OPCW

Technical Secretariat

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NOTE BY THE TECHNICAL SECRETARIAT

REPORT OF THE FORTY-SIXTH MEETING OF THE VALIDATION GROUP FOR THE UPDATING OF THE OPCW CENTRAL ANALYTICAL DATABASE 26 AND 27 MARCH 2018

1. The Validation Group (hereinafter "the Group") met on 26 and 27 March 2018 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)
Nuclear magnetic resonance (NMR) spectroscopy	Mr Damian Magiera (Germany)

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. The Group accepted the resignations of Mr Roberto Martínez Alvarez (Spain) from the NMR and MS subgroups, and Mr Harri Koskela (Finland) and Mr James Jones (United Kingdom of Great Britain and Northern Ireland) from the NMR subgroup. The Group acknowledged the support of all these contributors over the years of their membership.

5. The Group agreed to a naming correction for 2-pyridinylmethylene malononitrile (OPCW chemical ID number 5066) to 3-pyridinylmethylene malononitrile.

6. This report of the Forty-Sixth Meeting of the Group presents the sets of validated analytical data of scheduled and non-scheduled chemicals to be forwarded to the Director-General for appropriate action (Annexes 1 and 2).

7. This report also presents the sets of validated analytical data of non-scheduled chemicals to be added to the Validation Group Working Database (Annex 3).

8. A set of name changes to chemicals already in the OCAD was agreed by the Group. These chemicals are detailed in Annex 4.

9. The Group made some minor changes to its naming rules (version 7), copies of which can be obtained from the Technical Secretariat.

10. Available data from all analytical techniques will be sent to the Group at least six weeks before its next scheduled meeting.

11. The next meeting of the Group is scheduled to take place on 25 and 26 September 2018. The evaluators agreed to send their evaluation reports to the appointed coordinators no later than 11 September 2017. The evaluators have agreed to come to the meeting prepared to finalise the evaluation of the analytical data referred to in the previous paragraph.

12. Annex 5 to this report lists the members and evaluators of the Group.

Annexes:

Annex 1: Lists of Approved Data of Scheduled Chemicals Recommended for Inclusion in the OPCW Central Analytical Database

Annex 2: Lists of Approved Data of Non-Scheduled Chemicals Relevant to the Convention Recommended for Inclusion in the OPCW Central Analytical Database

Annex 3: Lists of Approved Data Relevant to the Chemical Weapons Convention

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 OF SCHEDULED CHEMICALS 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 INFRARED DATA OF SCHEDULED CHEMICALS

OPCW Code	Chemical Name	Schedule	Decision
04-1-0364rv	Cyclooctyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-1-0365rv	2-Methylcyclopentyl N,N-dimethylphosphoramidocyanidate	1.A.02	B
04-1-0366rv	2-Methylcyclohexyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-1-0367rv	2,6-Dimethylcyclohexyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-1-0368rv	3,5-Dimethylcyclohexyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-1-0369rv	4-tert-Butylcyclohexyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-1-0370rv	1-Isopropyl-2-methylpropyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-1-0371rv	2,2-Dimethylpropyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-1-0372rv	1-Ethylpropyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-1-0395v	1-Methylbutyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-1-0396v	1-Methylhexyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-1-0397v	1-Methylheptyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-1-0398v	1-Methyloctyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-1-0399v	1-Methylnonyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-1-0400v	Nonyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-1-0401v	Decyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-1-0402v	2-Methylcyclohexyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-1-0403v	3,5-Dimethylcyclohexyl N,N-diethylphosphoramidocyanidate	1.A.02	A

TABLE 2: LIST OF APPROVED MS DATA OF SCHEDULED CHEMICALS

OPCW Code	Chemical Name	Schedule	Decision
04-2-0573ar	2-Methylcyclopentyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-2-0573br	2-Methylcyclopentyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-2-0580r	1-Ethylpropyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
04-2-0582	3-Methylbutyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0583b	1-Methylbutyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0584a	1-Methylhexyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0584b	1-Methylhexyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0585a	1-Methylheptyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0585b	1-Methylheptyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0586a	1-Methyloctyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0586b	1-Methyloctyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0587a	1-Methylnonyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0587b	1-Methylnonyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0588	Nonyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0590a	2-Methylcyclohexyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0590b	2-Methylcyclohexyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0591a	3,5-Dimethylcyclohexyl N,N-diethylphosphoramidocyanidate	1.A.02	A
04-2-0591b	3,5-Dimethylcyclohexyl N,N-diethylphosphoramidocyanidate	1.A.02	A
28-2-0257	N-Bis(dimethylamino)methylidene-P-methylphosphonamidofluoridate	2.B.04	B
28-2-0258	Methyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	A
28-2-0259	Methyl-d3 N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	A
28-2-0260	Ethyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	A
28-2-0261	Isopropyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	A
28-2-0262	Propyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	A
28-2-0263	sec-Butyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	A
28-2-0264	Butyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	A
28-2-0265	S,S-Diethyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0266	S,S-Diisopropyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0267	S-Isopropyl S-propyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0268	S,S-Dipropyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0269	S-sec-Butyl S-ethyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0270	S-Ethyl S-isobutyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0271	S-Butyl S-ethyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0272	S-sec-Butyl S-isopropyl methylphosphonodithioloselenoate	2.B.04	A

OPCW Code	Chemical Name	Schedule	Decision
28-2-0274	S-Butyl S-isopropyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0275	S-Butyl S-propyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0276	Bis(S-sec-butyl) methylphosphonodithioloselenoate	2.B.04	B
28-2-0277	S,S-Diisobutyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0278	S,S-Dibutyl methylphosphonodithioloselenoate	2.B.04	A
28-2-0279	S-Ethyl S-pentyl methylphosphonodithioloselenoate	2.B.04	B
28-2-0280	S,S-Dipentyl methylphosphonodithioloselenoate	2.B.04	A

TABLE 3: LIST OF APPROVED NMR DATA OF SCHEDULED CHEMICALS

OPCW Code	Chemical Name	Schedule	Decision
05-03-0194	O-Isobutyl methylphosphonothionate, sodium salt	2.B.04	B
05-03-0009	Isopropyl methylphosphonofluoridate	1.A.01	A
05-03-0014	Pinacolyl methylphosphonofluoridate	1.A.01	A
05-03-0016	Pinacolyl methylphosphonofluoridate	1.A.01	A
05-03-0019	Butyl methylphosphonofluoridate	1.A.01	A
05-03-0024	Pentyl methylphosphonofluoridate	1.A.01	A
05-03-0026	Pentyl methylphosphonofluoridate	1.A.01	A
05-03-0032	Heptyl methylphosphonofluoridate	1.A.01	A
05-03-0041	Ethyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
05-03-0043	Ethyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
05-03-0044	Ethyl N,N-dimethylphosphoramidocyanidate	1.A.02	A
05-03-0045	1,3-Bis(2-chloroethylthio)propane	1.A.04	A
05-03-0047	1,4-Bis(2-chloroethylthio)butane	1.A.04	A
05-03-0049	Bis(2-chloroethylthio)methane	1.A.04	A

TABLE 4: 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	Name	Sched	Col	RI(a)	RI(b)	RI(c)	Decision
04-4-0381r	Cyclooctyl N,N-dimethylphosphoramidocyanidate	1.A.02	1	1807			A
04-4-0382r	2-Methylcyclopentyl N,N-dimethylphosphoramidocyanidate	1.A.02	1	1487	1490		A
04-4-0383r	2-Methylcyclohexyl N,N-dimethylphosphoramidocyanidate	1.A.02	1	1601	1607	1615	A
04-4-0385r	3,5-Dimethylcyclohexyl N,N-dimethylphosphoramidocyanidate	1.A.02	1	1638	1663	1668	A
04-4-0386r	4-tert-Butylcyclohexyl N,N-dimethylphosphoramidocyanidate	1.A.02	1	1851	1918		A
04-4-0387r	1-Isopropyl-2-methylpropyl N,N-dimethylphosphoramidocyanidate	1.A.02	1	1470			A
04-4-0389r	1-Ethylpropyl N,N-dimethylphosphoramidocyanidate	1.A.02	1	1345			A
04-4-0391	3-Methylbutyl N,N-diethylphosphoramidocyanidate	1.A.02	1	1507			A
04-4-0392	1-Methylbutyl N,N-diethylphosphoramidocyanidate	1.A.02	1	1473	1477		A
04-4-0393	1-Methylhexyl N,N-diethylphosphoramidocyanidate	1.A.02	1	1654	1659		A
04-4-0394	1-Methylheptyl N,N-diethylphosphoramidocyanidate	1.A.02	1	1751	1757		A
04-4-0395	1-Methyloctyl N,N-diethylphosphoramidocyanidate	1.A.02	1	1849	1856		A
04-4-0396	1-Methylnonyl N,N-diethylphosphoramidocyanidate	1.A.02	1	1948	1956		A
04-4-0397	Nonyl N,N-diethylphosphoramidocyanidate	1.A.02	1	1948			A
04-4-0398	Decyl N,N-diethylphosphoramidocyanidate	1.A.02	1	2051			A
04-4-0399	2-Methylcyclohexyl N,N-diethylphosphoramidocyanidate	1.A.02	1	1749	1753		A
04-4-0400	3,5-Dimethylcyclohexyl N,N-diethylphosphoramidocyanidate	1.A.02	1	1793	1799		A
28-4-0260	N-Bis(dimethylamino)methylidene-P-methylphosphonamidofluoridate	2.B.04	1	1534			B
28-4-0261	Methyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	1	1621			A
28-4-0262	Methyl-d3 N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	1	1618			A
28-4-0263	Ethyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	1	1662			A
28-4-0264	Isopropyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	1	1668			A

OPCW Code	Name	Sched	Col	RI(a)	RI(b)	RI(c)	Decision
28-4-0265	Propyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	1	1749			A
28-4-0266	sec-Butyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	1	1752	1758		A
28-4-0267	Butyl N-[bis(dimethylamino)methylidene]-P-methylphosphonamidate	2.B.04	1	1847			A
28-4-0268	S,S-Diethyl methylphosphonodithioloselenoate	2.B.04	1	1563			A
28-4-0269	S,S-Diisopropyl methylphosphonodithioloselenoate	2.B.04	1	1596			A
28-4-0270	S-Isopropyl S-propyl methylphosphonodithioloselenoate	2.B.04	1	1672			A
28-4-0271	S,S-Dipropyl methylphosphonodithioloselenoate	2.B.04	1	1741			A
28-4-0272	S-sec-Butyl S-ethyl methylphosphonodithioloselenoate	2.B.04	1	1685	1690		A
28-4-0273	S-Ethyl S-isobutyl methylphosphonodithioloselenoate	2.B.04	1	1700			A
28-4-0274	S-Butyl S-ethyl methylphosphonodithioloselenoate	2.B.04	1	1754			A
28-4-0275	S-sec-Butyl S-isopropyl methylphosphonodithioloselenoate	2.B.04	1	1695	1703		A
28-4-0276	S-sec-Butyl S-propyl methylphosphonodithioloselenoate	2.B.04	1	1761	1767		A
28-4-0277	S-Butyl S-isopropyl methylphosphonodithioloselenoate	2.B.04	1	1765			A
28-4-0278	S-Butyl S-propyl methylphosphonodithioloselenoate	2.B.04	1	1839			A
28-4-0279	Bis(S-sec-butyl) methylphosphonodithioloselenoate	2.B.04	1	1777	1789		B
28-4-0280	S,S-Diisobutyl methylphosphonodithioloselenoate	2.B.04	1	1821			A
28-4-0281	S,S-Dibutyl methylphosphonodithioloselenoate	2.B.04	1	1935			A
28-4-0282	S-Ethyl S-pentyl methylphosphonodithioloselenoate	2.B.04	1	1858			B
28-4-0283	S,S-Dipentyl methylphosphonodithioloselenoate	2.B.04	1	2138			A

Annex 2

LISTS OF APPROVED DATA OF NON-SCHEDULED CHEMICALS RELEVANT TO THE CONVENTION 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 5: LIST OF APPROVED MS DATA OF NON-SCHEDULED CHEMICALS RELEVANT TO THE CONVENTION

OPCW Code	Chemical Name	Schedule	Decision	Justification	Classification
28-2-0281	Bis(2-trimethylsilyloxyethyl)disulfide	NS	A	TMS derivative of degradation product/impurity of sulfur mustard 1.A.04.	NDP(1A04)*
28-2-0282	Bis(2-trimethylsilyloxyethylthio)methane	NS	A		
28-2-0283	1,2-Bis(2-trimethylsilyloxyethylthio)ethane	NS	A		
28-2-0284	1,3-Bis(2-trimethylsilyloxyethylthio)propane	NS	A		
28-2-0285	1,4-Bis(2-trimethylsilyloxyethylthio)butane	NS	A		
28-2-0286	1,5-Bis(2-trimethylsilyloxyethylthio)pentane	NS	A		

* Non-scheduled degradation products and/or known synthesis impurities or by-products related to schedule 1.A.04

TABLE 6: LIST OF APPROVED GC(RI) DATA OF NON-SCHEDULED CHEMICALS RELEVANT TO THE CONVENTION

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	Col	RI(a)	Decision	Justification	Classification
28-4-0284	Bis(2-trimethylsilyloxyethyl)disulfide	NS	1	1630	A	TMS derivative of degradation product/impurity of sulfur mustard 1.A.04.	NDP(1A04)*
28-4-0285	Bis(2-trimethylsilyloxyethylthio)methane	NS	1	1767	A		
28-4-0286	1,2-Bis(2-trimethylsilyloxyethylthio)ethane	NS	1	1888	A		
28-4-0287	1,3-Bis(2-trimethylsilyloxyethylthio)propane	NS	1	1990	A		
28-4-0288	1,4-Bis(2-trimethylsilyloxyethylthio)butane	NS	1	2106	A		
28-4-0289	1,5-Bis(2-trimethylsilyloxyethylthio)pentane	NS	1	2216	A		

* Non-scheduled degradation products and/or known synthesis impurities or by-products related to schedule 1.A.04

Annex 3

LISTS OF APPROVED DATA RELEVANT TO THE CHEMICAL WEAPONS CONVENTION

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

TABLE 7: LIST OF APPROVED MS DATA OF NON-SCHEDULED CHEMICALS

OPCW Code	Chemical Name	Schedule	Decision
28-2-0287	Bis(2-tert-butyldimethylsilyloxyethyl)sulfide	DS	A
28-2-0288	Bis(2-tert-butyldimethylsilyloxyethyl)disulfide	NS	A
28-2-0289	Bis(2-tert-butyldimethylsilyloxyethylthio)methane	NS	A
28-2-0290	1,2-Bis(2-tert-butyldimethylsilyloxyethylthio)ethane	NS	A
28-2-0291	1,3-Bis(2-tert-butyldimethylsilyloxyethylthio)propane	NS	A
28-2-0292	1,4-Bis(2-tert-butyldimethylsilyloxyethylthio)butane	NS	A
28-2-0293	1,5-Bis(2-tert-butyldimethylsilyloxyethylthio)pentane	NS	A

TABLE 8: LIST OF APPROVED GC(RI) DATA OF NON-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	Name	Sched	Col	RI(a)	RI(b)	RI(c)	Decision
28-4-0290	Bis(2-tert-butyldimethylsilyloxyethyl)sulfide	DS	1	1871			B
28-4-0291	Bis(2-tert-butyldimethylsilyloxyethyl)disulfide	NS	1	2091			A
28-4-0292	Bis(2-tert-butyldimethylsilyloxyethylthio)methane	NS	1	2236			B
28-4-0293	1,2-Bis(2-tert-butyldimethylsilyloxyethylthio)ethane	NS	1	2358			A
28-4-0294	1,3-Bis(2-tert-butyldimethylsilyloxyethylthio)propane	NS	1	2463			A
28-4-0295	1,4-Bis(2-tert-butyldimethylsilyloxyethylthio)butane	NS	1	2587			A
28-4-0296	1,5-Bis(2-tert-butyldimethylsilyloxyethylthio)pentane	NS	1	2696			A

Annex 4

LIST OF CHEMICALS FOR WHICH THE VALIDATION GROUP AGREED NAME CHANGES

Name to be Replaced	New Name
Propyl diphenylarsinothioite	Propyl diphenylarsinothiolite
Ethyl diphenylarsinothioite	Ethyl diphenylarsinothiolite
Methyl (diphenylarsino)thioacetate	Methyl (diphenylarsino)thioloacetate
O-Ethyl methylphosphonothiocyanidate	O-Ethyl methylphosphonothionocyanidate
O-Propyl methylphosphonothiocyanidate	O-Propyl methylphosphonothionocyanidate
N-Heptafluorobutyryloxyethyl-N,N-dimethylamine	N-2-(Heptafluorobutyryloxyethyl)-N,N-dimethylamine
N-Heptafluorobutyryloxyethyl-N,N-diisopropylamine	N-2-(Heptafluorobutyryloxyethyl)-N,N-diisopropylamine
N-Heptafluorobutyryloxyethyl-N-methyl-N-propylamine	N-2-(Heptafluorobutyryloxyethyl)-N-methyl-N-propylamine
N-Heptafluorobutyryloxyethyl-N-isopropyl-N-methylamine	N-2-(Heptafluorobutyryloxyethyl)-N-isopropyl-N-methylamine
O,O-Diethyl phosphoric acid	Diethyl phosphoric acid
1,5-Bis(2-heptafluorobutyryloxyethylthio)-n-pentane	1,5-Bis(2-heptafluorobutyryloxyethylthio)pentane
1,2-Bis(2-trimethylsilyloxyethylsulfonylethyl)ether	Bis(2-trimethylsilyloxyethylsulfonylethyl)ether
Bis(2-heptafluorobutyryloxyethylsulfide)ethane	1,2-Bis(2-heptafluorobutyryloxyethylthio)ethane
(2-N,N-Diisopropylaminoethyl)(2-N,N-Dipropylaminoethyl)disulfide	(2-N,N-Diisopropylaminoethyl)(2-N,N-dipropylaminoethyl)disulfide
(2-N,N-Dipropylaminoethyl)(2-N-Methyl-N-propylaminoethyl)sulfide	(2-N,N-Dipropylaminoethyl)(2-N-methyl-N-propylaminoethyl)sulfide

Annex 5

LIST OF MEMBERS OF THE VALIDATION GROUP[1]

Name	Country	Address	Phone/Fax/E-Mail	Speciality
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Jiří Čermák*	Czech Republic	Výzkumný ústav organických syntéz .a.s (Research Institute for Organic Syntheses) c.p. 296 53354 Rybitví Czech Republic	+420 724400614 jiri.cermak@vuos.com	MS

[1] An asterisk indicates that the evaluator was present at this meeting of the Group and a double asterisk indicates that the evaluator provided an evaluation but was unable to attend.

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