

**NOTE BY THE TECHNICAL SECRETARIAT****REPORT OF THE FORTY-FOURTH MEETING OF THE VALIDATION GROUP  
FOR THE UPDATING OF THE OPCW CENTRAL ANALYTICAL DATABASE  
28 AND 29 SEPTEMBER 2016**

1. The Validation Group (hereinafter “the Group”) met on 28 and 29 September 2016 to discuss the evaluation of new analytical data for possible inclusion in the OPCW Central Analytical Database (OCAD) and to consider matters related to it. Mr James Riches of the United Kingdom of Great Britain and Northern Ireland served as Chairperson of the meeting.
2. The evaluators for the analytical techniques evaluated new data and sent their written reports to the coordinators for each analytical technique. The names of the coordinators who were present at the meeting, along with the technique for which each was responsible, are listed below:

Gas chromatography (retention index) (GC(RI))	Mr Gary Mallard (acting coordinator) (United States of America)
Mass spectrometry (MS)	Mr Vesa Häkkinen (acting coordinator) (Finland)
Infrared (IR) spectroscopy	Mr Armando Alcaraz (United States of America)

3. The coordinators provided an evaluation summary of the data presented to the Group for discussion at the meeting. The evaluators finalised the evaluation of the analytical data and confirmed that the approved data is technically valid.
4. This report of the Group’s Forty-Fourth Meeting presents the sets of validated analytical data of scheduled chemicals to be forwarded to the Director-General for appropriate action (Annex 1).
5. The Group discussed the classification of non-scheduled chemicals relevant to the Chemical Weapons Convention currently in the Validation Group Working Database. A set of those chemicals, listed with their justification statements in Annex 2, is recommended for inclusion in the OCAD and is being forwarded to the Director-General for appropriate action.
6. The Group discussed procedures for the submission of MS/MS data. A small number of changes to the Note by the Technical Secretariat (hereinafter “the Secretariat”) entitled “Procedures for the Evaluation of Data to be Included in the OPCW Central Analytical Database” (S/969/2011, dated 2 November 2011) were agreed. The Note will be updated by the Secretariat.



7. The Group agreed a number of changes to version V.5 of the naming rules. The new version of the rules will be issued by the Secretariat.
8. The Group discussed the OCAD data entries 09-2-0176 and 09-4-0058. It was agreed that these data entries are to be removed from the OCAD because the mass spectrum is not consistent with other similar chemicals in the database. Details of this chemical are listed in Annex 3.
9. A set of name changes to chemicals already in the OCAD was agreed by the Group. These chemicals are detailed in Annex 4.
10. The Secretariat is using hand-held Raman spectroscopic detectors during its industrial inspections on a trial basis (S/1383/2016, dated 10 May 2016). The Group discussed Raman data collection and possible inclusion in the OCAD and decided to continue this discussion at future meetings.
11. Mr Alexandre Bennett (United Kingdom of Great Britain and Northern Ireland) agreed to coordinate the MS Subgroup at future meetings.
12. Available data from all analytical techniques will be sent to the Group at least six weeks before its next scheduled meeting.
13. The next meeting of the Group is scheduled to take place on 29 and 30 March 2017. The evaluators agreed to send their evaluation reports to the appointed coordinators no later than 15 March 2017, and agreed to come to the meeting prepared to finalise the evaluation of the analytical data referred to in the previous paragraph.
14. Annex 5 to this report, lists the members of the Group.

Annexes:

- Annex 1: Lists of Approved Data Recommended for Inclusion in the OPCW Central Analytical Database
- Annex 2: Lists of Validated Data of Non-Scheduled Chemicals Relevant to the Convention
- Annex 3: Data Entry Recommended for Removal from the OPCW Central Analytical Database
- Annex 4: List of Chemicals for which the Validation Group Agreed Name Changes
- Annex 5: List of Members of the Validation Group

## Annex 1

**LISTS OF APPROVED DATA RECOMMENDED FOR INCLUSION  
IN THE OPCW CENTRAL ANALYTICAL DATABASE**

Note: In the last column of the tables that follow, “A” means “accepted”; “B”, “accepted subject to minor corrections”.

**TABLE 1: LIST OF APPROVED MS DATA OF SCHEDULED CHEMICALS**

<b>OPCW code</b>	<b>Chemical Name</b>	<b>Schedule</b>	<b>Decision</b>
04-2-0562ar	2-Methylcyclopentyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	A
04-2-0562br	2-Methylcyclopentyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	A
04-2-0563ar	2,6-Dimethylcyclohexyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	B
04-2-0563br	2,6-Dimethylcyclohexyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	B
04-2-0564ar	3,5-Dimethylcyclohexyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	B
04-2-0564br	3,5-Dimethylcyclohexyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	B
04-2-0564cr	3,5-Dimethylcyclohexyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	B
04-2-0568ar	Pinacolyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	B
04-2-0568br	Pinacolyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	B
04-2-0571ar	Pinacolyl S-2-diethylaminoethyl propylphosphonothiolate	1.A.03	B
04-2-0571br	Pinacolyl S-2-diethylaminoethyl propylphosphonothiolate	1.A.03	B
07-2-3490	Methyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3491	Methyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3492	Methyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3493	Methyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3496	Ethyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3497	Ethyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3498	Ethyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3499	Ethyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3502	Propyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3503	Propyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3504	Propyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A

OPCW code	Chemical Name	Schedule	Decision
07-2-3506	Propyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3507	Isopropyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3508	Isopropyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3509	Isopropyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3510	Isopropyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3511	Isopropyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3512	Isopropyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3513	Butyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3514	Butyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3515	Butyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3516	Butyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3519a	sec-Butyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3519b	sec-Butyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3520a	sec-Butyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3520b	sec-Butyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3521a	sec-Butyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3521b	sec-Butyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3522a	sec-Butyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3522b	sec-Butyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3523a	sec-Butyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3523b	sec-Butyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3524a	sec-Butyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3524b	sec-Butyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3525	Isobutyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A

OPCW code	Chemical Name	Schedule	Decision
07-2-3526	Isobutyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3527	Isobutyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3528	Isobutyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3529	Isobutyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3530	Isobutyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3531	Cyclohexyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3532	Cyclohexyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3533	Cyclohexyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3534	Cyclohexyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3535	Cyclohexyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3536	Cyclohexyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3537a	Pinacolyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3537b	Pinacolyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3538a	Pinacolyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3538b	Pinacolyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3539a	Pinacolyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3539b	Pinacolyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3540a	Pinacolyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3540b	Pinacolyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3542a	Pinacolyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
07-2-3542b	Pinacolyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	A
16-2-0278a	2-Methoxy-1-methylethyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0278b	2-Methoxy-1-methylethyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B

OPCW code	Chemical Name	Schedule	Decision
16-2-0280	2-Ethoxyethyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0281b	1,2-Dimethylpropyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0282	2,2-Dimethylpropyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0283	1-Ethylpropyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0284	3-Methylbutyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0285	Cyclopentyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0286a	1-Ethyl-2-methylpropyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0286b	1-Ethyl-2-methylpropyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0287a	2-Ethoxy-1-methylethyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0287b	2-Ethoxy-1-methylethyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
16-2-0288b	2-Methoxy-1-methylethyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	B
16-2-0289	Cyclopropylmethyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	B
16-2-0290	2-Ethoxyethyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	B
16-2-0291b	1,2-Dimethylpropyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	B
16-2-0292	2,2-Dimethylpropyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	B
16-2-0293	1-Ethylpropyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	B
16-2-0294	3-Methylbutyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	B
16-2-0295	Cyclopentyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	B
28-2-0202	Methyl 2-diethylaminoethyl methylphosphonite	1.B.10	A
28-2-0203	Methyl-d3 2-diethylaminoethyl methylphosphonite	1.B.10	A
28-2-0204	Ethyl 2-diethylaminoethyl methylphosphonite	1.B.10	A
28-2-0205	Ethyl-d5 2-diethylaminoethyl methylphosphonite	1.B.10	A
28-2-0206	Ethyl 2-diisopropylaminoethyl methylphosphonite	1.B.10	A
28-2-0207	Ethyl-d5 2-diisopropylaminoethyl methylphosphonite	1.B.10	A
28-2-0208	Ethyl 2-dimethylaminoethyl ethylphosphonite	1.B.10	A
28-2-0209	Ethyl-d5 2-dimethylaminoethyl ethylphosphonite	1.B.10	A
28-2-0210	Methyl-d3 2-dimethylaminoethyl ethylphosphonite	1.B.10	A
28-2-0211	Ethyl 2-diethylaminoethyl ethylphosphonite	1.B.10	A
28-2-0212	Ethyl-d5 2-diethylaminoethyl ethylphosphonite	1.B.10	A
28-2-0213	Ethyl 2-diisopropylaminoethyl ethylphosphonite	1.B.10	A
28-2-0214	Ethyl-d5 2-diisopropylaminoethyl ethylphosphonite	1.B.10	A
28-2-0215	Bis(2-diethylaminoethyl) ethylphosphonite	2.B.04	A
28-2-0216	Methyl-d3 2-diethylaminoethyl methylphosphonate	2.B.04	A

<b>OPCW code</b>	<b>Chemical Name</b>	<b>Schedule</b>	<b>Decision</b>
28-2-0217	Ethyl-d5 2-diethylaminoethyl methylphosphonate	2.B.04	A
28-2-0218	Ethyl-d5 2-diisopropylaminoethyl methylphosphonate	2.B.04	A
28-2-0219	Phenyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	B
28-2-0220	Methyl 2-dimethylaminoethyl ethylphosphonate	2.B.04	A
28-2-0221	Methyl-d3 2-dimethylaminoethyl ethylphosphonate	2.B.04	A
28-2-0222	Ethyl 2-dimethylaminoethyl ethylphosphonate	2.B.04	A
28-2-0224	Methyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	A
28-2-0227	Bis(2-dimethylaminoethyl) ethylphosphonate	2.B.04	A
28-2-0228	Bis(2-diethylaminoethyl) ethylphosphonate	2.B.04	A
28-2-0229	Bis(2-diisopropylaminoethyl) ethylphosphonate	2.B.04	A

**TABLE 2: LIST OF APPROVED GC(RI) DATA OF SCHEDULED CHEMICALS**

Note: A “1” under the “Column” heading of GC(RI) data means an HP5 or an SE54 column and a “2” means a DB-5MS column.

OPCW Code	Chemical Name	Schedule	Column	RI(a)	RI(b)	RI(c)	Decision
07-4-3353	Methyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1624			A
07-4-3354	Methyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1703			A
07-4-3355	Methyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1701			A
07-4-3356	Methyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1764			A
07-4-3357	Methyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	2	1751			A
07-4-3358	Methyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1822			A
07-4-3359	Ethyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1667			A
07-4-3360	Ethyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1747			A
07-4-3361	Ethyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1746			A
07-4-3362	Ethyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1804			A
07-4-3363	Ethyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	2	1791			A
07-4-3364	Ethyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1860			A
07-4-3365	Propyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1757			A
07-4-3366	Propyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1832			A
07-4-3367	Propyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1888			A
07-4-3368	Propyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	2	1876			A
07-4-3369	Propyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1943			A
07-4-3370	Isopropyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1677			A
07-4-3371	Isopropyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1751			A
07-4-3372	Isopropyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1752			A



OPCW Code	Chemical Name	Schedule	Column	RI(a)	RI(b)	RI(c)	Decision
07-4-3373	Isopropyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1808			A
07-4-3374	Isopropyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	2	1791			A
07-4-3375	Isopropyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1860			A
07-4-3376	Butyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1847			A
07-4-3377	Butyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1922			A
07-4-3378	Butyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1922			A
07-4-3379	Butyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1978			A
07-4-3380	Butyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	2	1966			A
07-4-3381	Butyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	2033			A
07-4-3382	sec-Butyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1765	1770		A
07-4-3383	sec-Butyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1839	1844		A
07-4-3384	sec-Butyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1841	1845		A
07-4-3385	sec-Butyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1894	1899		A
07-4-3386	sec-Butyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	2	1879	1884		A
07-4-3387	sec-Butyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1947	1951		A
07-4-3388	Isobutyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1798			A
07-4-3389	Isobutyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1874			A
07-4-3390	Isobutyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1874			A
07-4-3391	Isobutyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1930			A
07-4-3392	Isobutyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	2	1917			A

OPCW Code	Chemical Name	Schedule	Column	RI(a)	RI(b)	RI(c)	Decision
07-4-3393	Isobutyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1984			A
07-4-3394	Cyclohexyl S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	2091			A
07-4-3395	Cyclohexyl S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	2170			A
07-4-3396	Cyclohexyl S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	2172			A
07-4-3397	Cyclohexyl S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	2223			A
07-4-3398	Cyclohexyl S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	2	2208			A
07-4-3399	Cyclohexyl S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	2276			A
07-4-3400	Pinacoly S-2-N-ethyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1877	1893		A
07-4-3401	Pinacoly S-2-N-methyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	1953	1969		A
07-4-3402	Pinacoly S-2-N-isopropyl-N-methylaminoethyl propylphosphonothiolate	1.A.03	2	1955	1971		A
07-4-3403	Pinacoly S-2-N-ethyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	2007	2023		A
07-4-3404	Pinacoly S-2-N-ethyl-N-isopropylaminoethyl propylphosphonothiolate	1.A.03	2	1992	2009		A
07-4-3405	Pinacoly S-2-N-isopropyl-N-propylaminoethyl propylphosphonothiolate	1.A.03	2	2056	2073		A
16-4-0312	2-Methoxy-1-methylethyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1781	1793		B
16-4-0313	Cyclopropylmethyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1807			B
16-4-0314	2-Ethoxyethyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1845			B
16-4-0315	1,2-Dimethylpropyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1748	1764		B
16-4-0316	2,2-Dimethylpropyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1742			B
16-4-0317	1-Ethylpropyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1774			B

OPCW Code	Chemical Name	Schedule	Column	RI(a)	RI(b)	RI(c)	Decision
16-4-0318	3-Methylbutyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1818			B
16-4-0319	Cyclopentyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1902			B
16-4-0320	1-Ethyl-2-methylpropyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1825	1831		B
16-4-0321	2-Ethoxy-1-methyllethyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1829	1845		B
16-4-0322	2-Methoxy-1-methylethyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1842	1853		B
16-4-0323	Cyclopropylmethyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1872			B
16-4-0324	2-Ethoxyethyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1907			B
16-4-0325	1,2-Dimethylpropyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1811	1826		B
16-4-0326	2,2-Dimethylpropyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1809			B
16-4-0327	1-Ethylpropyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1836			B
16-4-0328	3-Methylbutyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1876			B
16-4-0329	Cyclopentyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1966			B
16-4-0330	1-Ethyl-2-methylpropyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1886	1892		B
16-4-0331	2-Ethoxy-1-methyllethyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1891	1905		B
28-4-0205	Methyl 2-diethylaminoethyl methylphosphonite	1.B.10	1	1171			A
28-4-0206	Methyl-d3 2-diethylaminoethyl methylphosphonite	1.B.10	1	1169			A
28-4-0207	Ethyl 2-diethylaminoethyl methylphosphonite	1.B.10	1	1227			A
28-4-0208	Ethyl-d5 2-diethylaminoethyl methylphosphonite	1.B.10	1	1224			A
28-4-0209	Ethyl 2-diisopropylaminoethyl methylphosphonite	1.B.10	1	1353			A
28-4-0210	Ethyl-d5 2-diisopropylaminoethyl methylphosphonite	1.B.10	1	1349			A
28-4-0211	Ethyl 2-dimethylaminoethyl ethylphosphonite	1.B.10	1	1169			A
28-4-0212	Ethyl-d5 2-dimethylaminoethyl ethylphosphonite	1.B.10	1	1165			A
28-4-0213	Methyl-d3 2-dimethylaminoethyl ethylphosphonite	1.B.10	1	1118			A
28-4-0214	Ethyl 2-diethylaminoethyl ethylphosphonite	1.B.10	1	1307			A
28-4-0215	Ethyl-d5 2-diethylaminoethyl ethylphosphonite	1.B.10	1	1303			A
28-4-0216	Ethyl 2-diisopropylaminoethyl ethylphosphonite	1.B.10	1	1436			A
28-4-0217	Ethyl-d5 2-diisopropylaminoethyl ethylphosphonite	1.B.10	1	1430			A

OPCW Code	Chemical Name	Schedule	Column	RI(a)	RI(b)	RI(c)	Decision
28-4-0218	Bis(2-diethylaminoethyl) ethylphosphonite	2.B.04	1	1718			A
28-4-0219	Methyl-d3 2-diethylaminoethyl methylphosphonate	2.B.04	1	1380			A
28-4-0220	Ethyl-d5 2-diethylaminoethyl methylphosphonate	2.B.04	1	1435			A
28-4-0221	Ethyl-d5 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1564			A
28-4-0222	Phenyl 2-diisopropylaminoethyl methylphosphonate	2.B.04	1	1993			B
28-4-0223	Methyl 2-dimethylaminoethyl ethylphosphonate	2.B.04	1	1309			A
28-4-0224	Methyl-d3 2-dimethylaminoethyl ethylphosphonate	2.B.04	1	1303			A
28-4-0225	Ethyl 2-dimethylaminoethyl ethylphosphonate	2.B.04	1	1361			A
28-4-0226	Ethyl-d5 2-dimethylaminoethyl ethylphosphonate	2.B.04	1	1359			A
28-4-0227	Methyl 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1592			A
28-4-0228	Methyl-d3 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1588			A
28-4-0229	Ethyl-d5 2-diisopropylaminoethyl ethylphosphonate	2.B.04	1	1638			A
28-4-0230	Bis(2-dimethylaminoethyl) ethylphosphonate	2.B.04	1	1630			A
28-4-0231	Bis(2-diethylaminoethyl) ethylphosphonate	2.B.04	1	1925			A
28-4-0232	Bis(2-diisopropylaminoethyl) ethylphosphonate	2.B.04	1	2173			A
04-4-0371r	2-Methylcyclopentyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	1	2027	2035		A
04-4-0372r	2,6-Dimethylcyclohexyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	1	2181	2192		A
04-4-0373r	3,5-Dimethylcyclohexyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	1	2186	2197	2205	A
04-4-0377r	Pinacolyl S-2-diethylaminoethyl isopropylphosphonothiolate	1.A.03	1	1915	1926		A
04-4-0380r	Pinacolyl S-2-diethylaminoethyl propylphosphonothiolate	1.A.03	1	1944	1959		A

## LISTS OF VALIDATED DATA OF NON-SCHEDULED CHEMICALS RELEVANT TO THE CONVENTION

**TABLE 1: LIST OF VALIDATED DATA OF NON-SCHEDULED DEGRADATION PRODUCTS AND/OR KNOWN SYNTHESIS IMPURITIES OR BY-PRODUCTS RELATED TO SCHEDULES 1.A.01 AND 1.A.02**

OPCW Code(s)	Chemical Name	Justification
08-2-0082	Ethyl 2-methoxyethyl N,N-dimethylphosphoramidate	Decontamination product of Tabun 1.A.02.
08-4-0085	Isopropyl trimethylsilyl N,N-diethylphosphoramidate	TMS derivative of isopropyl N,N-diethylphosphoramidate: hydrolysis product of isopropyl N,N-diethylphosphoroamidocyanidate 1.A.02.
08-4-0086	Isopropyl trimethylsilyl N,N-dipropylphosphoramidate	TMS derivative of isopropyl N,N-dipropylphosphoramidate: hydrolysis product of isopropyl N,N-dipropylphosphoroamidocyanidate 1.A.02.
08-4-0084	Methyl trimethylsilyl N,N-diethylphosphoramidate	TMS derivative of methyl N,N-diethylphosphoramidate: hydrolysis product of methyl N,N-diethyl phosphoramidocyanidate 1.A.02.
08-4-0079	Methyl trimethylsilyl N,N-dipropylphosphoramidate	TMS derivative of methyl N,N-dipropylphosphoramidate: hydrolysis product of methyl N,N-dipropyl phosphoramidocyanidate 1.A.02.
08-4-0091	Ethyl trimethylsilyl N,N-diethylphosphoramidate	TMS derivative of ethyl N,N-diethylphosphoramidate, hydrolysis product of ethyl N,N-diethylphosphoroamidocyanidate 1.A.02.

**TABLE 2: LIST OF VALIDATED DATA OF NON-SCHEDULED DEGRADATION PRODUCTS AND/OR KNOWN SYNTHESIS IMPURITIES OR BY-PRODUCTS RELATED TO SCHEDULE 1.A.03**

OPCW Code(s)	Chemical Name	Justification
07-4-2935		
24-4-0002r	Bis(2-N,N-diethylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-2-3172		
07-4-2940	(2-N,N-Diethylaminoethyl)(2-N,N-diisopropylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-2-3177		
07-4-2885	(2-N,N-Diethylaminoethyl)(2-N,N-diisopropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-2-3122		

OPCW Code(s)	Chemical Name	Justification
07-4-2905 07-2-3142	(2-N,N-Diethylaminoethyl)(2-N,N-dimethylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2938 07-2-3175	(2-N,N-Diethylaminoethyl)(2-N,N-dipropylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2883 07-2-3120	(2-N,N-Diethylaminoethyl)(2-N,N-dipropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2937 07-2-3174	(2-N,N-Diethylaminoethyl)(2-N-ethyl-N-isopropylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2882 07-2-3119	(2-N,N-Diethylaminoethyl)(2-N-ethyl-N-isopropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2914 07-2-3151	(2-N,N-Diethylaminoethyl)(2-N-ethyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2859 07-2-3096	(2-N,N-Diethylaminoethyl)(2-N-ethyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2936 07-2-3173	(2-N,N-Diethylaminoethyl)(2-N-ethyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2881 07-2-3118	(2-N,N-Diethylaminoethyl)(2-N-ethyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2929 07-2-3166	(2-N,N-Diethylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2874 07-2-3111	(2-N,N-Diethylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2939 07-2-3176	(2-N,N-Diethylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2884 07-2-3121	(2-N,N-Diethylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2922 07-2-3159	(2-N,N-Diethylaminoethyl)(2-N-methyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2867 07-2-3104	(2-N,N-Diethylaminoethyl)(2-N-methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.

<b>OPCW Code(s)</b>	<b>Chemical Name</b>	<b>Justification</b>
07-4-2910 07-2-3147	(2-N,N-Diisopropylaminoethyl)(2-N,N-dimethylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2855 07-2-3092	(2-N,N-Diisopropylaminoethyl)(2-N,N-dimethylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2897 07-2-3134	(2-N,N-Diisopropylaminoethyl)(2-N,N-dipropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2949 07-2-3186	(2-N,N-Diisopropylaminoethyl)(2-N-ethyl-N-isopropylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2894 07-2-3131	(2-N,N-Diisopropylaminoethyl)(2-N-ethyl-N-isopropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2919 07-2-3156	(2-N,N-Diisopropylaminoethyl)(2-N-ethyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2864 07-2-3101	(2-N,N-Diisopropylaminoethyl)(2-N-ethyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2945 07-2-3182	(2-N,N-Diisopropylaminoethyl)(2-N-ethyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2890 07-2-3127	(2-N,N-Diisopropylaminoethyl)(2-N-ethyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2934 07-2-3171	(2-N,N-Diisopropylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2879 07-2-3116	(2-N,N-Diisopropylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2954 07-2-3191	(2-N,N-Diisopropylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2899 07-2-3136	(2-N,N-Diisopropylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2927 07-2-3164	(2-N,N-Diisopropylaminoethyl)(2-N-methyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2872 07-2-3109	(2-N,N-Diisopropylaminoethyl)(2-N-methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.

OPCW Code(s)	Chemical Name	Justification
07-4-2850 07-2-3087	(2-N,N-Dimethylaminoethyl)(2-N,N-Diethylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2908 07-2-3145	(2-N,N-Dimethylaminoethyl)(2-N,N-dipropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2853 07-2-3090	(2-N,N-Dimethylaminoethyl)(2-N,N-dipropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2907 07-2-3144	(2-N,N-Dimethylaminoethyl)(2-N-ethyl-N-isopropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2852 07-2-3089	(2-N,N-Dimethylaminoethyl)(2-N-ethyl-N-isopropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2902 07-2-3139	(2-N,N-Dimethylaminoethyl)(2-N-ethyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2847 07-2-3084	(2-N,N-Dimethylaminoethyl)(2-N-ethyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2906 07-2-3143	(2-N,N-Dimethylaminoethyl)(2-N-ethyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2851 07-2-3088	(2-N,N-Dimethylaminoethyl)(2-N-ethyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2904 07-2-3141	(2-N,N-Dimethylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2849 07-2-3086	(2-N,N-Dimethylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2909 07-2-3146	(2-N,N-Dimethylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2854 07-2-3091	(2-N,N-Dimethylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2903 07-2-3140	(2-N,N-Dimethylaminoethyl)(2-N-methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2848 07-2-3085	(2-N,N-Dimethylaminoethyl)(2-N-methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.



OPCW Code(s)	Chemical Name	Justification
07-4-2947 07-2-3184	(2-N,N-Dipropylaminoethyl)(2-N-ethyl-N-isopropylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2892 07-2-3129	(2-N,N-Dipropylaminoethyl)(2-N-ethyl-N-isopropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2917 07-2-3154	(2-N,N-Dipropylaminoethyl)(2-N-ethyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2862 07-2-3099	(2-N,N-Dipropylaminoethyl)(2-N-ethyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2943 07-2-3180	(2-N,N-Dipropylaminoethyl)(2-N-ethyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2888 07-2-3125	(2-N,N-Dipropylaminoethyl)(2-N-ethyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2932 07-2-3169	(2-N,N-Dipropylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2877 07-2-3114	(2-N,N-Dipropylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2951 07-2-3188	(2-N,N-Dipropylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2896 07-2-3133	(2-N,N-Dipropylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2925 07-2-3162	(2-N,N-Dipropylaminoethyl)(2-N-methyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2916 07-2-3153	(2-N-Ethyl-N-isopropylaminoethyl)(2-N-ethyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2861 07-2-3098	(2-N-Ethyl-N-isopropylaminoethyl)(2-N-ethyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2942 07-2-3179	(2-N-Ethyl-N-isopropylaminoethyl)(2-N-ethyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2887 07-2-3124	(2-N-Ethyl-N-isopropylaminoethyl)(2-N-ethyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.

OPCW Code(s)	Chemical Name	Justification
07-4-2931 07-2-3168	(2-N-Ethyl-N-isopropylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2876 07-2-3113	(2-N-Ethyl-N-isopropylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2948 07-2-3185	(2-N-Ethyl-N-isopropylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2893 07-2-3130	(2-N-Ethyl-N-isopropylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2924 07-2-3161	(2-N-Ethyl-N-isopropylaminoethyl)(2-N-methyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2869 07-2-3106	(2-N-Ethyl-N-isopropylaminoethyl)(2-N-methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2915 07-2-3152	(2-N-Ethyl-N-methylaminoethyl)(2-N-ethyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2860 07-2-3097	(2-N-Ethyl-N-methylaminoethyl)(2-N-ethyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2913 07-2-3150	(2-N-Ethyl-N-methylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2858 07-2-3095	(2-N-Ethyl-N-methylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2918 07-2-3155	(2-N-Ethyl-N-methylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2863 07-2-3100	(2-N-Ethyl-N-methylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2912 07-2-3149	(2-N-Ethyl-N-methylaminoethyl)(2-N-methyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2857 07-2-3094	(2-N-Ethyl-N-methylaminoethyl)(2-N-methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2930 07-2-3167	(2-N-Ethyl-N-propylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.

<b>OPCW Code(s)</b>	<b>Chemical Name</b>	<b>Justification</b>
07-4-2875 07-2-3112	(2-N-Ethyl-N-propylaminoethyl)(2-N-isopropyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2944 07-2-3181	(2-N-Ethyl-N-propylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2889 07-2-3126	(2-N-Ethyl-N-propylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2923 07-2-3160	(2-N-Ethyl-N-propylaminoethyl)(2-N-methyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2868 07-2-3105	(2-N-Ethyl-N-propylaminoethyl)(2-N-methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2933 07-2-3170	(2-N-Isopropyl-N-methylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2878 07-2-3115	(2-N-Isopropyl-N-methylaminoethyl)(2-N-isopropyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2921 07-2-3158	(2-N-Isopropyl-N-methylaminoethyl)(2-N-methyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2866 07-2-3103	(2-N-Isopropyl-N-methylaminoethyl)(2-N-methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2926 07-2-3163	(2-N-Isopropyl-N-propylaminoethyl)(2-N-methyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2871 07-2-3108	(2-N-Isopropyl-N-propylaminoethyl)(2-N-methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2952 07-2-3189	(2-N,N-Diisopropylaminoethyl)(2-N,N-Dipropylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2870 07-2-3107	(2-N,N-Dipropylaminoethyl)(2-N-Methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2880 24-4-0001r 07-2-3117	Bis(2-N,N-diethylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.

<b>OPCW Code(s)</b>	<b>Chemical Name</b>	<b>Justification</b>
07-4-2955 24-4-0004r 07-2-3192	Bis(2-N,N-diisopropylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2900 24-4-0003r 07-2-3137 24-2-0031	Bis(2-N,N-diisopropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2901 24-4-0006r 07-2-3138	Bis(2-N,N-dimethylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2846 07-2-3083 24-2-0033	Bis(2-N,N-dimethylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2950 24-4-0008r 07-2-3187 24-2-0036	Bis(2-N,N-dipropylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2895 24-4-0007r 07-2-3132	Bis(2-N,N-dipropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2946 07-2-3183	Bis(2-N-ethyl-N-isopropylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2891 07-2-3128	Bis(2-N-ethyl-N-isopropylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2911 07-2-3148	Bis(2-N-ethyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2856 07-2-3093	Bis(2-N-ethyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2941 07-2-3178	Bis(2-N-ethyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.

<b>OPCW Code(s)</b>	<b>Chemical Name</b>	<b>Justification</b>
07-4-2886 07-2-3123	Bis(2-N-ethyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2928 07-2-3165	Bis(2-N-isopropyl-N-methylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2873 07-2-3110	Bis(2-N-isopropyl-N-methylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2953 07-2-3190	Bis(2-N-isopropyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2898 07-2-3135	Bis(2-N-isopropyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2920 07-2-3157	Bis(2-N-methyl-N-propylaminoethyl)disulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2865 07-2-3102	Bis(2-N-methyl-N-propylaminoethyl)sulfide	Known impurity and/or degradation product associated with 1.A.03 synthesis.
07-4-2796 07-2-3033	N,N-Dimethyl-N-(2-trimethylsilyloxyethyl)amine	TMS derivative of N,N-dimethylaminoethanol. Exempted in 2.B.11 but a degradation product of 1.A.03 chemicals.
08-4-0076 08-2-0101	Trimethylsilyl N,N-diethylaminoethyl-2-sulfonate	TMS derivative of N,N-diethylaminoethyl-2-sulfonate: degradation product of 2-(N,N-diethylamino)ethanethiol which is associated with schedule 1.A.03.
08-4-0077 08-2-0102	Trimethylsilyl N,N-diisopropylaminoethyl-2-sulfonate	TMS derivative of N,N-diisopropylaminoethyl-2-sulfonate: degradation product of 2-(N,N-diisopropylamino)ethanethiol which is associated with schedule 1.A.03.
08-4-0075 08-2-0100	Trimethylsilyl N,N-dimethylaminoethyl-2-sulfonate	TMS derivative of N,N-dimethylaminoethyl-2-sulfonate: degradation product of 2-(N,N-dipropylamino)ethanethiol which is associated with schedule 1.A.03.
07-4-2836 07-2-3073	N,N-Dimethylaminoethanol	Exemption in schedule 2.B.11 but a degradation product of 1.A.03 chemicals.
07-4-2840 07-2-3077	N,N-Diethylaminoethanol	Exemption in schedule 2.B.11 but a degradation product of 1.A.03 chemicals.
07-4-2800 07-2-3037	N,N-Diethyl-N-(2-trimethylsilyloxyethyl)amine	TMS derivative of N,N-diethylaminoethanol. Exempted in 2.B.11 but a degradation product of 1.A.03.

**TABLE 3: LIST OF VALIDATED DATA OF NON-SCHEDULED DEGRADATION PRODUCTS AND/OR KNOWN SYNTHESIS IMPURITIES OR BY-PRODUCTS RELATED TO SCHEDULE 1.A.04**

<b>OPCW Code(s)</b>	<b>Chemical Name</b>	<b>Justification</b>
17-4-0077 24-4-0018r 17-2-0102 25-2-0005	Divinylsulfone	Degradation product of sulfur mustard 1.A.04.
17-4-0076 24-4-0017r 17-2-0101 24-2-0041	Divinylsulfoxide	Degradation product of sulfur mustard 1.A.04.
24-4-0013r 24-2-0039	N-(2-Trimethylsilyloxyethyl)thiomorpholine	TMS derivative of N-(2-hydroxyethyl)thiomorpholine (a reaction product of sulfur mustard 1.A.04 with a decon reagent: monoethanolamine).
17-2-0111	2-(2-Chlorovinyl)-1,3,6,2-dioxathiarosane	Reaction product of Lewisite 1 with thiodiglycol.
24-4-0012r 24-2-0038	N-(2-Hydroxyethyl)thiomorpholine	Reaction product of sulfur mustard 1.A.04 with a decon reagent: monoethanolamine.
24-4-0010r 25-2-0001	1,4-Dithiane	Impurity in sulfur mustard 1.A.04.
24-4-0011r 25-2-0002	1,4-Oxathiane	Impurity in sulfur mustard 1.A.04.
24-4-0009r 24-2-0037	2-Chloroethyl 2-hydroxyethyl sulfide	Hydrolysis product of sulfur mustard 1.A.04.
24-4-0019r 24-2-0042	2-Chloroethyl vinyl sulfide	Degradation product of sulfur mustard 1.A.04.
17-4-0071 24-4-0021r 17-2-0096 24-2-0044	2-Chloroethyl vinyl sulfone	Degradation product of sulfur mustard 1.A.04.

OPCW Code(s)	Chemical Name	Justification
17-4-0070 24-4-0020r 17-2-0095 24-2-0043	2-Chloroethyl vinyl sulfoxide	Degradation product of sulfur mustard 1.A.04.
17-4-0069 17-2-0094	2-Chloroethylthioethyl 2-chloroethylthioethyl ether	Analogue of bis(2-chloroethylthioethyl)ether (O-Mustard). Known impurity in synthesis associated with 1.A.04.
24-4-0040r	1,3-Bis(2-trimethylsilyloxyethylsulfanyl)propane	TMS derivative of 1,3-bis(2-hydroxyethylsulfanyl)propane, a degradation product of 1,3-bis(2-chloroethylthio)propane 1.A.04.
24-4-0041r 24-2-0060	1,3-Bis(2-trimethylsilyloxyethylsulfonyl)propane	TMS derivative of 1,3-bis(2-hydroxyethylsulfonyl)propane a degradation product of 1,3-bis(2-chloroethylthio)propane 1.A.04.
24-4-0028r	1,3-Bis(2-trimethylsilyloxyethylthio)propane	TMS derivative of 1,3-bis(2-hydroxyethylthio)propane hydrolysis product of 1,3-bis(2-chloroethylthio)propane 1.A.04.
17-4-0073 24-4-0016r 17-2-0098 25-2-0004	Bis(2-chloroethyl)sulfone	Oxidation product of sulfur mustard 1.A.04.
17-4-0074 24-4-0015r 17-2-0099	Bis(2-chloroethyl)sulfoxide	Oxidation product of sulfur mustard 1.A.04.
24-4-0022r 24-2-0045	2-Hydroxyethyl vinyl sulfide	Degradation product of sulfur mustard 1.A.04.
24-4-0024r 24-2-0047	2-Hydroxyethyl vinyl sulfone	Degradation product of sulfur mustard 1.A.04.
24-4-0034r	1,2-Bis(2-trimethylsilyloxyethylsulfanyl)ethane	TMS derivative of 1,2-bis(2-hydroxyethylsulfanyl)ethane, degradation product of 1,2-bis(2-chloroethylthio)ethane (sesquimustard) 1.A.04.
24-4-0035r 24-2-0054	1,2-Bis(2-trimethylsilyloxyethylsulfonyl)ethane	TMS derivative of 1,2-bis(2-hydroxyethylsulfonyl)ethane, degradation product of 1,2-bis(2-chloroethylthio)ethane (sesquimustard) 1.A.04.
25-2-0020	1,2-Bis(2-trimethylsilyloxyethylthio)ethane	TMS derivative of 1,2-bis(2-hydroxyethylthio)ethane, hydrolysis product of 1,2-bis(2-chloroethylthio)ethane (sesquimustard) 1.A.04.

OPCW Code(s)	Chemical Name	Justification
24-4-0037r	1,2-Bis(2-trimethylsilyloxyethylsulfonyl)ether	TMS derivative of bis(2-hydroxyethylsulfonyl)ether, degradation product of bis(2-chloroethylthio)ether (O-mustard) 1.A.04.
24-4-0033r 25-2-0023	Bis(2-trimethylsilyloxyethyl)sulfone	TMS derivative of bis(2-hydroxyethyl)sulfone, degradation product of bis(2-hydroxyethyl)sulfide (thiodiglycol) 2.B.13.
24-4-0032r 08-2-0124	Bis(2-trimethylsilyloxyethyl)sulfoxide	TMS derivative of bis(2-hydroxyethyl)sulfoxide, degradation product of bis(2-hydroxyethyl)sulfide (thiodiglycol) 2.B.13.
24-4-0038r	Bis(2-trimethylsilyloxyethylsulfanyl)methane	TMS derivative of bis(2-hydroxyethylsulfanyl)methane, degradation product of bis(2-chloroethylthio)methane 1.A.04.
24-4-0046r	Bis(2-trimethylsilyloxyethylsulfanyl)methyl)ether	TMS derivative of bis(2-hydroxyethylsulfanyl)methyl)ether, degradation product of bis(2-chloroethylthio)ether 1.A.04.
24-4-0039r 24-2-0058	Bis(2-trimethylsilyloxyethylsulfonyl)methane	TMS derivative of bis(2-hydroxyethylsulfonyl)methane, degradation product of bis(2-chloroethylthio)methane 1.A.04.
24-4-0047r	Bis(2-trimethylsilyloxyethylsulfonylmethyl)ether	TMS derivative of bis(2-hydroxyethylsulfonylmethyl)ether, degradation product of bis(2-chloroethylthio)ether 1.A.04.
24-4-0027r	Bis(2-trimethylsilyloxyethylthio)methane	TMS derivative of bis(2-hydroxyethylthio)methane, hydrolysis product of bis(2-chloroethylthio)methane 1.A.04.
24-4-0026r 25-2-0021	Bis(2-trimethylsilyloxyethylthio)ether	TMS derivative of bis(2-hydroxyethylthio)ether, hydrolysis product of bis(2-chloroethylthio)ether (O-mustard) 1.A.04.
24-4-0031r 24-2-0052	Bis(2-trimethylsilyloxyethylthiomethyl)ether	TMS derivative of bis(2-hydroxyethylthiomethyl)ether, hydrolysis product of bis(2-chloroethylthio)ether 1.A.04.
24-4-0029r 08-4-0156 08-2-0188	1,4-Bis(2-trimethylsilyloxyethylthio)butane	TMS derivative of 1,4-bis(2-hydroxyethylthio)butane, hydrolysis product of 1,4-bis(2-chloroethylthio)butane 1.A.04.
24-4-0030r	1,5-Bis(2-trimethylsilyloxyethylthio)pentane	TMS derivative of 1,5-bis(2-hydroxyethylthio)pentane, hydrolysis product of 1,5-bis(2-chloroethylthio)pentane 1.A.04.
24-4-0042r	1,4-Bis(2-trimethylsilyloxyethylsulfanyl)butane	TMS derivative of 1,4-bis(2-hydroxyethylsulfanyl)butane, degradation product of 1,4-bis(2-chloroethylthio)butane 1.A.04.
24-4-0043r 08-4-0158	1,4-Bis(2-trimethylsilyloxyethylsulfonyl)butane	TMS derivative of 1,4-bis(2-hydroxyethylsulfonyl)butane, degradation product of 1,4-bis(2-chloroethylthio)butane 1.A.04.



OPCW Code(s)	Chemical Name	Justification
24-4-0044r	1,5-Bis(2-trimethylsilyloxyethylsulfanyl)pentane	TMS derivative of 1,5-bis(2-hydroxyethylsulfanyl)pentane, degradation product of 1,5-bis(2-chloroethylthio)pentane 1.A.04.
24-4-0045r 24-2-0064	1,5-Bis(2-trimethylsilyloxyethylsulfonyl)pentane	TMS derivative of 1,5-bis(2-hydroxyethylsulfonyl)pentane, degradation product of 1,5-bis(2-chloroethylthio)pentane 1.A.04.

**TABLE 4: LIST OF VALIDATED DATA OF NON-SCHEDULED DEGRADATION PRODUCTS AND/OR KNOWN SYNTHESIS IMPURITIES OR BY-PRODUCTS RELATED TO SCHEDULE 1.A.05**

OPCW Code(s)	Chemical Name	Justification
17-2-0111	2-(2-Chlorovinyl)-1,3,6,2-dioxathiasocane	Reaction product of Lewisite 1 with thiodiglycol.

**TABLE 5: LIST OF VALIDATED DATA OF RIOT CONTROL AGENTS**

OPCW Code(s)	Chemical Name	Justification
16-4-0047 19-4-0007 16-2-0018	2-Chloroacetophenone	Riot control agent (code CN). On list of declared riot control agents compiled by the OPCW (S/1177/2014).
19-4-0009 19-4-0009 08-2-0133 24-2-0076	2-Chlorobenzylidene malononitrile	Riot control agent (code CS). On list of declared riot control agents compiled by the OPCW (S/1177/2014).
24-4-0056r 25-2-0017	Capsaicin	Riot control agent (component of pepper spray). On list of declared riot control agents compiled by the OPCW (S/1177/2014).
19-4-0010 24-2-0077	Dibenz[b,f][1,4]oxazepine	Riot control agent (code CR). On list of declared riot control agents compiled by the OPCW (S/1177/2014).
24-4-0057r 25-2-0018	Pelargonic acid vanillylamide	Riot control agent (component of pepper spray). On list of declared riot control agents compiled by the OPCW (S/1177/2014).

**TABLE 6: LIST OF VALIDATED DATA OF NON-SCHEDULED CHEMICALS REQUIRED TO REMOVE FALSE POSITIVES IN SCHEDULE 2.B.11 INSPECTIONS**

OPCW Code(s)	Chemical Name	Justification
07-4-2840 07-2-3077	N,N-Diethylaminoethanol	Exemption in schedule 2.B.11 but a known false positive of other 2.B.11 chemicals.
07-4-2800 07-2-3037	N,N-Diethyl-N-(2-trimethylsilyloxyethyl)amine	TMS derivative of N,N-diethylaminoethanol. Exempted in 2.B.11 but a known false positive of other 2.B.11 chemicals.

**TABLE 7: LIST OF VALIDATED DATA OF NON-SCHEDULED CHEMICALS REQUIRED TO REMOVE FALSE POSITIVES IN SCHEDULE 2.B.12 INSPECTIONS**

OPCW Code(s)	Chemical Name	Justification
07-4-2880 24-4-0001r 07-2-3117	Bis(2-N,N-diethylaminoethyl)sulfide	A known false positive for a 1.A.03 chemical.
07-4-2900 24-4-0003r 07-2-3137 24-2-0031	Bis(2-N,N-diisopropylaminoethyl)sulfide	A known false positive for a 1.A.03 chemical.
07-4-2846 07-2-3083 24-2-0033	Bis(2-N,N-dimethylaminoethyl)sulfide	A known false positive for a 1.A.03 chemical.
07-4-2895 24-4-0007r 07-2-3132	Bis(2-N,N-dipropylaminoethyl)sulfide	A known false positive for a 1.A.03 chemical.

**Annex 3**

**DATA ENTRY RECOMMENDED FOR REMOVAL FROM THE OPCW CENTRAL ANALYTICAL DATABASE**

<b>OPCW Code(s)</b>	<b>Chemical Name</b>	<b>Justification</b>
09-2-0176 09-4-0058	O-Isobutyl O-trimethyl methylphosphonothionate	Spectrum not consistent with chemical structure and other similar examples of this chemical class.

## Annex 4

## LIST OF CHEMICALS FOR WHICH THE VALIDATION GROUP AGREED NAME CHANGES

Name to be Replaced	New Name
Di(cis-hex-4-enyl) dipropylpyrophosphonate	Bis(cis-hex-4-enyl) dipropylpyrophosphonate
Di(cis-hex-4-enyl) propylphosphonate	Bis(cis-hex-4-enyl) propylphosphonate
Di(trans-hex-3-enyl) dipropylpyrophosphonate	Bis(trans-hex-3-enyl) dipropylpyrophosphonate
Di(trans-hex-3-enyl) propylphosphonate	Bis(trans-hex-3-enyl) propylphosphonate
Di(trans-hex-4-enyl) dimethylpyrophosphonate	Bis(trans-hex-4-enyl) dimethylpyrophosphonate
Di(trans-hex-4-enyl) dipropylpyrophosphonate	Bis(trans-hex-4-enyl) dipropylpyrophosphonate
Di(trans-hex-4-enyl) ethylphosphonate	Bis(trans-hex-4-enyl) ethylphosphonate
Di(trans-hex-4-enyl) methylphosphonate	Bis(trans-hex-4-enyl) methylphosphonate
Di(trans-hex-4-enyl) propylphosphonate	Bis(trans-hex-4-enyl) propylphosphonate
Di(trans-hex-4-enyl) diethylpyrophosphonate	Bis(trans-hex-4-enyl) diethylpyrophosphonate

Annex 5

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