) pp. 776-786; Javadi M. A., Yazdani S., Sajjadi H., et al. *"Chronic and delayed-onset mustard gas keratitis: report of 48 patients and review of literature*".

[158] See e.g., Mostafa Ghanei, Ali Amini Harandi. *"The Respiratory Toxicities of Mustard Gas."* Iran J Med Sci December 2010; Vol. 35, No. 4 273.

[159] See e.g., Ghabili K, Agutter PS, Ghanei M, Ansarin K. *"Mustard gas toxicity: the acute and chronic pathological effects."* J Appl Toxicol. 2010; 30(7) pp. 627-643; D. Steinritz and H. Thiermann, Dirk Steinritz and Horst Thiermann, pp. 2686-2688.

[160] The latency period refers to the delay between the time of exposure and the appearance of clinical manifestations. This can range from a few hours to up to 24 hours, depending on the dose and route of exposure. See e.g., Sermet Sezigen, Rusen Koray Eyison, Mesut Ortatatli, Ertugrul Kilic, Levant Kenar. *"Myelosuppression and acute hematological complications of sulfur mustard exposure in victims of chemical terrorism."* Toxicology Letters, 318 (2020), pp. 92-98.

[161] See e.g., Sulfur Mustard: Blister Agent, NIOSH, "*Centers for Disease Control and Prevention*".

[162] Moisture is a measure of the content of water (in liquid state) present in the air, while humidity measures its vapour content (i.e., water in gaseous state).

[163] See e.g., Ghabili K., Agutter P. S., Ghanei M., Ansarin K., Shoja M. M. *"Mustard gas toxicity: the acute and chronic pathological effects."* J Appl Toxicol. 2010 Oct; 30(7), pp. 627-43.

6.119 The IIT requested an expert toxicologist who had not been involved in previous assessments of the incident to formulate an independent evaluation of the symptoms experienced on 1 September 2015, and to determine whether the reported symptoms were consistent with exposure to sulfur mustard.

6.120 The expert consulted by the IIT examined the FFM report on Marea[164] alongside photographs, videos, and information provided by both IIT and FFM witnesses— including medical personnel—on the symptoms and treatment of individuals affected on 1 September 2015, as well as additional materials available in open sources.

6.121 To minimise potential bias and to protect confidentiality, the IIT provided the expert with anonymised accounts from 21 individuals interviewed either by the FFM or the IIT, including affected persons and others present at the sites at which the incident took place, or those who were otherwise involved in the rescue operations.

6.122 Following the review of relevant materials and medical and scientific literature, the expert independently assessed the anonymised statements against typical symptoms of sulfur mustard exposure.[165]

6.123 The IIT took note of information provided by witnesses who stated that they had been affected by two substances released from projectiles, namely, a black viscous liquid and a yellow powder, both with a "pungent smell" akin to "rotten eggs", "boiled eggs", or "garlic" at several locations in Marea on 1 September 2015.

6.124 The effects, as described in the witness accounts of 11 symptomatic individuals reviewed by the IIT were as follows: (a) neurological symptoms, such as loss of consciousness and headaches; (b) ocular symptoms, such as watery eyes, dryness, and redness were reported in 11 individuals as immediate symptoms in the acute phase of toxic exposure; (c) oropharyngeal symptoms, such as a sore throat; (d) respiratory symptoms, such as shortness of breath, difficulty breathing, and "suffocation"; (e) cutaneous symptoms, such as itching, redness, rashes and blisters; and (f) gastrointestinal symptoms, such as nausea and vomiting.[166] The onset of symptoms was reported by some, but not all individuals. Similarly, long-term symptoms were reported by some, but not all individuals.

6.125 Medical personnel interviewed by the IIT recounted receiving casualties at the Al-Hurriyah field hospital in Marea, situated in the south-east of the town, approximately half an hour after shelling began. Affected individuals were disrobed, washed, and dressed by medical personnel in a temporary decontamination tent located in the hospital grounds, before being brought inside for triage and treatment.

[164] See FFM Report on Marea, 1 and 3 September 2015, specifically paras 7.58-7.83.

[165] In the clinical assessment of the symptoms reported by the affected individuals, the expert toxicologist categorised the severity of symptoms into three groups: (a) severe, for individuals requiring hospitalisation with intensive care after experiencing ocular, respiratory, and cutaneous symptoms; (b) moderate, for individuals requiring hospitalisation for longer than 24 hours; and (c) mild, for individuals discharged from hospital within 24 hours with ocular, respiratory, and cutaneous symptoms.

[166] Itching all over the body is not a universal symptom nor typical of sulfur mustard exposure. However, the IIT toxicologist determined that the impurity of the chemical agent used could be considered as a cause of this symptom occurring in individuals.

6.126 Records from the field hospital indicate that a total of 55 casualties were received between 1 September—the day of the attack—and 5 September.

6.127 As the vast majority of local residents, in particular women and children, had been displaced from Marea due to ongoing fighting, the incident disproportionately impacted males and first responders. No fatalities were recorded.

6.128 Records provided by medical personnel showed that patients were treated with IVs and anti-nausea tablets. Some affected individuals required oxygen, but were conscious, as corroborated by footage taken inside the hospital on the day of the attack.

6.129 The IIT expert assessed that individuals who were exposed to low dosage of sulfur mustard experienced ocular and respiratory symptoms even when they had no direct contact with either the substance or the projectile. These symptoms were likely attributable to evaporation of the substance or to exposure to particle-bound sulfur mustard. Since the affected individuals were released from hospital within 24 hours and did not require further hospitalisation, the IIT expert assessed that the severity of their symptoms could be categorised as mild.

6.130 Additionally, the expert assessed that only the individuals who had direct contact with the substance experienced high-dose exposure. This is evident in the case of a first responder who arrived at an impacted location to clear projectiles that had landed on the roof of the building.

6.131 The first responder was reportedly exposed to a black, viscous substance, which leaked onto his thigh during the removal of a projectile from the impacted area. Later, the first responder was also exposed to yellow powder, having stepped into it during the decontamination of the scene with water.

6.132 Direct exposure to sulfur mustard would result in erythema, with blister formation in the centre. This erythema can be observed in pre-blister formation images (Figure 7–left). The first responder reported “yellow tinted” blisters with a fluid-filled sac on the left thigh and on the left foot. The blisters described can be seen in images and videos taken two days after the incident occurred (Figure 7–right).

FIGURE 7: (LEFT) ERYTHEMA, PRE-BLISTER FORMATION; (RIGHT) BLISTER OUTCOMES (PICTURE TAKEN TWO DAYS AFTER THE INCIDENT)



6.133 With respect to the "blackening" of skin, as reported by the affected first responder, the expert determined that it was likely caused by hyperpigmentation. This can be observed in a photograph of the first responder's lower foot taken in 2023, as seen in Figure 8. Long-term complications following recovery such as scarring, hyperpigmentation, and hypopigmentation, typically occur when the dermis and subcutaneous tissue are affected.

FIGURE 8: HYPERPIGMENTATION OBSERVED IN AN IMAGE TAKEN IN 2023



6.134 Based on the reported clinical symptoms and long-term effects, the video and photographic evidence, as well as the description of the chemical substance, the IIT expert assessed with high confidence that the first responder was exposed to sulfur mustard.

6.135 The expert assessed that the clinical symptoms reported by individuals affected in the attack are characteristic of sulfur mustard exposure when considered clinically alongside other symptoms, such as skin blistering followed by erythema.

FIGURE 9: SKIN BLISTERING ON LEG AND FOOT



6.136 With regard to the distinction between the two substances reported at the relevant locations in Marea, namely black, viscous liquid and yellow powder, based on the testimonies of medical staff, reported symptoms, medical records from the hospital, as well as digital footage provided by affected individuals, the toxicologist determined that the overall symptoms and signs were consistent with one another, and with exposure to a blister agent.

6.137 In view of the alternative scenarios pursued during its investigation, the IIT also sought to determine whether the reported symptoms may have resulted from exposure to more than one scheduled or unscheduled chemical agents, rather than sulfur mustard alone. In that respect, the IIT asked the expert to assess the compatibility of sulfur mustard exposure with the reported clinical symptoms and signs, as described by affected individuals. The expert considered reported clinical symptoms in the short-term (acute) phase and chronic phase of exposure to the substance(s), medical records, and published data. Based on the holistic assessment of these materials, the expert determined that sulfur mustard exposure was the first and most likely diagnosis.

6.138 Additionally, with regard to symptoms, such as itching, that were considered atypical, the expert, relying on clinical data, digital footage, and the overall symptoms reported by affected individuals, assessed that they were likely caused by the use of an impure scheduled chemical agent. This is further corroborated by information obtained by the IIT which details similar, atypical symptoms observed in an incident that occurred on 11 August 2015, in which an impure sulfur mustard was found to have been used.

6.139 Following the expert review and assessment of the relevant materials, the IIT was able to conclude that the accounts of medical personnel and individuals affected by the incident of 1 September 2015 are consistent with exposure to an impure sulfur mustard.

Assessment of remnants, impact and delivery of the munitions

6.140 In its report on the Marea incident, the FFM obtained and assessed videos of an artillery projectile found at the site of an impact location on 1 September 2015. The FFM described that the videos taken on the roof of a house in Marea showed "a dark coloured artillery shell surrounded by a black liquid".[167] Additionally, several witnesses interviewed by both the IIT and the FFM stated that the projectiles observed on 1 September 2015 were artillery shells fired by Gvozdika artillery, mortars, and tanks.[168]

6.141 As noted in the "Chemical analyses" Section above, according to FFM witnesses, some projectiles released a black, oily liquid, while other projectiles released a yellow powder.[169] Rescuers interviewed by the FFM indicated that projectiles filled with chemicals were removed from impact locations and buried to prevent further exposure.[170]

6.142 Throughout the course of its investigation, the IIT collected additional statements, photographs, and video footage relating to locations reportedly impacted and to the munitions recovered at the sites.

6.143 In this context, the IIT was able to corroborate, through multiple sources, that the projectiles related to the incident had either been disposed of or buried in undisclosed locations that were no longer accessible.

6.144 Additionally, as noted above,[171] and as was the case with its previous investigations, the IIT was unable to visit the relevant sites of the incident in the Syrian Arab Republic. As a result, and much like the FFM, the IIT was unable to identify the exact whereabouts of the remnants or to retrieve them for physical examination.

6.145 On this basis, the IIT requested two experts, specialised in weapons and munitions systems and on ballistics, respectively—neither of whom had worked on the incident before—to engage in a thorough study of the imagery collected at the impact locations, the respective munitions observed at the sites, and their appearance and features, as also described in witness statements.

6.146 In particular, the experts were asked to assess whether the projectiles observed at the relevant locations in Marea could be identified as the source of the sulfur mustard, and to make a determination as to the method of their delivery.

6.147 The IIT considered over 56 allegations of impact locations, reported by witnesses and first responders interviewed the IIT, and sought to establish the relevance of these sites to the investigation, and in particular to the use of sulfur mustard at the locations allegedly impacted.

[167] FFM Report on Marea, 1 and 3 September 2015, para 7.49
[168] FFM Report on Marea, 1 and 3 September 2015, para 7.17
[169] FFM Report on Marea, 1 and 3 September 2015, para. 7.18.
[170] FFM Report on Marea, 1 and 3 September 2015, para. 7.33.
[171] See "Approach and challenges in the investigation" Section above.

6.148 The IIT could not independently verify all 56 of the reported impacted sites, due to the absence of sufficient information on the remnants, impact craters, alleged chemical substance(s), or effects that would allow the team to corroborate these allegations in line with its established standard of proof.

6.149 Furthermore, as mentioned above,[172] the temporal proximity, as well as the similarities between the incident under investigation and the previous chemical attack that occurred in Marea on 21 August 2015, led to challenges for witnesses when attempting to distinguish between both impact locations and incident dates. These challenges were further exacerbated by the time elapsed between the date of the incident and when the interviews with witnesses took place.

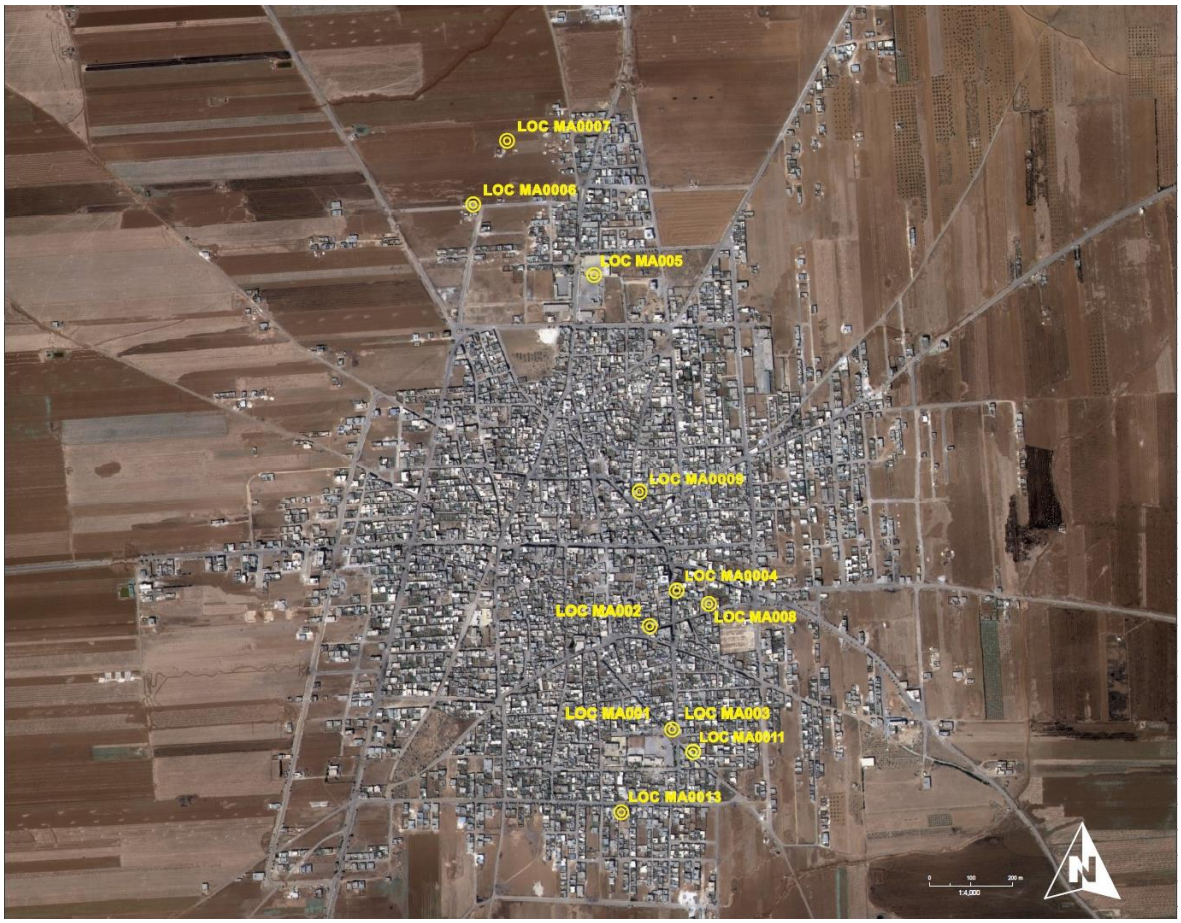
6.150 With this in mind, the IIT took note of the 56 impact locations and, where possible, sought to establish the relevance of these sites to the investigation, and in particular to the use of sulfur mustard at the sites. While the IIT could not independently verify all 56 of the reported impact sites, in its assessment of the relevant locations, it primarily considered locations where: (a) at least two witnesses reportedly observed remnants, alleged chemical substance(s), or impact craters; (b) affected individuals had become symptomatic; and (c) digital footage had been recorded and could be authenticated.

6.151 The IIT collected and assessed digital photographs and videos of the area, including their metadata, taken on 1 September 2015. According to standard practice, the authenticity of images and their content was checked and analysed through different means: witnesses were interviewed with regard to the recording of the videos and to the locations and individuals shown, images from various sources were compared, and metadata extraction was performed by a forensic institute.[173]

6.152 When geographical metadata was not available, the IIT used satellite and reference imagery[174] to determine relevant locations from available photographs and videos. Using this method, the IIT identified a total of 13 locations[175] where projectiles, substances, or impact craters linked to the incident were observed either jointly or separately (see Figure 10 below). This verified material, supported by statements of witnesses and first responders pointing to an additional five verified locations, allowed the IIT to establish 18 impact locations.

[172] See “Approach and challenges in the investigation” Section above.
[173] See “Approach and challenges in the investigation” Section above.
[174] For example, street-level photographs or other visual materials that are confirmed to be of a particular location.
[175] Of the 13 distinct impact locations conclusively identified by the IIT, two of these could not be definitively geolocated. These two locations are therefore not included in Figure 10 below.

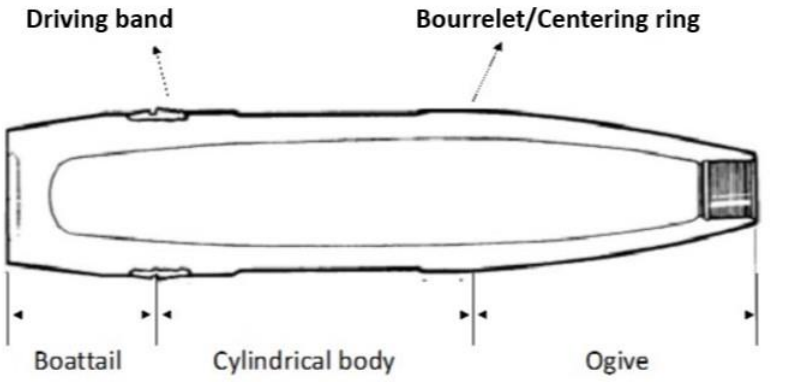
FIGURE 10: IMPACT LOCATIONS IDENTIFIED VIA AUTHENTICATED DIGITAL IMAGERY



6.153 Following the assessment of these impact locations, the IIT munitions expert was able to identify six distinct projectiles, three of which had fragmented, while the other three had remained "whole", or unbroken.

6.154 At the front, the "whole" projectiles displayed an ogival nose section with minor deformations, a cylindrical section limited by a centering ring (bourrelet), and a truncated cone section known as a boattail, which is located below a single driving band. Similarly, the fragmented projectiles presented a single driving band, and a boattail form at the base, all of which are typical of an artillery projectile (see Figure 11).

FIGURE 11: GENERIC ARTILLERY SHELL DESIGN



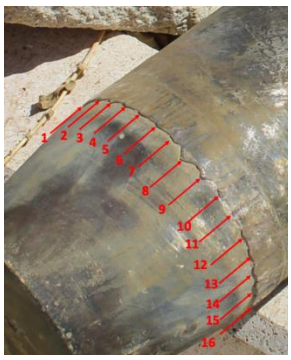
6.155 During the early stages of its investigation, the IIT obtained information claiming that 130-mm artillery projectiles had been used in the attack. Additionally, in its report on the incident in Marea, the FFM confirmed that the observed design of a munition seen at one of the impact locations matched that of an artillery shell[176] and indicated that the projectile had been fired.[177] However, the FFM stressed that it had not been able to access the locations to examine the munition and confirm the calibre.

6.156 Therefore, the IIT asked its munitions expert to determine the exact calibre of the artillery projectiles as a matter of priority. The expert examined authenticated videos and pictures taken at the relevant locations and assessed the external format and profile of the munitions, including the relative positions of the bourrelet and driving band, the ogive shape, and the boattail-type base.

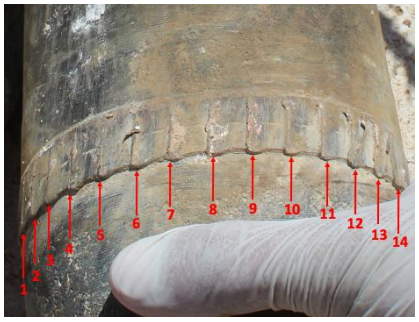
6.157 In addition, the expert measured the number of grooves visible on the driving band of each projectile. In the examined projectiles, the number of grooves observed did not exceed 16, which aligns with the maximum number of grooves expected on 122-mm artillery projectiles.[178]

[176] FFM Report on Marea, 1 and 3 September 2015, para. 7.50.
[177] FFM Report on Marea, 1 and 3 September 2015, para. 7.52.
[178] The total number of grooves on Soviet artillery shells, which are commonly used in the region where the incident took place, are as follows: 40 grooves for 130-mm artillery shells, and 48 grooves for 152-mm artillery shells.

FIGURE 12: NUMBER OF GROOVES VISIBLE IN THE ASSESSED PROJECTILES



MA005 (1)
(16 grooves)



MA005 (2)
(14 grooves)



MA007 (1)
(13 grooves)



MA007 (2)
(15 grooves)



MA008
(16 grooves)



MA013
(16 grooves)

6.158 Based on the overall assessment of the characteristics and grooves observed, the expert determined that the features of both the fragmented and "whole" projectiles are consistent with the design of a 122-mm artillery projectile. In particular, the dimensions and presence of a single driving band are consistent with a Soviet-type 122-mm artillery projectile.

6.159 The IIT also considered whether munitions other than the artillery projectiles identified by the expert had been used in the incident. Based on the information available to it, the IIT could not rule out that other munitions had been used in tandem with the artillery projectiles. However, in the course of its investigation, the IIT did not receive any credible information that would corroborate the use of a different type of munition in the incident.

6.160 Produced and exported globally in large quantities, 122-mm artillery projectiles are, to date, one of the most common artillery munitions found worldwide, particularly in the Syrian Arab Republic and neighbouring countries.

6.161 The commonality of the munition's type, coupled with the unclear colouring and markings—due to firing and impact—prevented a conclusive identification of the projectiles' manufacturing origins, with the exception of one projectile. The IIT munitions expert assessed that the etched letters and numbers on the artillery projectile in question likely correspond to a production batch (29) and year (1989), while the "HGE" marking indicated that at least the body of the shell may have been manufactured in Iraq.[179]

FIGURE 13: ARTILLERY PROJECTILE WITH MARKINGS



6.162 After establishing the calibre of the observed projectiles, the IIT sought to determine whether they had been fired, by assessing the visible driving bands.

6.163 Upon firing an artillery projectile, its driving band engages with the rifling[180] of the barrel, leaving engraved markings on the projectile's body.

6.164 All assessed projectiles had retained their driving bands, aside from those observed at locations MA012 and MA014, which had either partially retained or lost their driving band, respectively.

6.165 In all but one projectile (at location MA012), the engravings displayed on the driving bands were consistent with discharge from a conventional artillery gun. Given the absence of the full driving band at location MA012, the expert assessed the damage to the surrounding structures

[179] "HGE" likely stands for "Hutteen General Establishment", i.e., Hutteen State Establishment, the main conventional ammunition manufacturer in Iraq in the 1980s.

[180] Rifling is the term for the helical grooves machined into the inner surface of a barrel, designed to impart a stabilising spin to the projectile.

and found it to be also consistent with a projectile fired by an artillery gun, and having subsequently impacted near the recovery location.

6.166 Additionally, all projectiles observed at the relevant locations showed varying degrees of scorch marks, which are also consistent with the firing of a projectile from artillery guns.

6.167 Relying on military literature and available open sources, the IIT munitions expert took into consideration weapons systems available in the region and identified three gun systems likely to have been used in the delivery of the 122-mm projectiles, namely, the Soviet D-30 towed gun, the Soviet 2S1 Gvozdika self-propelled tracked gun system, and the Soviet M-30 towed gun. Other guns were considered but deemed less likely to have been used given their limited use in the geographical area.

6.168 The Soviet D-30 gun is one of the most widely used artillery gun systems in the region and throughout the conflict in the Syrian Arab Republic. Although other artillery gun models had been sighted in and around Marea prior to the incident, the IIT expert assessed that it was plausible that the D-30 could have been used to deliver the projectiles, being the most common system used in the area. However, the exact model used on 1 September 2015 could not be conclusively identified.

Distinctive features of the projectiles observed in Marea

6.169 As stated both in the FFM report and by witnesses interviewed by the IIT, on the day of the incident, Marea was subject to shelling by both conventional munitions and projectiles filled with a chemical payload.[181]

6.170 With this in mind, the munitions expert sought to identify whether the projectiles observed at these locations were purpose-built, modified, or of an indigenous design. Such an assessment was critical to inform a deeper understanding of the linkage between the observed projectiles and the use of sulfur mustard in Marea on 1 September 2015.

6.171 Purpose-built chemical artillery projectiles are typically derived from common high explosive (HE) or high-explosive fragmentation (HE-FRAG) projectiles and share many of their characteristics. Typically, chemical artillery projectiles are filled with a chemical agent, and most often fitted with a fuse and a bursting charge.

6.172 HE and HE-FRAG projectiles consist of a thick-walled munition body with a cavity for the explosive filling, and a fuse to initiate the explosive.

6.173 Unlike purpose-built chemical projectiles, HE projectiles would not burst open and expel the chemical payload over a target area without modification, that is, by removing the explosive composition and filling the resultant cavity with a chemical agent. The modified design is intended for the projectile to strike a target area and break open as a result of the kinetic force of impact, spilling its content.

6.174 Based on their features and characteristics, the IIT munitions expert assessed that the projectiles observed at the locations in Marea did not align with those of purpose-built chemical artillery

[181] See FFM Report on Marea, 1 and 3 September 2015, para. 1.3.

munitions. Therefore, the expert proceeded to consider two standard conventional artillery types, namely, bursting and carrier smoke projectiles, on the ground that they may be readily converted to deliver a chemical payload.

6.175 Bursting projectiles commonly consist of a conventional projectile body that contains a payload and a bursting charge running down its body, as well as a fuse in its nose. Once the fuse functions, it initiates the bursting charge which both shatters the projectile body and expels the payload.

6.176 Carrier projectiles[182] feature a removable/frangible base plate or filling holes either at the base or in the side wall of the projectile for payload insertion.

6.177 The IIT munitions expert noted that the projectiles observed at the relevant locations lacked the design traits of both carrier and purpose-built chemical artillery projectiles, indicating that the projectiles were conventional and had been modified to carry a chemical payload (i.e., not purpose-built).

6.178 As noted above, the IIT obtained photographs and videos in relation to multiple locations reported to have been impacted, of which it was able to verify 13 locations of relevance to the incident.

6.179 While the IIT munitions expert conducted a detailed examination of all 13 verified locations for which photographs and videos had been obtained, taking into account the totality of information for each location, one location stood out as an example illustrative of the patterns observed across all. This location was also the primary focus of the munitions analysis detailed in the FFM report.[183]

6.180 At this location, MA008, a 122-mm artillery projectile was observed on the roof of a building, surrounded by a dark liquid.[184] Several witnesses interviewed by the IIT and the FFM reported observing a projectile with a black substance which landed on the roof of an unoccupied house on 1 September 2015.

[182] Carrier projectiles (also known as cargo projectiles) are designed to deliver cargo up to the intended target area. Examples include cluster munitions and certain smoke and incendiary ammunition. Carrier projectiles can be delivered by artillery, aircraft, or missile systems.

[183] See FFM Report on Marea, 1 and 3 September 2015, para 7.49.

[184] See “Chemical analyses” Section above.

FIGURE 14: FUSE-WELL AREA OF THE PROJECTILE SEEN AT LOCATION MA008



6.181 No discernible impact crater could be seen in any of the videos or photographs. Additionally, the fuse-well area of the projectile at location MA008 was observed to be fairly intact, showing only slight deformations or openings, which is likely attributable to the preceding impact. The IIT ballistics expert assessed the damage to the projectile and determined that deformations are inconsistent with the use of an explosive payload. The absence of an impact crater further supports this analysis.

6.182 No remnants of any fusing system were observed on or near the projectile at location MA008, or at any of the 13 impact locations, which is in line with the findings of the FFM.[185] More specifically, one projectile identified at location MA013 exhibited remains of a protective cap over the fuse well, a component that is usually removed and replaced by a fuse prior to firing. One possible reason as to why the projectiles may have been fired while fitted with an inert nose-plug, rather than a fuse, is to limit the exposure of an artillery gun crew to a chemical payload. The munitions expert assessed it is likely that a chemical substance was poured into empty munition bodies through the fuse-well opening, after which the projectile was sealed using a nose-plug screwed back into the fuse-well threading.

[185] FFM Report on Marea, 1 and 3 September 2015, para 7.53.

FIGURE 15: PROJECTILE WITH PROTECTIVE CAP AT LOCATION MA013



6.183 In artillery projectiles, fuses ensure the detonation or payload release at the correct position in space and time relative to the target.

6.184 Their complete absence across all impact locations indicates that the projectiles were of a conventional high-explosive design, and altered to deploy a chemical payload.

6.185 Therefore, the munitions expert assessed it is likely that a chemical substance was poured into empty munition bodies through the fuse-well opening, after which the projectile was sealed using a nose-plug screwed back into the fuse-well threading.

Fragmentation phenomenon

6.186 As noted in the "Chemical analyses" Section above, at locations where a yellow powder, rather than a black substance, was observed, the projectiles fragmented upon impact.

6.187 Witnesses recounted how the yellow "powder spread and remained suspended in the air for a period of time after the impact of the projectile."[186] The IIT consulted with multiple specialists to understand the fragmentation phenomenon observed at locations where either a yellow powder was seen or where no black substance was observed.

6.188 At these locations, neither fuses nor their remnants were observed at any of the locations, including where the projectiles fragmented. The fracture patterns are not in line with the action of a fuse.

[186] FFM Report on Marea, 1 and 3 September 2015, para. 7.23.

Typically, the fragmentation of projectiles with an explosive payload would result in a much greater number of pieces than those seen in Marea.

6.189 The overall observations of both the "fragmented" and unbroken projectiles, as well as their fracture patterns, are not in line with the action of a fuse—with or without an additional bursting charge—as the direction does not correspond to the longitudinal fracture lines expected for a pressurised projectile body.

6.190 Instead, the factures observed resemble those expected in inert artillery shells upon impacting a hard surface, such as steel or reinforced concrete.

6.191 The IIT could not ascertain why these projectiles fractured uniquely, compared to others, resulting in the suspension of yellow powder after impact. However, the IIT experts noted that factors such as variations in materials and potential weakening of the shell (due to chemical interactions or internal pressurisation from chemical decomposition during manufacturing and/or storage) may have contributed to this phenomenon.

Impact conditions

6.192 Once established that the projectiles lacked any fuses and were modified to carry a liquid payload, the IIT ballistics expert used both Point Mass Modelling (PMM) and Finite Element Modelling (FEM) to establish whether the observed impact conditions were consistent with damage originating from a projectile.[187]

6.193 To mimic conditions observed on 1 September 2015, a fuse was omitted in line with observations of the actual projectile bodies. Instead, a simplified steel transport cap was added on the top of the fuse well.

6.194 The projectile body was assumed to be made of high-strength steel, a typical material used in artillery shells.

6.195 Three different impact surfaces, such as those reported and observed in Marea, were considered: soil, concrete, and reinforced concrete.

FIGURE 16: IMPACT DAMAGE, TYPICAL OF INERT ARTILLERY PROJECTILES, AS OBSERVED AT THREE LOCATIONS



(A) (B) (C)

[187] All finite element simulations were performed using the commercial finite element software Ansys LS-DYNA. For the finite element modelling, the OF-426 artillery projectile was used as a generic shell design for the simulations.

6.196 Through the results of the modelling, the expert found that the overall damage observed on the projectiles and at their respective impact sites aligned with damage resulting from the projectiles' impact with common construction materials. This suggests damage that is characteristic of either artillery projectiles with a non-explosive payload or HE projectiles which failed to explode.

6.197 The findings above are consistent with observations at location MA020, where samples confirming the use of sulfur mustard were collected. Despite the absence of a projectile in the available imagery, based on the observed surrounding damage it is apparent that the relevant projectile did not burst and disperse its content upon initial impact, but rather penetrated several layers of hard construction before dispersing a thick, dark-black viscous liquid.

6.198 No signs of explosive fragmentation of the projectile body nor any explosive residues were observed at the impact site, which is consistent with the lack of a fuse, burster charge, or explosive fill. These findings further support the conclusion that the artillery projectiles had been specifically modified to deliver this liquid to the target area, without exploding on initial impact.

6.199 The damage to the surrounding structures, coupled with the shape of the impact crater, allowed for an estimate to be made of the vertical plane in which the projectile was flying prior to impact.

6.200 From visual analysis of the authenticated videos and pictures taken at the relevant locations, the IIT ballistics expert assessed the impact craters and the angle at which the damage to them occurred, to determine the likely firing position(s).

6.201 Based on the combined findings of the FEM and the observations at the impact locations for which the angle of impact[188] could be estimated, the expert concluded that the firing direction was on a north-south axis.[189]

6.202 This assessment is corroborated by statements from multiple witnesses who identified Tal Malid, 3 km south of Marea, as the firing location.

6.203 Based on the available information and imagery of relevant impact locations, no exact determination could be made as to whether more than one firing position or artillery gun was used.

Firing range

6.204 The findings of the FEM and overall observations of the damage at the impact locations aligned with the use of a 122-mm artillery gun projectile, lacking a fuse or burster charge.

[188] The angle of impact can also be referred to as the plane of fall.

[189] The imagery and information available did not allow the expert to establish the exact trajectory of the projectiles on that axis.

6.205 On this basis, PMM was constructed to assess the minimum and maximum firing distance.[190] The maximum firing distance was assessed based on the maximum muzzle velocity[191] of the projectile.

6.206 As highlighted above, the D-30 gun system was widely used in the region. Therefore, the D-30 artillery system was assumed for the PMM. Additionally, the D-30 gun system has a relatively high muzzle velocity, leading to an upper-limit estimation.

6.207 The muzzle velocity of a D-30 or 2S1 artillery gun system, corresponds to 690 m/s and can only be achieved by gun systems. This gives a theoretical maximum firing range of approximately 15,300 m (15 km).

6.208 An M-30 artillery gun system was also used in the model, along with a reduced charge, giving a muzzle velocity of 515 m/s.[192] For this gun system, open sources indicate a maximum range of 11,500 to 11,800 m (11.5 km to 11.8 km), which is confirmed by the PMM , giving a maximum theoretical range of 11,900 m/s.

6.209 Although other weapon systems could have been used in the model, the impact conditions would not have significantly changed significantly.

6.210 A generic drag curve of the projectile was selected and then scaled to give the best fit for the maximum firing range as a function of muzzle velocity. All inputs for the model were further chosen in line with the 122-mm artillery projectile.

6.211 The construction of the firing tables,[193] required by the absence of specific data on the exact artillery gun system, was predicated on theoretical models to determine the estimated impact conditions for two different propellant loads, namely, a standard and reduced load. Open-source data provided foundational muzzle velocities and maximum range estimations for these propellant loads.

6.212 The PMM was then used to determine the extreme firing and impact conditions as a function of gun elevation.

6.213 The PMM results indicate a close correlation between the theoretical predictions and the stated performance characteristics for the different propellant loads.

6.214 As the theoretical maximum was found to be 15 km, the IIT ballistics expert concluded that the artillery projectiles used on 1 September 2015 could only have been fired within a 15-km radius.

6.215 Contrary to a maximum distance, a minimum distance could not be established. This is due to the fact that, as artillery uses a modular charge system, similar impact conditions can be achieved from very different firing locations.

[190] The model used the standard atmospheric conditions as specified by the International Civil Aviation Organization to determine air properties as a function of altitude and assumed wind-still conditions. The model used does not take into account the drift, that is, the lateral movement of the projectile.

[191] Muzzle velocity is the speed of a projectile as it leaves the muzzle of a barrel/gun.

[192] If the M-30 gun system was used, a reduced charge would have to be used (due to the lower resistance of the M-30 barrel).

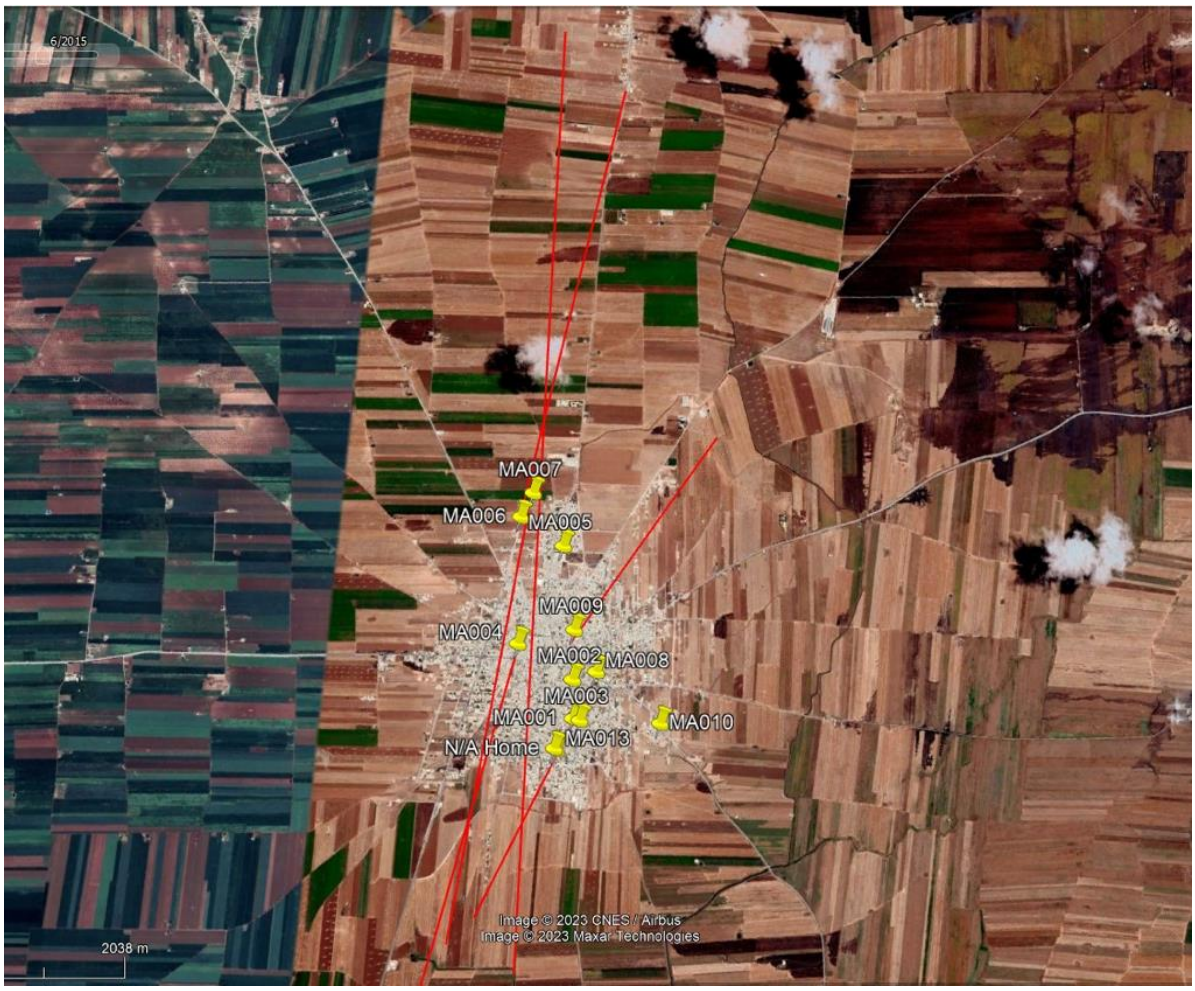
[193] A firing table is typically a chart or table which provides specific data needed for firing a gun accurately on target under standard conditions. It also details corrections that are necessary for conditions such as winds or temperature variations.

Impact of liquid fill on artillery behaviour and firing distance

6.216 Artillery systems function by igniting a propellant within a chamber, creating high-pressure combustion gasses that propel a projectile through a rifled barrel. This rifling imparts the necessary rotation to allow for stable flight.

6.217 With solid explosive payloads, any initial imbalance remains constant once the projectile is fired. Projectiles carrying a liquid payload experience static and dynamic imbalance from fluid movement and "sloshing"[194] due to centrifugal force. This imbalance leads to a wider ballistics dispersion and diminishes precision, effectively rendering any desired targeting arbitrary. This is in line with what was observed in Marea on 1 September 2015.

FIGURE 17: GEOGRAPHIC SPREAD OF IMPACT LOCATIONS



6.218 Additionally, the imbalance alters the projectile's drag, causing it to fall short of its target.

6.219 Factors influencing the level of imbalance include the volume of the fluid fill, the size of the free volume allowing for sloshing, the spatial arrangement of the fluid relative to the projectile's

[194] "Sloshing" can be referred to as the irregular movement of a liquid in a confined object.

longitudinal axis of inertia, the fluid's viscosity and density, the overall balance of the projectile, and the precision of the ammunition placement in the chamber.

6.220 In particular, depending on the viscosity of the liquid, the projectile will spin up faster or slower after it has left the barrel, leading to reduced stability and impacting the maximum range of an artillery gun system.

Conclusions

6.221 Based on the overall observations at the relevant locations, as well as the combined assessment of the munitions and ballistics experts, the IIT has reasonable grounds to believe that at least 18 HE or HE-FRAG projectiles of a 122-mm calibre were used on 1 September 2015 in Marea.

6.222 The exact manufacturing origin of the projectiles could not be identified due to a lack of clear markings.

6.223 The absence of filling holes and plugs, of a removable/frangible base plate, and of the general design features of HE projectiles, indicates that the munitions observed were not cargo or purpose-built chemical artillery shells, but rather conventional artillery modified to accommodate a liquid fill.

6.224 At all of the assessed locations in Marea, the recovered projectiles and fragments observed lacked any fusing systems. This suggests that the shells were fired without a fuse and did not contain any type of bursting charge. Rather, they were filled with a non-explosive compound after the removal of the original explosive filler.[195] Furthermore, there were no indications that the projectiles carried any explosive components in addition to the primary non-explosive fill.

6.225 The absence of typical explosive damage patterns or explosive materials from the projectiles at all assessed locations further supports the conclusion that the projectiles did not contain an explosive payload. Furthermore, firing projectiles carrying an explosive payload without adequate fusing would have been of no practical use.

6.226 The FEM simulations performed by the IIT ballistics expert further supported the analysis that the damage observed on all the recovered projectiles' bodies and parts[196] showed damage consistent with impact on soil or building construction at their respective recovery locations, rather than with an explosive payload or charge. Notably, the damage observed included spill marks of brownish fluids coming from the projectile bodies.

6.227 Based on the analysis above, the IIT has reasonable grounds to believe that that the projectiles observed at the relevant locations in Marea were modified to carry the black liquid also observed at those locations.

6.228 The IIT thoroughly assessed the possibility that the projectiles observed at the assessed locations may have been delivered by means other than an artillery gun system. However, both the IIT munitions and ballistics experts independently determined that the damage to the projectiles and impact sites was consistent with the identified munitions and delivery method. This conclusion

[195] The projectiles were likely filled manually through the fuse wells and subsequently sealed with an inert plug.

[196] Except at location MA014, where no driving band was visible.

also allowed the IIT to discount as extremely unlikely the hypothesis that the recovered projectile bodies and parts may have been moved from their initial impact locations to other locations after their respective impact.

6.229 A comprehensive analysis of the impact locations where the angles of impact could be estimated strongly suggests that the firing directions align with a north-south axis. However, owing to the limitations of the information available to the IIT, resulting from the lack of access to remnants and impact locations, the exact boundaries of this north-south trajectory could not be determined.

6.230 Based on the comprehensive assessment of the impact locations, the IIT concluded that the projectiles were fired from within a 15-km radius from the impact sites. The fact that the projectiles were determined to be modified 122-mm HE or HE-FRAG artillery projectiles, and that the operational range of the 122-mm weapons systems available in the area does not exceed 15 km, supports this conclusion.

6.231 The presence of a liquid payload inside conventional projectiles is uncommon, since the sloshing of the fluid content upon firing adversely impacts the projectile's initial accuracy. The diminished precision in turn leads to a wider spread of impact points, effectively rendering any desired targeting arbitrary. This is in line with the lack of any discernible targeting pattern in Marea following the 1 September 2015 attack.

6.232 This further supports the hypothesis that the munitions assessed were adapted and improvised for chemical dispersal with a liquid chemical fill, rather than being purpose-built chemical munitions.

The origin of the munitions

6.233 Based on the combined assessment of the IIT's munitions and ballistics experts, the IIT has reasonable grounds to believe that, on 1 September 2015, no fewer than 18 modified artillery projectiles, at least six of which carried a sulphur mustard payload, were launched from artillery guns positioned either to the north or the south of Marea.

6.234 For the purposes of identifying the origin of the projectiles, the IIT carried out a detailed assessment of the context of the military activity in the area. It found that, at the time of the incident, ISIL held territory extending up to at least 17 km to the north, 18 km to the south, and over 60 km to the east of Marea. This information was corroborated by 13 witnesses, who confirmed ISIL's territorial control in these directions.

6.235 The IIT has determined that the artillery systems used to deploy the projectiles have a maximum range of 15 km. As noted above, this range decreases significantly when the liquid payload of the projectiles is taken into account.

6.236 Witnesses recounted to the IIT that, on the day of the incident, several projectiles were fired from Tal Malid, and Herbel, which are situated 4 km south-east and 5 km south of Marea, respectively. In an effort to establish the firing position(s) relevant to the incident, the IIT obtained and assessed satellite imagery of several locations of relevance, including Tal Malid and Herbel, from the days prior to and following 1 September 2015.

6.237 As noted above, and in contrast to its previous reports, the IIT faced challenges in obtaining satellite imagery from the period surrounding the incident.[197] The mobility of artillery gun positions, as well as the ease with which they can be concealed, further complicated the identification of the launch site(s). Additionally, as also noted above and described by witnesses, Marea and the surrounding area were under continuous shelling at the time of the incident. As a result, multiple artillery firing locations would have been in operation.

6.238 Satellite imagery captured on 5 September 2015 showed an artillery firing position in Tal Malid. However, the location could not be conclusively determined as the firing location—or one of the firing locations—used on 1 September 2015.

6.239 Given that at the time of the incident, ISIL's territorial control over the areas surrounding Marea extended beyond 15 km to the north, east, and south, the lack of geographical specificity does not undermine the assessment that ISIL-held territories were the likely launch points of the artillery projectiles used on 1 September 2015.

6.240 With this in mind, and in line with its investigative hypotheses and scenarios, the IIT attempted to build up as accurate a picture as possible of the structure and command of ISIL at the time that the Marea incident took place. In so doing, the IIT relied on multiple sources of information, including witness statements, copies of primary documentation, ISIL's online propaganda materials, United Nations and States Parties' sanctions lists, and consultations with military analysts and other experts.

ISIL command structure as relevant to the Marea incident

6.241 Between 2013 and 2017, ISIL maintained a highly dynamic and constantly changing organisational structure. Pivotal to ISIL's governance was the decentralisation of command and decision-making through the division of territory into *wilayas* (governorates). A *wali*, or governor, appointed by the so-called "Caliph" [REDACTED],[198] oversaw the administration of the respective *wilaya* (governorate). According to information received by the IIT, at the time of the incident in Marea, ISIL maintained 19 *wilayas* across Iraq and the Syrian Arab Republic.

6.242 ISIL demonstrated a high degree of organisation, maintaining comprehensive records of its activities across all departments, in all its self-declared governorates. This documentation included budget and expenditure sheets, memoranda, administrative directives, orders, and personnel records.

6.243 Recognising the potential insights that these documents could offer, the IIT pursued access to these records in order to gain a better understanding of ISIL's operational activities and decision-making processes. Given the geographical location of the town, and the organisation's territorial structure, the IIT has reasonable grounds to believe that ISIL's military operations against Marea would have been conducted under the administration of *Wilayat Halab*, ISIL's "Aleppo Governorate".

[197] This limitation resulted from several factors, including the scarcity of imagery of specific locations on multiple dates, and the extent of the area of interest from which the artillery may have been fired exceeding 15 km.

[198] From June 2014 to his death in October 2019.

6.244 Extensive documentation reviewed by the IIT suggests that at least three different ISIL members held the position of *Wali* of Aleppo—or acted on the *Wali*'s behalf—near the time of the incident of 2015. However, the information received by the IIT did not allow it to conclusively determine which of these individuals was serving as the ISIL Governor of Aleppo at the time of the Marea incident.

6.245 Materials reviewed and analysed by the IIT further indicate that while the *Wali* oversaw all administrative matters pertaining to the *Wilaya*, issues requiring executive decision-making were referred to the *Al-Lajna Al-Mufawtha* (Delegated Committee).

6.246 Serving directly under [REDACTED], the Delegated Committee acted as an executive body which supervised all *wilayas*, *dawawin* (departments), and *makatib* (offices) within the territory held by ISIL, and exercised control over the organisation's most critical and strategic decisions.

6.247 The Emir of the Delegated Committee and its members were appointed by the "Caliph". According to the information obtained and reviewed by the IIT, at the time of the incident the Emir of the Delegated Committee was [REDACTED] (also known as [REDACTED]), while [REDACTED] (known by his nom de guerre [REDACTED]) was serving as deputy Emir.

6.248 It is worthy of note that reliable sources also identify [REDACTED] as the commander of ISIL's Al-Siddiq Brigade, which some IIT witnesses, in their statements, reported as being located around Marea at the time of the incident of 1 September 2015.

6.249 Analysts consulted by the IIT confirmed that while the "Caliph" remained the ultimate authority, the Delegated Committee ensured the effective translation of his decisions into practical governance and administration on the ground.

6.250 The IIT reviewed primary documentation showing that the Delegated Committee facilitated communications between the relevant ISIL departments and committees for the purposes of procuring raw materials relevant to the manufacture and development of chemical weapons. For instance, a set of documents obtained and analysed by the IIT reveals how, at the request of *Diwan Al-Jund* (the Department of Soldiery), and upon the written approval and directive of the Delegated Committee, funds were distributed to the Committee for Military Development and Manufacturing (CMDM) from Bayt Al-Mal, in other words ISIL's "Treasury", for the procurement of raw materials.

6.251 During the IIT's assessment of ISIL's organisational structures and their relation to the use and deployment of chemical weapons, the CMDM—led at the time of the incident by [REDACTED], known by his nom de guerre of [REDACTED]—emerged as the key focal point for overseeing and coordinating the group's efforts to enhance its military capabilities.

6.252 Credible information obtained by the IIT suggests that [REDACTED] (also known as [REDACTED]) was the head of *Diwan Al-Jund* in 2015. However, the IIT was unable to corroborate whether [REDACTED] still held that position at the time of the 1 September incident in Marea. Credible information further supports [REDACTED] involvement in ISIL's chemical weapons programme, as well as in the use of sulphur mustard in Taza, Iraq, in March 2016.

6.253 Materials reviewed by the IIT indicate that the CMDM, which fell under the administrative control of *Diwan Al-Jund*, was responsible for the planning, procurement, research, and development of chemical weapons for the Islamic State. Under the leadership of the CMDM, ISIL also developed several chemical agents, including sulfur mustard.

6.254 Beyond the production of chemical weapons, the CMDM was tasked with spearheading research, development, production, and design of weaponry and military apparatus to sustain the war effort, drawing on a mix of acquired local expertise and the technical acumen of foreign recruits.

6.255 The CMDM actively sought to recruit scientists, chemists, engineers, and craftsmen with relevant expertise. Information provided to the IIT further confirms that ISIL benefitted from the expertise of chemists and scientists who had worked for the Government of Iraq in the 1990s, and who had joined the ranks of ISIL as early as 2014.

6.256 Information obtained by the IIT identifies [REDACTED] (also known as [REDACTED], or [REDACTED]) as the primary driver behind ISIL's chemical weapons programme, and the director of the groups's research and development, based in Mosul, Iraq. In this capacity, he is thought to have supervised ISIS' production capability, personally designing part of the production system. Credible information reviewed by the IIT further indicates that these efforts had been initiated by [REDACTED] cousin, [REDACTED]—also known as [REDACTED]—from whom [REDACTED] took over after the latter's death.

ISIL's chemical weapons manufacturing and development capabilities

6.257 As ISIL captured swathes of territory in Iraq and the Syrian Arab Republic in 2014, it seized a range of critical industrial infrastructure across various sectors, which allowed the group to further expand its chemical weapons ambitions. In Mosul, Iraq's second largest city, ISIL seized, inter alia, food-storage centres, laboratories, and pharmaceutical and industrial factories, such as the Al-Mishraq sulfur plant, the Al-Qasoor water treatment plant, and a chlorine gas factory.

6.258 In particular, the IIT received credible information that, in 2015, ISIL established a research and development team at the University of Mosul, responsible for the development of sulfur mustard. Additional information reviewed by the IIT indicates that the CMDM converted warehouses, schools, and private residences into chemical and weapons manufacturing and production sites.

6.259 Visual analysis of materials shared with the IIT shows multiple ISIL manufacturing sites in Iraq and the Syrian Arab Republic, demonstrating a highly organised production line developed by the CMDM.

6.260 According to credible information received by the IIT, one of the locations in Tel-Afar, Iraq, functioned exclusively as a sulfur mustard production site. The IIT chemistry expert established that both the equipment observed and the order of assembly seen in the images were consistent with what is normally expected in the production process for ethylene, which is required for the synthesis of sulfur mustard.

6.261 This corroborates additional information received by the IIT that ISIL synthesised sulfur mustard precursors, produced sulfur mustard agents, and developed sulfur mustard-filled munitions in separate locations before deploying chemical weapons to the field.

6.262 As stated above, ISIL's territory transcended national borders. This cross-border fluidity significantly bolstered the group's operational capabilities, and allowed for the unrestricted transfer of resources, personnel, and materials between ISIL-held territory in Iraq and the Syrian Arab Republic. This cross-border traffic is reflected in credible information received by the IIT detailing ISIL's movement of toxic chemicals from Iraq to the Syrian Arab Republic, and vice versa, in 2015.

The use of chemical weapons in ISIL ideology

6.263 The IIT identified a publication that outlines ISIL's ideological and theological perspectives on chemical warfare. The document was printed in July 2015 by Al-Hima Library, a publishing arm of ISIL's Department of Central Information.

6.264 This document unequivocally posits the permissibility of using any available weaponry, including nuclear, chemical, and bacteriological weapons, in combat "even if this leads to the killing of those whose intentional killing has been forbidden, such as children, women and the like."[199]

6.265 The IIT also reviewed a letter drafted by the Delegated Committee and disseminated on 14 July 2016, showing that ISIL had introduced financial incentives with a view to increasing the use of chemical weapons in the battlefield. This included a reward of 10 silver coins for the use of weapons with a chemical payload.

[199] Publication on file with the IIT.

FIGURE 18: LETTER SHOWING INCENTIVISATION OF CHEMICAL WEAPONS USE BY ISIL'S DELEGATED COMMITTEE



الدولة الإسلامية
اللجنة المفوضة

العدد: ٧٧٧
التاريخ: ١٤٣٧/١٠/٩هـ
٢٠١٦/٧/١٤م

بسم الله الرحمن الرحيم

إلى/ الولايات والدواوين والهيئات كافة

م/ إعطاء جعل لمقاتلين الدولة الإسلامية

الحمد لله، والصلاة والسلام على رسول الله، وعلى آله وصحبه أما بعد:

السلام عليكم ورحمة الله وبركاته ...

أسأل الله تبارك وتعالى أن يتقبلكم بقبوله، ويزيدكم بهداه، ويسدد رأيكم، ويشد عضلكم، ويستعملكم على طاعته، ويوفقكم لما يحبه ويرضاه. إنه ولي ذلك والقادر عليه

التحرير ...

قال تعالى: ﴿فَقَاتِلْ فِي سَبِيلِ اللَّهِ لَا تُكَلَّفُ إِلَّا نَفْسَكَ وَحَرِّضِ الْمُؤْمِنِينَ عَسَى اللَّهُ أَنْ يَكُفَّ بَأْسَ الَّذِينَ كَفَرُوا وَاللَّهُ أَشَدُّ بَأْسًا وَأَشَدُّ تَنْكِيلًا﴾ [سورة النساء: ٨٤]

إن من باب التحريض على قتال أعداء الله والمؤمنين والاتحاد فيهم وتحريض الإخوة على قتالهم، أمر [redacted] بإعطاء كل من الدنانير الذهبية إلى كل من يحقق الإثخان في تدمير أسلحة وعتاد أعداء الله تعالى، وذلك حسب الترتيب التالي:

- العلمانيات (حربية/ مرورية / مسدود): إعطاء سيارة قيمتها لا تقل عن (٢) سبع دنانير ذهبية عيار ٢١ للمغيرة أو للشخص وذلك حسب توجيهات الأمير.
- الدبابات: إعطاء (٣) ثلاثة دنانير ذهبية عيار ٢١ للمغيرة أو للشخص وذلك حسب توجيهات الأمير.
- المدرعات والناقلات المصفحة: إعطاء (٢) سبع دنانير ذهبية عيار ٢١ للمغيرة أو للشخص وذلك حسب توجيهات الأمير.
- الشاحنات الكبيرة والصهاريج: إعطاء (١) اثنين دينار عدا التي تفجر بنفسه أرضي.
- الدروع بأنواعها والآليات المصفحة: إعطاء (٤) أربع دنانير ذهبية عدا التي تفجر بنفسه أرضي.
- الآليات عامة: إعطاء (٢) اثنين دينار عدا التي تفجر بنفسه أرضي.
- النفس: لكل مرتد أو كافر: إعطاء دينار واحد، إذا كان مصلي/ ٢/١ نصف دينار إذا كان معه شاهد.
- الإسناد: كل قذيفة تحقق إصابات مباشرة، يتم إعطاء واحد درهم فضة للمغيرة على أن يكون هناك شاهد أو تصوير، هذا في حال عدم معرفة نوع خسائر العدو، وأما في حالة معرفة خسائر العدو يُعطى لأكبر هدف وليس لكل هدف، على أن يكون الخير في نفس اليوم.
- استخدام السلاح الكيميائي بالمقاذف والصواريخ يُعطى لكل قذيفة (١٠) عشرة دراهم فضية للمغيرة.
- قتل جندي مرتد أو كافر: يُعطى (١٠) عشرة دراهم فضية، بأيّ طريقة كان القتل عدا القنص.
- أسر جندي مرتد أو كافر: إعطاء واحد دينار ذهبي.

آلية إعطاء الجعل عن بينة المقاتل:

على الأخ المقاتل أو المغيرة تقديم طلب إلى الأمير المباشر، بالعمل الذي تم تحديده في المعركة أو الغزوة، مع تقديم الأدلة الكافية من الشهود أو التصوير.

على الأمير المباشر التحقق من صحة الطلب والشهود والتصديق عليه، وإعطاء نسخة معتمدة لصاحب الطلب، مع رفع تقرير مفصل إلى الإدارين أعلاه (الكتيبة/اللواء/الفرقة) يتم صرفه من بيت المال مع الكشافة الشهرية للمقاتلين، وإذا ثبت عدم صحة الطلب يحوّل الأمر إلى القضاء العسكري.

إذا قتل الأخ بعد تقديم الطلب ورفعه إلى بيت المال، يُصرف المثل إلى أهله، أما إذا قتل أثناء المعركة فقد وقع أجره على الله.

وجزاكم الله خيرًا..

ملاحظات: ١) هذا العمل يكون سارياً من تاريخ صدور هذا الكتاب ولمدة شهر.

٢) لا بد من تعميمه على جميع الإخوة.

اللجنة المفوضة

IV. FACTUAL FINDINGS

7. GENERAL REMARKS

7.1 The IIT scrutinised the information obtained and reached its conclusions on the basis of a holistic assessment through a widely shared methodology, in compliance with the relevant provisions of the Convention, as well as international best practices of international fact-finding bodies and commissions of inquiry.[200]

7.2 Throughout the investigation, various hypotheses were considered and pursued. Taking into account the different mandates of the FFM and of the IIT, the IIT was able to expand its sources of information, perform supplementary analyses, and consult additional experts for the specific purpose of identifying the perpetrator of the attack. This allowed for further clarity, consistency, and corroboration as to what witnesses and the original chemical analyses had indicated about the origins of the chlorine identified by the FFM at the two locations.

7.3 The IIT holistically assessed all of the information it obtained, taking a critical approach against the posited scenarios, keeping an open mind, and encouraging States Parties—including the Syrian Arab Republic—and other entities to contribute to expanding its evidentiary basis.

7.4 As the investigation progressed, some scenarios appeared increasingly less likely, as they could not be substantiated through, nor reasonably explain, the information obtained from a variety of distinct sources, taken as a whole. As a result of its investigation, the IIT could not identify any plausible explanation for the concurrence of information before it, other than the conclusions presented below.

8. FACTUAL FINDINGS ON THE INCIDENT IN MAREA, 1 SEPTEMBER 2015

8.1 In relation to the incident of 1 September 2015, in light of the information obtained and considered in its totality, the IIT concludes that there are reasonable grounds to believe that between 09:00 and 12:00 (UTC+3),[201] during sustained attacks aimed at capturing the town of Marea (Aleppo Governorate), units of the Islamic State in Iraq and the Levant (ISIL) deployed sulfur mustard, using one or more artillery guns.

8.2 The IIT identified several impact locations across the town of Marea, with no discernible targeting pattern. All of the remnants and munitions observed at these sites were conventional artillery projectiles, of a 122-mm calibre, modified to disperse a liquid payload. Upon impact, at least six projectiles leaked a black, viscous substance with a "pungent" and "garlic-like" smell. At least 11 named individuals who came into contact with the liquid substance experienced symptoms consistent with exposure to sulfur mustard.

8.3 The IIT further established that the chemical payload was deployed by artillery from areas under the control of ISIL.

[200] See Annex 2 to this report.

[201] At least 15 witnesses confirmed that the incident occurred sometime after 09:00 (UTC+3) and before noon prayer time, i.e., around 12:00 (UTC+3).

8.4 The IIT has reached this conclusion by applying a holistic approach to the assessment of the information related to the different hypotheses that it pursued during its investigation.

8.5 As noted above, sulfur mustard is a chemical warfare agent with powerful vesicant properties. It has no legitimate manufacturing, agricultural or industrial uses, and thus can only be used as a weapon. In its pure state, sulfur mustard is a colourless, odourless, oily liquid while, as an industrial product, it appears yellow-to-dark brown due to the impurities it contains.

8.6 In light of the analytical results presented above, the IIT has reasonable grounds to believe that sulfur mustard was used as a weapon in Marea on 1 September 2015, and that this chemical agent was produced via an improvised "Levinstein" method.

8.7 The analysis of the chemical payload documented in the attack is consistent with an indigenous production by a non-State actor, rather than with a State-operated production on an industrial level. The improvised nature of the production route—as confirmed by the chemical data reviewed by the IIT—is also inconsistent with State-level production.

8.8 The identification of "Levinstein" as the production route of the sulfur mustard used in Marea also allowed the IIT to discount as extremely unlikely the hypothesis that the chemical agent used in the attack may have originated from a State stockpile. Both the declared stockpile of the Syrian Arab Republic, and the now-dismantled chemical weapons programme of Iraq, bordering the Aleppo Governorate where Marea is located, included sulfur mustard that was produced via the Meyer route, i.e., a different production route to Levinstein.

8.9 Based on the analysis of the composition of the relevant chemical impurities, the IIT established that the use in Marea of black, oily sulfur mustard produced via the Levinstein route falls within a well-documented pattern of chemical attacks carried out in both the Syrian Arab Republic and in Iraq between 2015 and 2017. In particular, the IIT assessed that the sulfur mustard used in Taza, Iraq, on 8 March 2016 and in Um-Housh, Syrian Arab Republic, on 16 September 2016, respectively, was very similar to sulfur mustard deployed in Marea on 1 September 2015. This, in turn, indicates a common improvised Levinstein production route across the attacks mentioned above.

8.10 The IIT has identified at least 11 named individuals—including medical personnel and first responders—who were affected by the chemical substance. Based on the expert assessment of witness accounts, digital footage, and clinical data, the IIT was able to conclude that their symptoms, including suffocation, irritation of eyes and nose, vomiting, and severe burns and blisters, are consistent with exposure to an impure sulfur mustard.

8.11 Based on the overall observations at the relevant locations, as well as on the combined assessment of the munitions and ballistics experts, as corroborated by witness accounts, the IIT has reasonable grounds to believe that at least 18 High-Explosive (HE) or High-Explosive Fragmentation (HE-FRAG) projectiles of a 122-mm calibre were used in Marea on 1 September 2015.

8.12 The lack of filler plugs on the sides, of a solid base plate, and of the general design of an HE projectile indicate that the munitions observed were not cargo or purpose-built chemical artillery projectiles, but rather conventional artillery modified to accommodate a liquid fill. This further supports the hypothesis that the munitions assessed were adapted and improvised for chemical dispersal with a liquid chemical fill, rather than being purpose-built chemical munitions.

8.13 At all the assessed locations in Marea, the recovered projectiles and observed fragments lacked any fusing systems. This suggests that the projectiles were fired without a fuse and did not contain any type of bursting charge. Rather, they were filled with a non-explosive compound that replaced the original explosive filler. Additionally, there were no indications that the projectiles carried any explosive components in addition to the primary, non-explosive fill.

8.14 The absence of typical explosive damage patterns or explosive material from the projectiles, at all assessed locations, further supports the assessment that these projectiles did not contain an explosive payload.

8.15 Finite Element Model simulations performed by the IIT ballistics expert further supported the analysis that the damage observed on all the bodies and parts of the recovered projectiles was inconsistent with an explosive payload or charge.[202] Instead, the projectiles are likely to have been filled manually following the removal of the explosive filler.

8.16 In light of the analysis above, as corroborated by witness accounts, the IIT has reasonable grounds to believe that the projectiles observed at the relevant locations in Marea were modified to carry the black liquid that was also observed at the sites.

8.17 The comprehensive assessment of the impact locations suggests that the firing directions align with a north-south axis, and that the projectiles were fired from within a 15-km radius of the impact sites. The fact that the projectiles were determined to be modified 122-mm HE or HE-FRAG artillery projectiles, and that the operational range of the 122-mm weapons system known to be available in the area does not exceed 15 km, supports this conclusion.

8.18 For the purposes of identifying the origin of the artillery projectiles, the IIT thoroughly assessed the context of military activities in the area. As noted above, in the summer of 2015, after a series of territorial gains in northern Aleppo, ISIL had effectively besieged Marea. Based on a thorough reconstruction of front lines and territorial control around the town at the time during which the incident took place, the IIT found that ISIL held territory extending up to at least 17 km to the north, 18 km to the south, and over 60 km to the east of Marea. This information was corroborated by at least 13 witnesses, who confirmed ISIL's territorial control in these directions. While the available information did not allow the IIT to conclusively identify the relevant firing location(s), witnesses recounted that, on the day of the incident, several projectiles were fired from Tal Malid, 4 km south-east of Marea, and Herbel, 5 km south of Marea.

8.19 Based on the combined assessment of military analysis, ballistics determination of both the firing direction and the radius, and witness statements, the IIT has reasonable grounds to believe that the artillery projectiles could only have been fired from areas which, at the time of the attack, were under ISIL control.

8.20 The IIT assesses that the tactical situation in Marea at the time of the attack was consistent with the use of sulfur mustard by ISIL, as the group was motivated to solidify recent territorial gains and to further advance to seize the town due to its strategic position.

[202] With the exception of one location (MA014), where no driving bands were visible.

8.21 The IIT notes that the findings above are consistent with a well-documented pattern of use of indigenously produced sulfur mustard by ISIL across the region between 2015 and 2017. The IIT notes, in particular, that two incidents of use of sulfur mustard in Marea on 21 August 2015 and in Um-Housh, also in the Aleppo Governorate, on 16 September 2016 were both attributed to ISIL by the OPCW-United Nations Joint Investigative Mechanism.[203]

8.22 The IIT notes that the circumstances of the 1 September attack in Marea are very similar to those of the 21 August attack, with both featuring artillery projectiles carrying a sulphur mustard payload. The connection between the two incidents is reinforced by the fact that the 21 August attack occurred just a few days earlier.

8.23 Investigations conducted by Iraq into a series of incidents of use of sulfur mustard between 2015 and 2017 also identified ISIL as the perpetrator.[204]

8.24 For chemical weapons to be used in the incidents described above, orders would be required. Documentation reviewed by the IIT showed that ISIL was a highly organised bureaucracy which maintained detailed records of its operational activities, such as tactical communications, directives, circulars, and financial records. Military operations of such a strategic nature as the attack carried out in Marea, involving the large-scale deployment of weapons containing a chemical payload, would only have occurred pursuant to orders from ISIL's executive branch, i.e., the Delegated Committee, which acted as the group's primary executive body.

8.25 Based on the review and analysis of multiple sources of information and documentation, the IIT assesses that at the time of the incident, the Delegated Committee was chaired by [REDACTED] (also known as [REDACTED]) with [REDACTED] (known by his nom de guerre [REDACTED]) serving as deputy Emir. The IIT further assessed that the Delegated Committee was operating directly under ISIL's "Caliph", [REDACTED].

8.26 In the course of its investigation, the IIT has been able to link additional organisational structures and individuals to the use and deployment of chemical weapons by ISIL, including ISIL's *Diwan Al-Jund* (Department of Soldiery) and the Committee for Military Development and Manufacturing, led at the time of the incident by [REDACTED]—known by his nom de guerre of [REDACTED].

8.27 Two further ISIL members, [REDACTED] (also known as [REDACTED]or [REDACTED]), and [REDACTED] (also known as [REDACTED]), were identified as the primary drivers of ISIL's chemical weapons programme.

8.28 According to credible information that it obtained, the IIT has reasonable grounds to believe that the tactical decisions as to when and where to use chemical weapons resided with ISIL local or regional commanders. The IIT has received identifying information regarding some of the ISIL units deployed around Marea at the time of the incident. However, it has been unable to verify this information through multiple independent sources, or to specifically link those units to the use of sulfur mustard in the attack. Therefore, the IIT could not draw definitive conclusions to the requisite degree of certainty as regards the specific chain of command for the orders given in the 1 September attack in Marea.

[203] Third and Seventh Reports of the OPCW-United Nations Joint Investigative Mechanism (S/2016/738 and S/2017/904).
[204] See EC-81/NAT.5, pp. 1 and 2.

8.29 In line with its well-established methodology, the IIT further considered and pursued alternative scenarios during its investigation.

8.30 From the early stages of its investigation, the IIT assessed that the nature of the chemical incident that occurred in Marea on 1 September 2015 was not consistent with the chemical weapons attacks carried out by the Syrian Arab Republic, as detailed in the First, Second, and Third IIT Reports. Additionally, witness reports indicating the direction of fire were not in line with the probable position of forces of the Syrian Arab Republic at the time of the incident.

8.31 The IIT nonetheless explored the possibility that the authorities of the Syrian Arab Republic may have lost control of sulfur mustard or of its pre-loaded projectiles, and that other actors may have taken advantage of such loss of control. As recalled above in this report, analytical data shows that the chemical substance used in Marea is not consistent with sulfur mustard originating from the Syrian Arab Republic's stockpile or production process. In particular, the IIT concluded that the sulfur mustard used on 1 September 2015 was manufactured through an improvised Levinstein route, which, as highlighted above, differs markedly from the Meyer route used by the Syrian Arab Republic.

8.32 For the same reasons, the IIT has discounted as extremely unlikely the possibility that disposed chemical munitions from the former Iraqi chemical weapons programme may have been the source of the sulfur mustard used in Marea. The IIT has reviewed official statements and open-source reports concerning the temporary capture by ISIL, in 2014, of the Al-Muthanna complex, which was Iraq's main chemical weapons research, development and production facility from 1983 to 1991.[205] However, the IIT notes that the sulfur mustard produced in the former Iraqi chemical weapons programme was also synthetised via a Meyer, and not a Levinstein, route. [206]

8.33 The IIT has further pursued the alternative scenario whereby a non-State actor other than ISIL may have carried out the attack. In particular, the IIT has taken due note of several official statements by both the Syrian Arab Republic and the Russian Federation alleging the use of toxic chemicals as a weapon by *Jabhat al-Nusra*.[207]

8.34 The IIT assessed whether the any groups other than ISIL, located in the vicinity of Marea on 1 September 2015, may have had the means and capabilities to deploy sulfur mustard on the town. As noted above, the IIT determined that, owing to the limited range—15 km—of the artillery shells used to deploy the chemical payload, only ISIL, Syrian armed opposition groups, and the Syrian Democratic Forces would have been within firing distance from the impact locations. By that date, *Jabhat al-Nusra* had withdrawn from northern Aleppo and was in the process of relocating its forces to Idlib.

[205] See e.g., para. 61 of "Note by the Director-General: Opening Statement by the Director-General to the Conference of the States-Parties at its Nineteenth Session" (C-19/DG.16, dated 1 December 2014).

[206] See Chapter III (Iraq's Chemical Weapons Programme) of the United Nations Monitoring, Verification and Inspection Commission's Compendium of Iraq's Proscribed Weapons Programmes in the Chemical, Biological and Missile Area (June 2007).

[207] See e.g., Statement by Mr Safronkov, (Russian Federation), United Nations Security Council, 7893rd meeting (S/PV.7893, 28 February 2017), p. 6; Statement of H.E. Ambassador Milad Atieh, Permanent Representative of the Syrian Arab Republic to the OPCW at the 104th Session of the Executive Council, 10 – 13 October 2023.

8.35 However, the IIT did not receive any credible information suggesting that non-State actors other than ISIL, based in or around Marea, would have had the means, motive, or capabilities to manufacture and deploy sulfur mustard.

8.36 In this respect, the IIT further notes that its findings that ISIL carried out the attack on Marea on 1 September 2015 appear to be consistent with the Syrian Arab Republic's assessment that "Da'esh has used chemical weapons" in the "incidents which occurred in Marea", as provided in a statement to the Executive Council in November 2015.[208]

9. GENERAL CONCLUDING OBSERVATIONS

a) Non-State actors as "perpetrators"

9.1 In reaching its findings that a non-State actor, namely ISIL, carried out the attack in Marea on 1 September 2015, the IIT took into due consideration the mandate entrusted upon it by the Conference in decision C/SS-4/DEC.3.

9.2 It should be noted that the term "non-State actor" is not defined in the Convention.[209] In the absence of a universally accepted definition of the term, for the purposes of the present report only, "non-State actor" refers to any individual or groups different from a State.[210]

9.3 As noted above, the issue of whether the notion of "perpetrators" in the context of paragraph 10 of decision C-SS-4/DEC.3 also includes non-State actors was addressed in the previous IIT reports.

9.4 Notably, in the First IIT Report,[211] the IIT stipulated that its mandate, as related to the "perpetrators of the use of chemical weapons", was to be considered as including the identification of individuals, entities, groups, or governments who were perpetrators, organisers, sponsors, or otherwise involved in the use of chemicals as weapons,[212] namely, all those who were directly or indirectly involved in the use of chemical weapons.

9.5 In light of the applicability of the prohibition of the use of chemical weapons to all actors, the IIT further concluded, also in its First Report, that "non-State actors can be considered as 'perpetrators' under international law as well as within the meaning of this term in paragraph 10 of the Decision of 27 June 2018."[213]

9.6 The IIT maintained this position in both its Second and Third Reports.[214]

[208] See EC-M-50/NAT.18 (dated 23 November 2015), p. 4.
[209] See para. 1 of Note by the Secretariat: "The Chemical Weapons Convention and Accountability of Non-State Actors – Discussion Paper" (S/1254/2015, 9 March 2015).
[210] See para. 1 of S/1254/2015: "… For the purposes of this paper only, "non-State actor" refers to any individual or groups different from a State".
[211] See First IIT Report, para. 2.8.
[212] Ibid; see also para. 5 of United Nations Security Council resolution 2235 (2015) (dated 7 August 2015), stating that the OPCW-United Nations Joint Investigative Mechanism was to "identify to the greatest extent feasible individuals, entities, groups, or governments who were perpetrators, organisers, sponsors or otherwise involved in the use of chemicals as weapons …").
[213] First IIT Report, para. 2.12.
[214] See Second IIT Report, para. 1.4; Third IIT Report, para. 1.4.

9.7 This approach finds support in several provisions of decision C-SS-4/DEC.3. For instance, in paragraph 1 of C-SS-4/DEC.3, echoing the Ieper Declaration of 21 April 2015,[215] the Conference "[c]ondemns in the strongest possible terms the use of chemical weapons by *anyone* under any circumstances, emphasising that any use of chemical weapons anywhere, at any time, by *anyone*, under any circumstances is unacceptable and contravenes international norms and standards".[216]

9.8 This is in line with the international commitment to identify *anyone*[217] responsible for the use of chemical weapons, with the aim of holding them accountable, as reiterated in several OPCW policy-making organs' decisions, reports, and statements, United Nations Security Council resolutions, and other legal and normative instruments.[218]

9.9 Decision C-SS-4/DEC.3 also explicitly condemns the use of chemical weapons by both State and non-State actors, which it qualifies as a "direct threat to the object and purpose of the Convention"[219] and, among others, instances of use of chemical weapons by ISIL in the Syrian Arab Republic.[220]

9.10 In light of the above, the IIT considers the factual findings made in the present report to be consistent with its mandate. The IIT further assesses that ISIL's sophisticated command and governance structure, as reconstructed above;[221] the extent of the State-like functions it exercised; and its power in terms of military strength and territory at the time of the incident, which reached its peak in 2015, leave little doubt as to ISIL's status as an organised armed group, not acting under the lawful authority of any State. ISIL, as a fully-fledged party to the armed conflict in the Syrian Arab Republic, was thus bound by the prohibition of the use of chemical weapons.[222]

9.11 The IIT also recalls that, already when developing investigative hypotheses and scenarios in relation to the incidents reviewed in its three previous reports, it systematically considered non-State actors as possible perpetrators.[223] As its investigations progressed, the IIT pursued or discounted relevant leads concerning potential perpetrators, and identified State actors as such, based solely on all available information and evidence.

[215] "Declaration on the Occasion of the Centennial Commemoration of the First Large-Scale Use of Chemical Weapons at Ieper (*Ieper Declaration*)", unanimously adopted by all States Parties to the Convention on 21 April 2015. Available at https://www.opcw.org/sites/default/files/documents/event_photos/2015/Ieper/Ieper_Declaration.pdf.

[216] Para. 1 of C-SS-4/DEC.3 (emphasis added).

[217] Emphasis added.

[218] For a non-exhaustive list, see e.g., First IIT Report, para. 2.7.

[219] Para. 3 of C-SS-4/DEC.3.

[220] Para. 15 of C-SS-4/DEC.3.

[221] See "The origin of the munitions" Section above.

[222] Pursuant to Common Article 3 of the Geneva Conventions and customary international law, since the Syrian Arab Republic is not a signatory to Additional Protocol II to the Geneva Conventions, relating to non-international armed conflicts.

[223] See First IIT Report, paras 5.1 to 5.6; Second IIT Report, paras 4.1 to 4.3 and 6.1 to 6.3; and Third IIT Report, paras 4.1 to 4.6.

9.12 Accordingly, and in line with the impartiality, objectivity, and independence underpinning its methodology,[224] the IIT's requests for cooperation (as addressed to States Parties and other entities) include, as a matter of standard practice, background information related to actors that might have the capabilities to develop, produce, stockpile, and use chemical weapons, and evidence suggesting or contradicting the possible identification of certain actors as the perpetrators, regardless their status as State or non-State actors.

b) The obligations of the Syrian Arab Republic

9.13 As noted above,[225] in its investigation and analysis of the attack on Marea on 1 September 2015, the IIT established that, at the time of the incident, the Syrian Arab Republic did not have territorial control over the area from which the artillery shells filled with sulfur mustard were fired. To date, the area remains outside the control of the Syrian Arab Republic.

9.14 Nevertheless, pursuant to Article VII of the Convention, a State Party is required to adopt the necessary measures to implement its obligations under the Convention by prohibiting natural and legal persons anywhere on its territory or anywhere under its jurisdiction, as recognised by international law, from undertaking any activity prohibited to a State Party under the Convention, including enacting penal legislation with respect to such activity.[226]

9.15 Furthermore, even when a non-State actor acts autonomously, and can therefore be held accountable for the use of chemical weapons, it remains an obligation of States Parties to implement measures of accountability.[227]

9.16 Subparagraphs 1(a) and 1(c) of Article VII require States Parties to prohibit individuals from engaging in activities prohibited by the Convention, including by enacting penal legislation if the offence occurs on their territory or is undertaken by their nationals. States Parties that have adopted national legislation pursuant to these provisions are able to prosecute in their domestic courts their nationals who have committed the relevant offences. [228] This obligation is further strengthened by United Nations Security Council resolutions 1540 (2004), [229] 2253 (2015),[230] and 2322 (2016),[231] highlighting, inter alia, the need to hold accountable and bring to justice, extradite, or prosecute any person who supports, facilitates, participates or attempts to

[224] See para. 6 of EC-91/S/3; para. 8 of EC-92/S/8; and para. 3 of S/1918/2020.

[225] See "Factual findings on the incident in Marea, 1 Sept 2015" Section above.

[226] Regarding States Parties' obligation to investigate, as arising from Article VII of the Convention, see e.g., Statement by Mr. Safronkov, (Russian Federation), United Nations Security Council, 7893rd meeting (S/PV.7893, dated 28 February 2017), p. 7 (highlighting the need to enable the Syrian Arab Republic "in accordance with its obligations under Article VII of the Chemical Weapons Convention (CWC), to appropriately conclude a comprehensive national investigation verifying the facts laid out in the JIM's reports.").

[227] First IIT Report, para. 2.11 and footnotes 22 and 23.

[228] In this respect, see also e.g., "Joint Statement on Measures to Counter Chemical Terrorism" (C-24/NAT.24*, dated 29 November 2019), issued on behalf of Angola, Armenia, Azerbaijan, Belarus, Burkina Faso, Cambodia, China, Cuba, Iran (Islamic Republic of), Kazakhstan, Kyrgyzstan, the Lao People's Democratic Republic, Myanmar, Nicaragua, Pakistan, the Russian Federation, Serbia, the State of Palestine, the Syrian Arab Republic, Tajikistan, Uzbekistan, Venezuela (Bolivarian Republic of), Viet Nam, Zambia, and Zimbabwe, reaffirming, inter alia, "the need to ensure that all States Parties to the Convention, within the framework of their national legislation, prevent both natural and legal persons from engaging in any activity prohibited under the Convention, specifically by adopting appropriate criminal legislation ...". See also First IIT Report, para. 2.10.

[229] United Nations Security Council resolution 1540 (2004), para. 2.

[230] United Nations Security Council resolution 2253 (2015), para. 12.

[231] United Nations Security Council resolution 2322 (2016), para. 1.

participate in the direct or indirect financing of activities conducted by ISIL, Al-Qaida and associated individuals, groups, undertakings and entities.[232]

9.17 For the purpose of the present report, a note verbale was addressed to the Syrian Arab Republic on 21 November 2023 by the Secretariat, welcoming any information that the Syrian Arab Republic may be able to share on any criminal investigation and/or proceedings undertaken in relation to the use of chemical weapons in connection with the incident reviewed in this report. In a note verbale dated 11 December 2023, and classified as "protected", the Syrian Arab Republic did not address the specific queries raised by the IIT.

9.18 The IIT has further reviewed the report by the Director-General entitled "Overview of the Status of Implementation of Article VII of the Chemical Weapons Convention, as at 31 July 2023" (EC-104/DG.8 C-28/DG.7, dated 6 September 2023). According to this report,[233] the Syrian Arab Republic was among the nine States Parties which "had yet to submit information on the adoption of implementing legislation and/or had reported that legislation had yet to be adopted". Furthermore, according to the information available to the Secretariat, the Syrian Arab Republic had reported on the existence of draft legislation under development and consideration.[234]

d) The cross-border dimension of the incident

9.19 The IIT reiterates the specific challenges posed by the investigation of the use of chemical weapons by non-State actors with a cross-border component. The IIT further emphasises the critical importance of a transnational and/or regional approach to information gathering and analysis of organisational structures and patterns of use of chemical agents, delivery methods, and military tactics when investigating non-State actors, including terrorist groups, operating across the territories of two or more States.

9.20 The IIT welcomes the cooperation received by States Parties, partners, and other entities that are at the forefront of the investigation of use of chemical weapons by ISIL.

[232] United Nations Security Council resolution 2253 (2015), para. 12.
[233] Subpara. 75(c) of EC-104/DG.8 C-28/DG.7.
[234] Subpara. 79 of EC-104/DG.8 C-28/DG.7.

10. SUMMARY OF FACTUAL FINDINGS

10.1 In light of its mandate to identify the perpetrators of the use of chemical weapons in the Syrian Arab Republic by identifying and reporting on all information potentially relevant to the origin of those chemical weapons in the incident under consideration, the IIT concludes that there are reasonable grounds to believe that, on 1 September 2015, between 09:00 and 12:00 (UTC+3), during sustained attacks aimed at capturing the town of Marea (Aleppo Governorate), units of the Islamic State in Iraq and the Levant (ISIL) deployed sulfur mustard, using one or more artillery guns.

10.2 The IIT identified several impact locations across the town of Marea, with no discernible targeting pattern. All of the remnants and munitions observed at these sites were conventional artillery projectiles, of a 122-mm calibre, modified to disperse a liquid payload. Upon impact, at least six projectiles leaked a black, viscous substance with a "pungent" and "garlic-like" smell. At least 11 named individuals who came into contact with the liquid substance experienced symptoms consistent with exposure to sulfur mustard.

10.3 The IIT established that the chemical payload was deployed by one or more artillery guns from areas under the control of ISIL and that no entity other than ISIL possessed the means, motives, and capabilities to deploy sulfur mustard as part of an attack in Marea on 1 September 2015.

Annexes:

Annex 1: Information Management and Other Internal Procedures

Annex 2: Approach to Obtaining and Securing Information

Annex 3: Summary of Contacts with Representatives of the Syrian Arab Republic Relevant to the Work of the Investigation and Identification Team

Annex 4: Redacted Paragraphs

Annex 1

INFORMATION MANAGEMENT AND OTHER INTERNAL PROCEDURES

1. As explained in the Note by the Technical Secretariat entitled "Work of the Investigation and Identification Team Established by Decision C-SS-4/DEC.3 (Dated 27 June 2018)" (EC-92/S/8, dated 3 October 2019), and further detailed in the "First Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-SS-4/DEC.3 'Addressing the Threat from Chemical Weapons Use' – Ltamenah (Syrian Arab Republic) 24, 25, and 30 March 2017" (S/1867/2020, dated 8 April 2020),[235] since the activities of the Investigation and Identification Team (IIT) require vast amounts of information in all its forms to be collected and created, seamless and robust procedures are required to allow for the secure, consistent, and transparent management of such information, from the time of its collection or creation through to its ultimate preservation, transfer, or destruction. In setting up these procedures, the IIT took into account confidentiality and security requirements deemed necessary for the storage and use of the information material provided by other entities.

2. Starting from the premise that access to information within the IIT is on a need-to-know basis, effective and secure information handling is considered a key factor for the IIT to fulfil its mandate by: (a) ensuring the safety and security of the IIT's activities, personnel, and third parties; (b) maintaining the integrity of its records and information; (c) ensuring effective and timely search, analysis, and dissemination of information; and (d) increasing the awareness of confidentiality requirements by promoting correct information handling practices.

3. Established internal procedures related to information management cover all kinds of information material created, obtained, and managed by the IIT, which include both digital and physical material. Provisions are made to ensure the confidentiality of both categories of material in terms of organisational, physical, and information security measures.

4. In particular, and in addition to organisational and physical arrangements, the IIT's information management systems and its file storage system reside in the IIT Secure Network (ISN), designed and built in compliance with the OPCW Security Critical Network policies and requirements for the protection of OPCW confidential material. The ISN is accessible by designated terminals possessing appropriate security and confidentiality measures, which are "air gapped", with no external network interface.

5. The IIT's internal procedures provide for the registry procedure, the structure of the central repository for the IIT's records and information, access permission based on roles, responsibilities, the repository's contents, as well as the retention schedule of IIT records and information. Such procedures ensure that the chain of custody of information and the audit trail of records are properly captured, in order to maintain their continued integrity and authenticity. The IIT has further implemented steps to capture and protect results from open-source searches directly related to the identification of perpetrators within the IIT's mandate. A back-up plan was implemented in order to enhance security.

6. The case management system within the ISN aims at supporting investigation activities. This case management system is designed to be conducive to investigation and analysis activities, as

[235] See First IIT Report, especially Annex 1 (Information Management and Other Internal Procedures).

well as to ensuring the authenticity and reliability of records. The system, accessible through specific encrypted terminals in the ISN, is designed to allow only the IIT to securely and methodically keep the records and information associated with investigation and analysis activities, to add relationships among items, and to provide feedback on investigation steps. It allows for a comprehensive account of the chain of custody of each item obtained, including its movement, locations, and transfers. All electronic information collected and generated by the IIT as a result of its investigation activities is to be stored in the information management system. Moreover, the system organises material efficiently for its future transfer to the investigation mechanism established by the United Nations General Assembly in resolution 71/248 (2016) (the IIIM), as well as to any relevant investigatory entities established under the auspices of the United Nations, as mandated by paragraph 12 of decision of the Conference of the States Parties entitled "Addressing the Threat from Chemical Weapons Use" (C-SS-4/DEC.3, dated 27 June 2018).

7. Access control functions in this customised case management system allow IIT personnel to access records only with specific predefined permissions (including permissions to create, read, and modify records). The system is further designed to ensure audit trails that cannot be modified or removed. IIT personnel are trained in the use of the system as required and maintain awareness of the necessary security and confidentiality measures taken to protect the information material.

8. The investigation of the incident occurred in Marea on 1 September 2015 required extensive research on the dark web, where one of the alleged perpetrators considered by the IIT, namely ISIL, had posted critical information relating to its military activities, including the alleged manufacture and development of chemical weapons. Recognising the inherent risks associated with accessing these digital spaces, a robust and secure methodological framework was developed and implemented to maintain the integrity of the investigation and the safety of the IIT personnel involved. This included the development and use of virtual machines, which provided a controlled and isolated environment for navigating the dark web. Furthermore, additional safety measures for maintaining anonymity and securing data transmission were integrated into the methodology of the IIT investigation.

Annex 2

APPROACH TO OBTAINING AND SECURING INFORMATION

1. The investigative activities of the Investigation and Identification Team (IIT) on the incident in Marea on 1 September 2015 included gathering and assessing information provided to it by individuals, local entities, States Parties, and other international, regional, and local actors. They also involved, where applicable and relevant, technical and scientific examinations and analyses to identify the origin of the chemicals used, munition markings and physical characteristics, and technical information and/or extrapolations related to delivery means, such as munition trajectories. The activities further included interviews with alleged victims and other persons who might have witnessed the incident, as well as with experts in the various subjects relevant to the investigation, and evaluation of open-source material.[236] The IIT further relied on computer modelling to model trajectories of projectiles similar to the ones used in Marea on 1 September 2015, and to assess the damage observed both on munitions' bodies and remnants, and at impact sites, In fulfilling its mandate, the IIT obtained and analysed information and material from any relevant source in addition to the information already obtained from the OPCW Fact-Finding Mission in Syria (FFM), also in order to determine the relevance, probative value, and reliability of the information, as well as the credibility of the source.

2. The IIT takes particular care to ensure that any issues that may arise because of the different languages spoken by the investigators, on the one side, and interviewees, on the other, are properly addressed. Apart from having an interpreter present during interviews, and in addition to summaries of the interviews being prepared by the investigators, full transcripts of the interviews are subsequently translated into English by language professionals, so as to be able to properly verify the original interpretation. A transcript of the interview conducted by the IIT is produced through a process to accurately identify any discrepancy not easily captured when "live" interpretation of an interview is performed, either consecutively or simultaneously. Moreover, certain interviews are now also conducted directly in the language of the interviewee, with a transcript in English only produced afterwards.

3. For the specific purpose of this report, the IIT reached out to 18 witnesses directly related to this attack—at times reverting to certain individuals to request clarifications of previous statements and to expand on certain matters—including alleged victims. These interviews were considered in conjunction with 16 witness statements previously obtained by the FFM—of which 11 relate to the 1 September 2015 incident in Marea, and five relate to the 21 August 2015 attack—and 14 statements collected by other entities, thus allowing for a substantial amount of information from a broad variety of sources to be considered.

[236] See also Note by the Secretariat EC-92/S/8, dated 3 October 2019.

4. In relation to other entities willing to provide information or leads for the investigation, the general approach of the IIT has continued to be one of requesting access to information and to the sources of such information that the IIT considered could be obtained from those entities, and to assess them together with the rest of the information already at the IIT's disposal.

5. When entities willing to assist the IIT did not have relevant information directly, but could put the IIT in contact with persons of interest, the IIT proceeded to request this type of facilitation on the basis of the following understanding:

   (a) the IIT would not pay, in any way, fees or other forms of remuneration for the support provided by these entities;

   (b) the entity in question would ensure that no person had been unduly influenced or pressured to provide information or to extend his/her cooperation for the purpose of the IIT's investigations; and

   (c) with a view to protecting persons of interest who might be at risk because of their interaction with the IIT, sufficient guarantees would be provided to protect confidentiality as well as the privacy of these persons, including their identification data and statements.

6. Unless specific circumstances dictated otherwise, the IIT treated all information obtained from external entities and individuals as "OPCW Highly Protected", the highest classification category within the OPCW confidentiality regime, and restricted its access on the basis of the need-to-know principle in accordance with the Confidentiality Annex to the Chemical Weapons Convention and the OPCW Policy on Confidentiality.[237]

7. The IIT treated the information collected through a widely shared methodology among investigatory bodies, such as international fact-finding bodies and commissions of inquiry, in particular with regard to the chain of custody of the samples and material.

8. These samples were treated to ensure their integrity, including during their transportation to the OPCW Laboratory in the Netherlands and from there to OPCW designated laboratories. This continues to be done in accordance with the Verification Annex to the Convention and corresponding applicable internal procedures and practices of the Secretariat.[238]

9. For such material and samples, the chain of custody was maintained and documented by the Secretariat from the moment of collection or receipt. For instance, once in the custody of the Secretariat, samples were treated according to OPCW procedures to ensure their integrity, as well as their security, preservation, and confidentiality. At the

[237] See para. 4.1 of Part V and paras 3.1 to 3.4 of Part VI of the OPCW Policy on Confidentiality (C-I/DEC.13/Rev.2, dated 30 November 2017), as well as subpara. 2(h) of the Confidentiality Annex to the Chemical Weapons Convention.

[238] With specific respect to the storage conditions in the OPCW Laboratory and the degradation of samples to be analysed, see further "Advice on chemical weapons sample stability and storage provided by the Scientific Advisory Board of the Organisation for the Prohibition of Chemical Weapons to increase investigative capabilities worldwide", also available in *Talanta*, vol. 188 (2018), pp. 808, 810, and 811.

OPCW Laboratory, the samples were prepared for off-site analysis at two OPCW designated laboratories in accordance with paragraph 57 of Part II of the Verification Annex. The sample processing included verification of their identity, i.e., through sample codes, item descriptions, and seal numbers; solvent extraction and/or splitting into fresh primary containers; packaging of sample splits together with positive and negative control samples; and detailed analysis of positive and negative control samples before dispatch. Internal established procedures for splitting, packing, and transportation to the OPCW designated laboratories were applied, and all steps of the process were documented.

10. Upon arrival at the OPCW designated laboratories, the identity and seal integrity of the samples are once again verified against the accompanying chain of custody form. All samples, namely authentic and control samples, are prepared and analysed in accordance with instructions issued by the OPCW Laboratory. This is in the form of a document setting out the scope of the analysis, which also contains the identification data for the samples and their corresponding tamper-proof seal numbers.

11. The OPCW designated laboratories, which operate under a quality system in accordance with International Organization for Standardization/International Electrotechnical Commission Standard ISO/IEC 17025, are also obliged to maintain the chain of custody of the samples throughout their processes. All activities performed by the OPCW designated laboratories on behalf of the OPCW must conform to the terms and conditions of the technical arrangements between the Secretariat and the OPCW designated laboratories.

12. Owing to the ongoing conflict(s) occurring in the relevant areas, access by the Secretariat to the sites of incidents shortly after their occurrence was often not possible. Therefore, the IIT has consistently ensured that samples and other material taken by other entities were supported by documents, photographs, video footage, forensic analyses, and/or witness testimony. In order to do this, the IIT reached out to specialists and forensic institutes to provide geolocation and metadata from the image files obtained. This approach has been applied consistently in light of the fact that it is the combination, consistency, and corroboration of all of the information gathered as a whole, rather than single pieces of evidence, which form the basis of the IIT's conclusions.[239]

13. The IIT took guidance from practices and principles derived from relevant decisions by the Conference of the States Parties and Secretariat procedures,[240] as well as from the approach of States Parties investigating similar incidents, and applied them, mutatis mutandis, in full compliance with the Chemical Weapons Convention.

[239] See, for instance, Note by the Secretariat S/1654/2018 (dated 20 July 2018), pp. 3, 9,10, and 21. The IIT further notes that this approach follows the practice of international and domestic investigations in these types of events.

[240] *Cf.*, among others: Conference decision C-I/DEC.47; "Standard Operating Procedure for Evidence Collection, Documentation, Chain-of-Custody and Preservation During an Investigation of Alleged Use of Chemical Weapons" (QDOC/INS/SOP/IAU01), first issued in 2011.

14. Information gathered during the IIT's investigation remains available for transfer to the mechanism established by the United Nations General Assembly in resolution 71/248 (2016) (the IIIM), as well as to any relevant investigatory entities established under the auspices of the United Nations, as mandated by paragraph 12 of decision C-SS-4/DEC.3, and reinforced by paragraph 9 of Executive Council decision entitled "Addressing the Possession and Use of Chemical Weapons by the Syrian Arab Republic" (EC-94/DEC.2, dated 9 July 2020).

Annex 3

SUMMARY OF CONTACTS WITH REPRESENTATIVES OF THE SYRIAN ARAB REPUBLIC RELEVANT TO THE WORK OF THE INVESTIGATION AND IDENTIFICATION TEAM

1. In relation to the investigations required under paragraph 10 of decision C-SS-4/DEC.3 "Addressing the Threat from Chemical Weapons Use", the Technical Secretariat (the Secretariat) has engaged in continuous and extensive communications aimed at obtaining input from all States Parties, and the Syrian Arab Republic in particular—as detailed in the "First Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-SS-4/DEC.3 'Addressing the Threat from Chemical Weapons Use' – Ltamenah (Syrian Arab Republic) 24, 25, and 30 March 2017" (S/1867/2020, dated 8 April 2020 (hereinafter the "First IIT Report"),[241] the "Second Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-SS-4/DEC.3 'Addressing the Threat from Chemical Weapons Use' – Saraqib (Syrian Arab Republic) 4 February 2018" (S/1943/2021, dated 12 April 2021) (hereinafter the "Second IIT Report"),[242] and the "Third Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-SS-4/DEC.3 'Addressing the Threat from Chemical Weapons Use', Douma (Syrian Arab Republic), 7 April 2018" (S/2125/2023, dated 27 January 2023) (hereinafter the "Third IIT Report")[243]

2. Communications with the authorities of the Syrian Arab Republic, which took place between June 2019, (when the IIT started its activities), April 2020 (when the First IIT Report was issued), April 2021 (when the Second IIT Report was issued), January 2023 (when the Third IIT Report was issued), and are still ongoing, have included: attempts to consult with those authorities; requests for visits to the Syrian Arab Republic and for meetings with relevant individuals; and invitations to provide the IIT with input on its methodologies. The IIT has also made requests to the Syrian National Authority to provide any information on the relevance, probative value, and reliability of information relevant to the origin of the chemical weapons and useful in identifying perpetrators in certain incidents, as well as on relevant criminal investigation and/or proceedings undertaken, and penal legislation enacted, by the Syrian Arab Republic in relation to the use of chemical weapons within its territory.

3. The authorities of the Syrian Arab Republic did not engage with the IIT, despite: (a) various requests addressed to them by the Secretariat; (b) the obligation by the Syrian Arab Republic to cooperate with the Secretariat under paragraph 7 of Article VII of the Chemical Weapons Convention; and (c) the obligation incumbent on the Syrian Arab Republic, pursuant to United Nations Security Council resolution 2118 (2013), to cooperate fully with the OPCW by providing personnel designated by the OPCW with immediate and unfettered access to any and

[241] See First IIT Report, Annex 3 (Summary of Contacts with Representatives of the Syrian Arab Republic Relevant to the Work of the Investigation and Identification Team).

[242] See Second IIT Report, Annex 3 (Summary of Contacts with Representatives of the Syrian Arab Republic Relevant to the Work of the Investigation and Identification Team).

[243] See Third IIT Report, Annex 3 (Summary of Contacts with Representatives of the Syrian Arab Republic and Other States Parties Relevant to the Current Investigations of the Investigation and Identification Team).

all sites and individuals that the OPCW has grounds to believe to be of importance for the purpose of its mandate.

4. On 14 February 2023, the Secretariat addressed a note verbale to the Permanent Representation of the Syrian Arab Republic to the OPCW, [244] attaching a note by the IIT which invited the Syrian Arab Republic to, inter alia, submit any concrete information and sources or suggest additional avenues of inquiry in respect of the incident in Marea on 1 September 2015. The note further indicated the IIT's availability to meet with representatives of the Syrian Arab Republic, at their convenience and at a location of their choosing. The purpose of this meeting would have been to discuss the progress of the investigation and the provision of other information, including access to locations that the authorities of the Syrian Arab Republic may have been able to facilitate. As at the date of this report, the Secretariat had not received a response from the Syrian Arab Republic.

5. On 21 November 2023, the Secretariat addressed a second note verbale to the Permanent Representation of the Syrian Arab Republic to the OPCW, attaching a further note by the IIT. [245] In line with a previous request addressed by the Coordinator of the IIT to the Permanent Representation,[246] the note welcomed information that the Syrian Arab Republic may provide on any criminal investigation and/or proceedings undertaken in relation to the use of chemical weapons within its territory, and in particular in relation to the Marea incident, as well as on the relevant penal legislation applicable to such case. Once more, the note reiterated the IIT's availability to receive such information in any setting or format that the Syrian Arab Republic may have deemed feasible.

6. On 11 December 2023, the Permanent Representation of the Syrian Arab Republic to the OPCW, through a note verbale, classified as "protected", transmitted the response of the Syrian National Authority to "the Technical Secretariat's request regarding the Marea incident 2015". On 8 February 2024, the Secretariat addressed a further note verbale to the Syrian Arab Republic, which to date it has not responded to.

[244] NV/ODG-359/23, dated 14 February 2023.
[245] NV/ODG-487/23, dated 21 November 2023.
[246] See L/IIT/22059319, dated 2 September 2019.

OPCW
Organisation for the Prohibition of Chemical Weapons

NV/ODG-359 /23

The Technical Secretariat (hereinafter referred to as the "Secretariat") of the Organisation for the Prohibition of Chemical Weapons (hereinafter referred to as the "OPCW") presents its compliments to the Permanent Representation of the Syrian Arab Republic of the OPCW.

Reference is made to the work of the Investigation and Identification Team (IIT), established pursuant to paragraph 10 of the Decision adopted by the Conference of the States Parties to the Chemical Weapons Convention on 27 June 2018 (C-SS-4/DEC.3).

Following the issuance of its first three reports (S/1867/2020 dated 8 April 2020, S/1943/2021 dated 12 April 2021, and S/2125/2023, dated 27 January 2023), the IIT is progressing with its investigations and, as mandated by the above-mentioned decision, regularly reaches out to States Parties in order to gather information and conduct investigations and analysis on those incidents under its scope.

As was the case with the letters addressed by the Director-General of the OPCW to the Deputy Foreign Minister for Foreign Affairs and Expatriates of the Syrian Arab Republic dated 19 December 2019, 3 July 2020, 16 October 2020 and 22 December 2021, a Note is hereby attached seeking the cooperation of the Syrian Arab Republic on these activities as mandated by paragraph 7 of Article VII of the Chemical Weapons Convention.

The Technical Secretariat of the Organisation for the Prohibition of Chemical Weapons avails itself of this opportunity to renew to the Permanent Representation of the Syrian Arab Republic to the OPCW the assurances of its highest consideration.

The Hague, 14 February 2023

ORGANISATION FOR THE PROHIBITION OF CHEMICAL WEAPONS - THE HAGUE -

Permanent Representation of the Syrian Arab Republic
to the OPCW
President Kennedylaan 19
2517 JK The Hague

ANNEX TO NOTE VERBALE NV/ODG-359/23

Request for cooperation under Article VII of the Chemical Weapons Convention

This note follows the previous correspondence related to the work of the OPCW Technical Secretariat through the Investigation and Identification Team (IIT), established pursuant to the Decision of the Conference of the State Parties entitled "Addressing the Threat from Chemical Weapons Use" (C-SS-4/DEC.3, dated 27 June 2018). It further refers to note S/1867/2020 of the Technical Secretariat entitled First Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-SS-4/Dec.3 "Addressing the Threat from Chemical Weapons Use" – Ltamenah (Syrian Arab Republic) 24, 25, and 30 March 2017; to note S/1943/2021 entitled Second Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-SS-4/Dec.3 "Addressing The Threat From Chemical Weapons Use" - Saraqib (Syrian Arab Republic) – 4 February 2018; and to note S/2125/2023 entitled Third Report by the OPCW Investigation and Identification Team Pursuant to Paragraph 10 of Decision C-SS-4/Dec.3 "Addressing the Threat from Chemical Weapons Use" – Douma (Syrian Arab Republic) –7 April 2018.

Pursuant to paragraph 7 of Article VII of the Convention, each State Party undertakes to cooperate with the Organisation in the exercise of all its functions and in particular to provide assistance to the Secretariat.

As highlighted in the Note of the Technical Secretariat dated 28 June 2019 (EC-91/S/3, para. 10), when a State assumes an obligation in an international agreement, this expresses a legally binding undertaking. Therefore, the Secretariat expects full good-faith cooperation with the IIT from all States Parties, in particular with the provision of relevant information and access to relevant places and persons.

In line with the above, and further to EC-91/S/3, the Director-General, during his opening statement to the Council at its Ninety-First Session, requested all States Parties concerned to provide their full cooperation to the IIT (para. 21 of EC-91/DG.25, dated 9 July 2019). In September 2019, communications requesting assistance were sent to all States Parties, reiterating calls for assistance and specifically requesting information potentially relevant to establish the origin of the chemical weapons used in the nine identified incidents and useful to identify perpetrators.

In his letters to the Deputy Foreign Minister of the Syrian Arab Republic dated 23 October 2019 (L/ODG/221311/19), 19 December 2019 (L/ODG/221960), 3 July 2020 (L/ODG/223647/20) and 16 October 2020 (L/ODG/224348/20), the Director-General specifically called on the Syrian Arab Republic to cooperate with the IIT, and reiterated the Secretariat's request that it submits any information currently in its possession pertaining to the incidents being investigated.

ANNEX TO NOTE VERBALE NV/ODG-359/23

As the investigative work of the IIT progresses, the Secretariat reiterates once more the IIT's availability and willingness to receive information related to its mandate, in any setting or format the authorities the Syrian Arab Republic may deem feasible, in particular on the incidents outlined in Annex 2 of the Note of the Technical Secretariat dated 28 June 2019 (EC-91/S/3) in relation to which the IIT has not yet issues a report.[1]

In light of the above, and with specific reference to the incident in Marea (1 September 2015)[2], the Secretariat would be grateful for any concrete information the authorities of the Syrian Arab Republic may be able to share potentially relevant to establishing the origin of the chemical weapons used in that instance, and useful to identify the relevant perpetrators. That may include information on delivery methods; background information related to actors that might have the capabilities to develop, produce, stockpile and use such weapons; evidence suggesting or contradicting attribution to certain actors as the perpetrators; as well as any element related to the relevance, probative value, and reliability of such information and to the credibility of the relevant source(s). The Technical Secretariat would also welcome the opportunity to access, review and discuss the findings of any investigations or scientific or technical studies undertaken by the authorities of the Syrian Arab Republic in relation to the incident.

In particular, as with other incidents, the Secretariat would be grateful for any concrete information and sources (including videos, photographs, witness statements and GPS coordinates) that the authorities of the Syrian Arab Republic may have in their possession, including specific details on relevant subjects, command and control structures and locations of interest.

The Secretariat hereby further reiterates the IIT's willingness and availability to conduct any interviews with witnesses present at the time and site of the incident that the Syrian Arab Republic may be in the position to facilitate.

In addition, the Secretariat would greatly appreciate the Syrian Arab Republic's cooperation with regard to the following:

As the examination of the available information concerning the use of chemical weapons in the aforementioned incident continues, the Secretariat would like to once again reiterate the value of the IIT engaging with representatives of the Syrian Arab Republic, at latter's convenience and at a location of their choosing, to discuss the progress of its investigation as well as the provision of any information and access to relevant locations that the authorities of the Syrian Arab Republic may be able to facilitate.

[1] Al-Tamanah (12 and 18 April 2014), Kafr-Zita (18 April 2014), and Marea (1 September 2015).

[2] Ref: Note by the Technical Secretariat, Report of the OPCW Fact-Finding Mission in Syria Regarding the Incidents of the Alleged Use of Chemicals as a Weapon in Marea, Syrian Arab Republic, on 1 and 3 September 2015, S/2017/2022 (dated 24 January 2022).

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NV/ODG-487/23

The Technical Secretariat (hereinafter referred to as the "Secretariat") of the Organisation for the Prohibition of Chemical Weapons (hereinafter referred to as the "OPCW") presents its compliments to the Permanent Representation of the Syrian Arab Republic to the OPCW.

Reference is made to the work of the Investigation and Identification Team (IIT), established pursuant to paragraph 10 of the Decision adopted by the Conference of the States Parties to the Chemical Weapons Convention on 27 June 2018 (C-SS-4/DEC.3).

Further to its Note Verbale NV/ODG-359/23 dated 14 February 2023, the IIT is progressing with its investigation.

As was the case with the letters addressed by the Director-General of the OPCW to the Deputy Foreign Minister for Foreign Affairs and Expatriates of the Syrian Arab Republic dated 19 December 2019, 3 July 2020, 16 October 2020 and 22 December 2021, as well as with the aforementioned Note Verbale NV/ODG-359/23, a Note is hereby attached seeking the cooperation of the Syrian Arab Republic on these activities as mandated by paragraph 7 of Article VII of the Chemical Weapons Convention.

The Technical Secretariat of the Organisation for the Prohibition of Chemical Weapons avails itself of this opportunity to renew to the Permanent Representation of the Syrian Arab Republic to the OPCW the assurances of its highest consideration.

The Hague, 21 November 2023

ORGANISATION FOR THE PROHIBITION OF CHEMICAL WEAPONS - THE HAGUE -

Permanent Representation of the Syrian Arab Republic
to the OPCW
President Kennedylaan 19
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Request for Cooperation under Article VII of the Chemical Weapons Convention

This note follows the previous correspondence related to the work of the OPCW Technical Secretariat (hereinafter "the Technical Secretariat") through the Investigation and Identification Team (IIT), established pursuant to the Decision of the Conference of the State Parties entitled "Addressing the Threat from Chemical Weapons Use" (C-SS-4/DEC.3, dated 27 June 2018).

It follows, in particular, the note attached to Note Verbale NV/ODG-359/23, dated 14 February 2023, addressed by the Secretariat to the Permanent Representation of the Syrian Arab Republic to the OPCW.

In the said note, the Secretariat sought the Syrian Arab Republic's cooperation with specific reference to the IIT's investigation into the incident that occurred in Marea (1 September 2015).[1]

As the IIT's investigation nears its finalisation, and in line with the previous request addressed by the Coordinator of the IIT to the Permanent Representative of the Syrian Arab Republic to the OPCW (see letter L/IIT/22059319, dated 2 September 2019), the Secretariat would appreciate any information that the Syrian Arab Republic may provide on any criminal investigation and/or proceedings undertaken in relation to the use of chemical weapons within its territory, and in particular in relation to the incident under investigation, as well as on the relevant penal legislation applicable to such case.

The Secretariat reiterates the IIT's availability to receive such information in any setting or format the Syrian Arab Republic may deem feasible. The Secretariat would appreciate a response by 8 December 2023.

As the examination of the available information concerning the use of chemical weapons in the aforementioned incident continues, the Secretariat wishes to reiterate the value of the Syrian Arab Republic engaging with the IIT , at the convenience and at a location of mutual convenience, to discuss the progress of the IIT's investigation, as well as the provision of any information and access to relevant locations that the authorities of the Syrian Arab Republic may be decide to facilitate.

[1] Ref: Note by the Technical Secretariat, Report of the OPCW Fact-Finding Mission in Syria Regarding the Incidents of the Alleged Use of Chemicals as a Weapon in Marea, Syrian Arab Republic, on 1 and 3 September 2015, S/2017/2022 (dated 24 January 2022).

Annex 4

REDACTED PARAGRAPHS

This Annex has been classified as “OPCW Highly Protected” and is available to all States Parties in document IIT/HP/005, dated 22 February 2024.