

MEMORANDUM

SUBJECT: Corrections to the publication "*Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities*"

FROM: Barnes Johnson, Director
Economics, Methods, and Risk Analysis Division

TO: Waste Management Division Directors, Region I - X

State Hazardous Waste Directors

This memorandum transmits an *Errata* to the publication "*Human health Risk Assessment Protocol for Hazardous Waste Combustion Facilities*" (peer review draft, EPA530-D-98-001A, B & C) dated July 1998. In addition, it will serve to update you on the status of the protocol's finalization.

The risk assessment guidance became available for use via a Federal Register Notice on Friday, October 30, 1998. A public comment period was opened on that date as well. Since that time, the protocol has been used in a number of site-specific risk assessments on RCRA hazardous waste combustors. Additionally, a large number of comments were received through the public comment period. Consequently, this errata is a result of a combination of issues raised during implementation, as well as incorporation of relevant points which were raised during the comment period. We recommend that these corrections be used in conjunction with the protocol until the Office of Solid Waste is able to release a final protocol.

Please be aware, that due to the number and complexity of the comments received on the document, we still have a number of issues which have not been addressed by this errata. We are continuing to work through the unresolved issues at this time, but feel this interim measure is warranted to insure that any pending or future risk assessments have the advantage of this information. In addition, we will be sending the protocol (along with this errata) for an independent, exterior peer review within the next few months. We will address any outstanding public comments, as well as recommendations received from the peer review in a final document.

If you have any question or concerns on this matter, please contact Karen Pollard of my staff at (703) 308-3948 or Jeffrey Yurk of Region IV at (214) 665-8309.

Attachment

cc: RCRA-affiliated Branch Chiefs
RCRA-affiliated State Authorization and Permit Staff
ESD Labs
John Seitz, Director, Office of Air Quality Planning and Standards
Bill Farland, Director, National Center for Environmental Assessment, ORD
Larry Reed, Deputy Director, Office of Emergency Remedial Response

Dear Colleague:

This letter transmits an *Errata* to the publication “*Human health Risk Assessment Protocol for Hazardous Waste Combustion Facilities*” (peer review draft, EPA530-D-98-001A, B & C) dated July 1998. In addition, it will serve to update you on the status of the protocol’s finalization.

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If you have any question or concerns on this matter, please contact Karen Pollard of my staff at (703) 308-3948 or Jeffrey Yurk of Region 6 at (214) 665-8309.

Sincerely;

Barnes Johnson, Director
Economics, Methods, and Risk Analysis Division

Enclosure

Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (Peer Review Draft)

Errata - August 2, 1999

General Comments

Reference materials:

Numerous comments have been received challenging a number of physical/chemical parameters and toxicity values that are in the peer review draft version of the “*Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities*”. Since this protocol is a “snap shot” of risk assessment science at the time of its publication, it is possible (even probable) that a number of the parameters and toxicity values and their reference materials have been updated and/or revised. Therefore, when using the protocol, the risk assessor should verify the information and references to determine if they are still valid. The Office of Solid Waste (OSW) will continue to review all reference materials used while finalizing the protocol and change those which we deem necessary. Until that time, however, we provide the list below of documents which have been revised or finalized and are not currently reflected in the protocol. These documents are:

1. “*The Determination of Acute Reference Exposure Levels for Airborne Toxicants*” (SRP Review Draft, October 1998). This is a document that has acute toxicity levels (RELs) which may be different than those currently reflected in the protocol. This document can be found on the web at www.oehha.ca.gov/scientific/acutereel.htm.
2. “*Soil Screening Guidance*” (publication 9355.4-23 July 1996). Currently, the protocol references a 1994 draft of this document. This is document can be found at <http://www.epa.gov/oerrpage/superfund/resources/soil/toc.htm>
3. “*Superfund Chemical Data Matrix*” (publication 9345.1-21, EPA 540/R-96/028, June 1996). The data base can be down loaded from the OSWER web site at www.epa.gov/oerrpage/superfund/resources/scdm/index.htm.

Changes to Volume Two, Appendix A

NCEA provision toxicity values:

Please note, that a number of the toxicity values that have been changed in the table below reference a National Center for Exposure Assessment (NCEA) provisional number. The risk assessor should always check with their permitting authority on the validity and appropriateness of the provisional number prior to use.

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
Acetone	67-64-1	Kow	U.S. EPA (1994g)	Karickhoff and Long 1995	Incorrect reference cited
		BCF-fish	4.00E-01	1.03E-01	Revised per U.S. EPA (1999) using Kow correlation presented in Bintein et al. (1993)
Acenaphthene	83-32-9	S	3.80E+00	4.13E+00	U.S. EPA (1994c)
		H	2.00E-04	1.84E-04	Calculated per HHRAP (Eqtn. A3-1)
		Bv-ag	4.66E+00	5.07E+00	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	4.66E+00	5.07E+00	Calculated per HHRAP (Eqtns. A-3-15a,b)
Acetonitrile	75-05-8	S	1.30E-01	7.5E+04	Howard (1989-1993)
		H	3.79E+01	6.57E-05	Calculated per HHRAP (Eqtn. A3-1)
		Bv-ag	6.41E-10	3.70E-04	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	6.41E-10	3.70E-04	Calculated per HHRAP (Eqtns. A-3-15a,b)
Aldrin	309-00-2	Vp	2.90E-11	2.20E-08	U.S. EPA (1994c)
		S	U.S. EPA (1992)	U.S. EPA (1994c)	Incorrect reference cited
		H	1.35E-07	1.02E-04	Calculated per HHRAP (Eqtn. A3-1)
		Fv	0.227325	0.995540	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Bv-ag	1.58E+06	2.08E+03	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	1.58E+06	2.08E+03	Calculated per HHRAP (Eqtns. A-3-15a,b)
Aniline	62-53-3	URF	1.6E-03	1.6E-06	Extrapolated from oral CSF
Antimony	7440-36-0	Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
Aroclor 1016	12674-11-2	BAF-fish	5.33E+04	NA	BSAF-fish value applied as per HHRAP
		BSAF-fish	NA	2.0E+00	Value assigned for 2,3,3',4,4',5,5'-HPCB by U.S. EPA (1994b)
Aroclor 1254	11097-69-1	S	1.00E-02	5.15E-02	U.S. EPA (1994c)
		H	3.79E-03	7.37E-04	Calculated per HHRAP (Eqtn. A3-1)
		Koc	9.98E+05	9.83E+04	Calculated per HHRAP (Eqtn. A-3-5, other values agree w/ change)
		Kds	9.83E+04	9.83E+02	Calculated per HHRAP (Eqtn. A-3-8a)
		Bv-ag	6.01E+01	3.09E+02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	6.01E+01	3.09E+02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		BAF-fish	6.66E+05	NA	BSAF-fish value applied as per HHRAP
		BSAF-fish	NA	2.0E+00	Value assigned for 2,3,3',4,4',5,5'-HPCB by U.S. EPA (1994b)
Arsenic	7440-38-2	Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
		Ba-milk	6.0E-03	6.0E-05	Incorrect value per reference
		BCF-fish	1.14E+02	2.00E+01	Revised per U.S. EPA (1999)

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
Barium	7440-39-3	Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
		BCF-fish	NA	6.33E+02	Revised per U.S. EPA (1999)
Beryllium	7440-41-7	Oral CSF	4.3E+00	8.4E+00	IRIS database value has been deleted. Value set equal to Inhalation CSF
		Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
BHC, Beta-	319-85-7	BCF-fish	4.20E+01	6.20E+01	Revised per U.S. EPA (1999)
		Kow	U.S. EPA (1994g)	Karickhoff and Long 1995	Incorrect reference cited
Benzaldehyde	100-52-7	URF	1.80E-03	5.1E-04	Extrapolated from oral CSF
		Koc	2.01E-01	2.01E+01	Calculated per HHRAP (Eqtn. A-3-5, other values agree w/ change)
Benzo(b)fluoranthene	205-99-2	URF	2.10E-01	2.10E-04	Extrapolated from oral CSF
Benzo(k)fluoranthene	207-08-9	Koc	8.32E-05	8.32E+05	Calculated per HHRAP (Eqtn. A-3-5, other values agree w/ change)
Benzoic Acid	65-85-0	S	3.15E+03	3.13E+03	U.S. EPA (1994c)
		Vp	U.S. EPA (1992a)	U.S. EPA (1994c)	Incorrect reference cited
		H	3.22E-07	3.34E-07	Calculated per HHRAP (Eqtn. A3-1)
		Bv-ag	1.69E+01	1.68E+01	Calculated per HHRAP (Eqtns. A-3-15a,b)
Benzonitrile	100-47-0	Bv-forage	1.69E+01	1.68E+01	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Koc	2.33E+02	2.33E+01	Calculated per HHRAP (Eqtn. A-3-5)
		Kd-s	2.33E+00	2.33E-01	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	1.75E+01	1.75E+00	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	9.33E+00	9.33E-01	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	4.29E+00	4.29E+01	Calculated per HHRAP (Eqtn. A-3-13)
Benzyl Chloride	100-44-7	Kow	2.30E+00	2.00E+02	Calculation error
		Koc	2.71E+00	8.83E+01	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	2.71E-02	8.83E-01	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	2.03E-01	6.62E+00	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	1.08E-01	3.53E+00	Calculated per HHRAP (Eqtn. A-3-8c)
		RCF	6.75E+00	2.00E+01	Calculated per HHRAP (Eqtn. A-3-12)
		BCF-fish	1.11E+00	3.30E+01	Calculated using revised Kow value
		Br-rootveg	2.49E+02	2.27E+01	Calculated per HHRAP (Eqtn. A-3-13)
		Br-ag	2.39E+01	1.81E+00	Calculated per HHRAP (Eqtns. A-3-14a,b)
		Br-forage	2.39E+01	1.81E+00	Calculated per HHRAP (Eqtns. A-3-14a,b)
Benzyl Chloride	100-44-7	Bv-ag	3.28E-04	3.82E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	3.28E-04	3.82E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Ba-milk	1.83E-08	1.59E-06	Calculated per equations in HHRAP using modified parameter values

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
		Ba-beef	5.78E-08	5.02E-06	Calculated per equations in HHRAP using modified parameter values
		Ba-pork	6.99E-08	6.03E-06	Calculated per equations in HHRAP using modified parameter values
		Ba-egg	1.83E-05	1.59E-03	Calculated per equations in HHRAP using modified parameter values
		Ba-chicken	4.56E-08	4.02E-06	Calculated per equations in HHRAP using modified parameter values
Bromophenyl-Phenylether, 4-	101-55-3	Koc	1.21E+05	1.21E+04	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	1.21E+03	1.21E+02	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	9.09E+03	9.09E+02	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	4.85E+03	4.85E+02	Calculated per HHRAP (Eqtn. A-3-8c)
Cadmium	7440-43-9	RfC	3.5E-03	2.0E-04	NCEA Provisional Value
		Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
		BCF-fish	9.07E+02	2.50E+02	Revised per U.S. EPA (1999)
Chlordane	57-74-9	BCF-fish	6.07E-01	NA	Since log Kow > 4, violates application of equation
		BAF-fish	NA	3.07E+05	Since log Kow > 4, BAF fish value determined as per HHRAP
		RfD	5.00E-01	5.0E-04	IRIS update
Chloro-3-Methyl Phenol, 4-	59-50-7	Vp	ND	1.08E-05	U.S. EPA (1994b)
		H	ND	4.00E-07	Calculated per HHRAP (Eqtn. A3-1)
		Fv	ND	0.999972	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Koc	3.71E+03	3.71E+02	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	3.71E+01	3.71E+00	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	2.78E+02	2.78E+01	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	1.48E+02	1.48E+01	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	1.70E+00	1.70E+01	Calculated per HHRAP (Eqtn. A-3-13)
		Bv-ag	ND	2.80E+02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	ND	2.80E+02	Calculated per HHRAP (Eqtns. A-3-15a,b)
Chlorodifluoromethane	75-45-6	Kd-sw	---	7.38E-01	Calculated per HHRAP (Eqtn. A-3-8b)
Chlorine	7782-50-5	RfC	3.5E-01	2.0E-04	NCEA provisional value
Chlorobenzene	108-90-7	RfC	2.0E-02	6.0E-02	NCEA provisional value
Chlorobenzilate	510-15-6	URF	7.8E-06	7.8E-05	Transcription error
Chloroform	67-66-3	RfC	3.5E-02	3.0E-04	NCEA provisional value
Chloroisopropyl Ether, bis-1,2-	39638-32-9	Kd-sw	1.46E-02	1.09E+01	Calculated per HHRAP (Eqtn. A-3-8b)
Chlorophenyl-Phenylether, 4-	7005-72-3	Name	3-	4-	Change per CAS No.
		Koc	7.40E+04	7.40E+03	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	7.40E+02	7.40E+01	Calculated per HHRAP (Eqtn. A-3-8a)

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
		Kd-sw	5.55E+03	5.55E+02	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	2.96E+03	2.96E+02	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	1.48E+00	1.48E+01	Calculated per HHRAP (Eqtn. A-3-13)
Chromium	7440-47-3	RfD	1.0E+00	1.5E+00	IRIS Update
		RfC	3.5E+00	5.25E+00	Calculated from revised RfD
		BCF-fish	2.83E+02	1.90E+02	Revised per U.S. EPA (1999)
		Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
Hexavalent Chromium	18540-29-9	RfD	5.0E-03	3.0E-03	IRIS Update
		RfC	1.8E-02	1.4E-04	IRIS Update
		Inhalation CSF	4.1E+01	4.2E+01	Extrapolated from inhalation URF
		Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
Cresol, —	108-39-4	RfC	1.8E+00	1.8E-01	Extrapolated from oral RfD
Cumene	98-82-8	Koc	9.31E+03	9.31E+02	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	9.31E+01	9.31E+00	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	6.98E+02	6.98E+01	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	3.72E+02	3.72E+01	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	1.58E+00	1.58E+01	Calculated per HHRAP (Eqtn. A-3-13)
DDE, 4,4'-	72-55-9	Koc	8.64E+02	8.64E+04	U.S. EPA(1996b)
		Kds	8.64E+06	8.64E+02	Calculated per HHRAP (Eqtn. A-3-8a)
Di-n-Octyl Phthalate	117-84-0	Vp	5.90E-09	5.88E-09	U.S. EPA (1994c)
		H	7.68E-07	7.65E-07	Calculated per HHRAP (Eqtn. A3-1)
		Fv	1.000000	0.908110	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		BAF-fish	3.88E+03	1.40E+04	Calculated using revised BCF-fish reported in U.S. EPA (1999)
		Bv-ag	6.28E+08	6.3E+08	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	6.28E+08	6.3E+08	Calculated per HHRAP (Eqtns. A-3-15a,b)
Diazinon	333-41-5	Koc	1.33E+04	1.33E+03	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	1.33E+02	1.33E+01	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	9.96E+02	9.96E+01	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	5.31E+02	5.31E+01	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	1.55E+00	1.55E+01	Calculated per HHRAP (Eqtn. A-3-13)
Dibenz(a,h)anthracene	53-70-3	Br-rootveg	1.43E-04	1.43E+00	Calculated per HHRAP (Eqtn. A-3-13)
Dibromo-3-Chloropropane, 1,2-	96-12-8	URF	4.00E-04	6.86E-07	Calculated per HHRAP Using CSF-inh, not CSF-oral
Dichlorobenzene, 1,3-	541-73-1	Koc	8.03E+03	8.03E+02	Calculated per HHRAP (Eqtn. A-3-5)

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
		Kds	8.03E+01	8.03E+00	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	6.02E+02	6.02E+01	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	3.21E+02	3.21E+01	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	1.59E+00	1.59E+01	Calculated per HHRAP (Eqtn. A-3-13)
		RfD	8.90E-02	9.0E-04	NCEA provisional value
		RfC	3.12E-01	3.15E-03	Extrapolated from oral RfD
Dichlorobenzene, 1,4-	106-46-7	URF	6.90E-03	6.9E-06	Extrapolated from oral CSF
		RfD	2.30E-01	3.0E-02	NCEA provisional value
Dichloroethylene, cis-1,2-	156-59-2	Koc	4.98E+02	4.98E+01	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	4.98E+00	4.98E-01	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	3.73E+01	3.73E+00	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	1.99E+01	1.99E+00	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	2.38E+00	2.83E+01	Calculated per HHRAP (Eqtn. A-3-13)
Dichlorvos	62-73-7	Bv-ag	1.95E-03	1.95E+00	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	1.95E-03	1.95E+00	Calculated per HHRAP (Eqtns. A-3-15a,b)
Dieldrin	60-57-1	Vp	1.72E-12	1.31E-09	U.S. EPA (1994c)
		H	3.51E-09	2.66E-06	Calculated per HHRAP (Eqtn. A3-1)
		Fv	8.28E-02	0.986	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Bv-ag	6.50E+06	8.56E+03	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	6.50E+06	8.56E+03	Calculated per HHRAP (Eqtns. A-3-15a,b)
Dimethyl Phthalate	131-11-3	Koc	2.66E+02	3.09E+01	Calculated per HHRAP (Eqtn. A-3-4)
		Kds	2.66E+00	3.09E-01	Calculated per HHRAP (Eqtn. A-3-8a)
		Br-rootveg	3.95E+00	3.40E+01	Calculated per HHRAP (Eqtn. A-3-13)
Dimethoxybenzidine, 3,3'-	119-90-4	URF	4.00E-03	4.0E-06	Extrapolated from oral CSF
Dimethylphenol, 2,4-	105-67-9	Vp	2.18E-07	1.66E-04	U.S. EPA (1994c)
		H	4.27E-09	3.24E-06	Calculated per HHRAP (Eqtn. A3-1)
		Fv	0.997	1.000	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Bv-ag	4.27E+03	5.62E+00	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	4.27E+03	5.62E+00	Calculated per HHRAP (Eqtns. A-3-15a,b)
Dinitrotoluene, 2,4	121-14-2	URF	ND	1.9E-04	Extrapolated from oral CSF
Dinitrotoluene, 2,6	606-20-2	URF	ND	1.9E-04	Extrapolated from oral CSF
Dioxane, 1,4	123-91-1	Inhalation CSF	ND	1.1E-02	Extrapolated from oral CSF
Endosulfan I	115-29-7	Vp	1.72E-11	1.31E-08	U.S. EPA (1994c)

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
		H	3.04E-08	2.31E-05	Calculated per HHRAP (Eqtn. A3-1)
		Fv	7.47E-02	0.983944	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Bv-ag	9.36E+03	1.23E+01	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	9.36E+03	1.23E+01	Calculated per HHRAP (Eqtns. A-3-15a,b)
Endrin	72-20-8	Koc	1.08E+08	1.08E+04	U.S EPA (1996b)
Ethyl Methanesulfonate	62-50-0	URF	8.40E+01	8.4E-02	Extrapolated from oral CSF
Ethylhexyl Phthalate, bis-2-	117-81-7	Vp	1.12E-11	8.49E-09	U.S. EPA (1994c)
		S	U.S. EPA (1992a)	U.S. EPA (1994c)	Incorrect reference cited
		H	1.10E-08	8.37E-06	Calculated per HHRAP (Eqtn. A3-1)
		Fv	1.000	0.935	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		BAF-fish	3.60E+02	3.36E+02	Calculated using revised BCF-fish reported in U.S. EPA (1999)
		Bv-ag	1.77E+06	2.33E+03	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	1.77E+06	2.33E+03	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Koc	1.11E+09	1.11E+05	U.S. EPA (1994c)
Fluorene	86-73-7	Vp	1.08E-09	8.17E-07	U.S. EPA (1994c)
		S	1.90E+00	1.86E+00	U.S. EPA (1994c)
		H	9.41E-08	7.30E-05	Calculated per HHRAP (Eqtn. A3-1)
		Fv	0.934896	0.999908	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Bv-ag	1.63E+04	2.10E+01	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	1.63E+04	2.10E+01	Calculated per HHRAP (Eqtns. A-3-15a,b)
Formaldehyde	50-00-0	BCF-fish	1.07E+00	3.35E-01	Revised per U.S. EPA (1999) using Kow correlation presented in Bintein et al. (1993)
Formic Acid	64-18-6	Koc	5.39E+00	5.39E-01	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	5.39E-02	5.39E-03	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	4.04E-01	4.04E-02	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	2.16E-01	2.16E-02	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	1.19E+02	1.19E+03	Calculated per HHRAP (Eqtn. A-3-13)
Heptachlor	76-44-8	BCF-fish	5.52E+03	NA	Since log Kow > 4, violates application of equation
		BAF-fish	NA	2.01E+04	Since log Kow > 4, BAF-fish value determined as per HHRAP
1,2,3,4,6,7,8-HeptaCDD	35822-46-9	Ba-chicken	8.58E-03	1.77E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	2.55E-02	5.27E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	3.50E+05	9.10E+05	Revised value based on Lorber (1999)

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
		Bv-forage	3.50E+05	9.10E+05	Revised value based on Lorber (1999)
		ksg	1.09E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
1,2,3,4,6,7,8-HeptaCDF	67562-39-4	Ba-chicken	7.04E-03	1.45E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	2.09E-02	4.32E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	4.40E+05	8.30E+05	Revised value based on Lorber (1999)
		Bv-forage	4.40E+05	8.30E+05	Revised value based on Lorber (1999)
		ksg	3.57E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
1,2,3,4,7,8,9-HeptaCDF	55673-89-7	Ba-chicken	1.06E-02	2.18E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	2.42E-02	5.00E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	4.40E+05	8.30E+05	Revised value based on Lorber (1999)
		Bv-forage	4.40E+05	8.30E+05	Revised value based on Lorber (1999)
		ksg	3.57E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
Heptachlor Epoxide	1024-57-3	Vp	7.51E-12	5.71E-09	U.S. EPA (1994c)
		H	1.09E-08	8.29E-06	Calculated per HHRAP (Eqtn. A3-1)
		Fv	0.203415	0.994864	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Bv-ag	5.86E+05	7.71E+02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	5.86E+05	7.71E+02	Calculated per HHRAP (Eqtns. A-3-15a,b)
Hexachlorobenzene	118-74-1	BAF-fish	5.52E+04	1.79E+03	Calculated using revised BCF-fish value in U.S. EPA (1999)
Hexachloro-1,3-butadiene	87-68-3	BAF-fish	5.69E+03	1.92E+03	Calculated using revised BCF-fish value in U.S. EPA (1999)
Hexachlorocyclopentadiene	77-47-4	Kow	8.07E-04	8.07E+04	Typographical error
1,2,3,4,7,8-HexaCDD	39227-28-6	Ba-chicken	4.03E-02	8.32E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	4.53E-02	9.36E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	4.50E+05	5.20E+05	Revised value based on Lorber (1999)
		Bv-forage	4.50E+05	5.20E+05	Revised value based on Lorber (1999)

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
		ksg	1.09E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
1,2,3,6,7,8-HexaCDD	57653-85-7	Ba-chicken	2.57E-02	5.32E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	3.70E-02	7.64E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	4.50E+05	5.20E+05	Revised value based on Lorber (1999)
		Bv-forage	4.50E+05	5.20E+05	Revised value based on Lorber (1999)
		ksg	1.09E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
1,2,3,7,8,9-HexaCDD	19408-74-3	Ba-chicken	1.39E-02	2.86E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	2.33E-02	4.82E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	4.50E+05	5.20E+05	Revised value based on Lorber (1999)
		Bv-forage	4.50E+05	5.20E+05	Revised value based on Lorber (1999)
		ksg	1.09E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
1,2,3,4,7,8-HexaCDF	70648-26-9	Ba-chicken	3.48E-02	7.18E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	4.51E-02	9.32E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	1.50E+05	1.62E+05	Revised value based on Lorber (1999)
		Bv-forage	1.50E+05	1.62E+05	Revised value based on Lorber (1999)
		ksg	0.0	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
1,2,3,6,7,8-HexaCDF	57117-44-9	Ba-chicken	3.56E-02	7.36E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	4.53E-02	9.36E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	1.50E+05	1.62E+05	Revised value based on Lorber (1999)
		Bv-forage	1.50E+05	1.62E+05	Revised value based on Lorber (1999)
		ksg	0.0	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
1,2,3,7,8,9-HexaCDF	72918-21-9	Bv-ag	1.50E+05	1.62E+05	Revised value based on Lorber (1999)

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
		Bv-forage	1.50E+05	1.62E+05	Revised value based on Lorber (1999)
		ksg	0.0	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
2,3,4,6,7,8-HexaCDF	60851-34-5	Ba-chicken	1.74E-02	3.59E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	2.71E-02	5.59E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	1.50E+05	1.62E+05	Revised value based on Lorber (1999)
		Bv-forage	1.50E+05	1.62E+05	Revised value based on Lorber (1999)
		ksg	0.0	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
Hexachloroethane	67-72-1	Koc	1.82E+04	1.82E+03	Calculated per HHRAP (Eqtn. A-3-5)
Isophorone	78-59-1	Vp	7.08E-07	5.38E-04	U.S. EPA (1994c)
		H	8.15E-09	6.20E-06	Calculated per HHRAP (Eqtn. A3-1)
		Bv-ag	4.42E+02	5.81E-01	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	4.42E+02	5.81E-01	Calculated per HHRAP (Eqtns. A-3-15a,b)
Malathion	121-75-5	Name	Malathione	Malathion	Incorrect spelling
Methyl Acetate	79-20-9	RfC	3.5E+01	3.5E+00	Extrapolated from oral RfD
Methyl Isobutyl Ketone (MIBK)	108-10-1	URF	2.30E-01	2.3E-04	Extrapolated from oral CSF
Dibromomethane	74-95-3	Koc	2.60E-01	2.60E+01	Calculated per HHRAP (Eqtn. A-3-5)
Mercury	7439-97-6	Fv	0.999774	1.00	Value assumed per HHRAP(Chapter 2); based on U.S. EPA (1997g)
Naphthalene	91-20-3	RfD	4.00E-02	2.00E-02	IRIS update
		RfC	1.40E-01	3.00E-03	IRIS update
Nickle	7440-02-0	Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
		BCF-fish	3.07E+02	7.80E+01	Revised per U.S. EPA (1999)
Nitroaniline, 2-	88-74-4	Koc	3.93E+02	3.93E+01	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	3.93E+00	3.93E-01	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	2.95E+01	2.95E+00	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	1.57E+01	1.57E+00	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	3.18E+00	3.18E+01	Calculated per HHRAP (Eqtn. A-3-13)
Nitroaniline, 3-	99-09-2	Koc	1.66E+02	1.66E+01	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	1.66E+00	1.66E-01	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	1.24E+01	1.24E+00	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	6.62E+00	6.62E-01	Calculated per HHRAP (Eqtn. A-3-8c)

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
		Br-rootveg	5.40E+00	5.40E+01	Calculated per HHRAP (Eqtn. A-3-13)
Nitroaniline, 4-	100-01-6	Koc	1.72E+02	1.72E+01	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	1.72E+00	1.72E-01	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	1.29E+01	1.29E+00	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	6.89E+00	6.89E-01	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	5.25E+00	5.25E+01	Calculated per HHRAP (Eqtn. A-3-13)
Nitrophenol, 2-	88-75-5	Koc	3.53E+02	3.53E+01	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	3.53E+00	3.53E-01	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	2.65E+01	2.65E+00	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	1.41E+01	1.41E+00	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	3.36E+00	3.36E+01	Calculated per HHRAP (Eqtn. A-3-13)
Nitrophenol, 4-	100-02-7	Koc	4.37E+02	4.37E+01	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	4.37E+00	4.37E-01	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	3.28E+01	3.28E+00	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	1.75E+01	1.75E+00	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	3.01E+00	3.01E+01	Calculated per HHRAP (Eqtn. A-3-13)
N-Nitrosodiphenylamine	86-30-6	Vp	1.74E-07	1.32E-04	U.S. EPA (1994c)
		S	3.50E+01	3.74E+01	U.S. EPA (1994c)
		H	9.84E-07	6.99E-04	Calculated per HHRAP (Eqtn. A3-1)
		Fv	0.998671	1.000	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Bv-ag	9.51E+01	1.34E-01	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	9.51E+01	1.34E-01	Calculated per HHRAP (Eqtns. A-3-15a,b)
N-Nitrosodipropylamine	621-64-7	Vp	6.09E-06	4.63E-03	U.S. EPA (1994c)
		S	U.S. EPA (1992a)	U.S. EPA (1994c)	Incorrect reference cited
		H	5.43E-08	4.13E-05	Calculated per HHRAP (Eqtn. A3-1)
		Bv-ag	3.04E+01	4.00E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	3.04E+01	4.00E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		URF Reference	U.S. EPA 1997b	Extrapolated from oral CSF	Reference correction
1,2,3,4,6,7,8,9 - OctaCDD	3268-87-9	Vp	8.61E-11	1.09E-15	Based on U.S. EPA 1994a
		S	4.00E-07	7.40E-08	Based on U.S. EPA 1994a
		Fv	0.992606	0.001694	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Ba-chicken	1.10E-03	2.27E+00	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
		Ba-egg	9.90E-03	2.05E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	8.60E+06	2.36E+06	Revised value based on Lorber (1999)
		Bv-forage	8.60E+06	2.36E+06	Revised value based on Lorber (1999)
		ksg	1.09E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
1,2,3,4,6,7,8,9-OctaCDF	39001-02-0	Ba-chicken	4.40E-04	9.09E-01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	7.92E-03	1.64E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	1.30E+06	2.28E+06	Revised value based on Lorber (1999)
		Bv-forage	1.30E+06	2.28E+06	Revised value based on Lorber (1999)
		ksg	1.10E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
1,2,3,7,8-PentaCDD	40321-76-4	Ba-chicken	5.50E-02	1.14E+02	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	4.71E-02	9.73E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	1.20E+05	2.39E+05	Revised value based on Lorber (1999)
		Bv-forage	1.20E+05	2.39E+05	Revised value based on Lorber (1999)
		ksg	0.0	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
1,2,3,7,8-PentaCDF	57117-41-6	Bv-ag	4.60E+04	9.75E+04	Revised value based on Lorber (1999)
		Bv-forage	4.60E+04	9.75E+04	Revised value based on Lorber (1999)
		ksg	3.57E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
2,3,4,7,8-PentaCDF	57117-31-4	Ba-chicken	7.22E-02	1.49E+02	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	5.61E-02	1.16E+02	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	4.60E+04	9.75E+04	Revised value based on Lorber (1999)
		Bv-forage	4.60E+04	9.75E+04	Revised value based on Lorber (1999)
		ksg	3.57E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
Pentachlorobenzene	608-93-5	BAF-fish	3.61E+04	4.62E+04	Calculated using revised BCF-fish value in U.S. EPA (1999)
Phenanthrene	85-01-8	Koc	5.01E+04	2.09E+04	Calculated per HHRAP (Eqtn. A-3-4)
		Kds	5.01E+02	2.09E+02	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	3.76E+03	1.57E+03	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	2.01E+03	8.35E+02	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	1.49E+00	3.58E+00	Calculated per HHRAP (Eqtn. A-3-13)
Phthalic Anhydride	85-44-9	Koc	4.80E-01	2.10E-01	Calculated per HHRAP (Eqtn. A-3-4)
		Kds	4.80E-03	2.10E-03	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	3.60E-02	1.57E-02	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	1.92E-02	8.40E-03	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	1.33E+03	3.04E+03	Calculated per HHRAP (Eqtn. A-3-13)
Pyrene	129-00-0	Vp	7.36E-12	5.59E-09	U.S. EPA (1994c)
		S	1.30E-01	1.37E-01	U.S. EPA (1994c)
		H	1.14E-08	8.25E-06	Calculated per HHRAP (Eqtn. A3-1)
		Fv	0.196576	0.994635	Calculated per HHRAP (Eqtn. A-3-10 and A-3-11)
		Bv-ag	1.04E+06	1.44E+03	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	1.04E+06	1.44E+03	Calculated per HHRAP (Eqtns. A-3-15a,b)
Ronnel	299-84-3	Kdbs	5.10E+03	5.10E+02	Calculated per HHRAP (Eqtn. A-3-8c)
Selenium	7782-49-2	Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
Silver	7440-22-4	Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
		BCF-fish	8.77E+01	2.04E+02	Revised per U.S. EPA (1999)
Strychnine	57-24-9	Koc	4.53E+02	4.53E+01	Calculated per HHRAP (Eqtn. A-3-5)
2,3,7,8-TetraCDD	1746-01-6	Vp	4.45E-11	9.74E-13	U.S. EPA 1994a
		S	4.83E-04	1.93E-05	U.S. EPA 1994a
		Fv	0.977776	0.490154	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Koc	2.69E+04	2.69E+06	Calculated per HHRAP (Eqtn. A-3-7)
		URF	3.30E-08	3.3E+01	U.S. EPA 1997c– Units correction
		Ba-chicken	7.30E-02	1.51E+02	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	5.96E-02	1.23E+02	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	6.10E+04	6.55E+04	Revised value based on Lorber (1999)
		Bv-forage	6.10E+04	6.55E+04	Revised value based on Lorber (1999)

Appendix A-3 COPC tables Revisions (August 1999):

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
		ksg	4.29E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
2,3,7,8-TetraCDF	51207-31-9	Vp	1.97E-11	1.17E-11	Based on U.S. EPA 1994a
		Fv	0.767641	0.663449	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Ba-chicken	5.63E-02	1.16E+02	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Ba-egg	3.61E-02	7.45E+01	Calculation error; BCF reported by Stephens (1995) should be divided by daily soil intake (0.022) instead of multiplied
		Bv-ag	8.10E+04	4.57E+04	Revised value based on Lorber (1999)
		Bv-forage	8.10E+04	4.57E+04	Revised value based on Lorber (1999)
		ksg	3.57E-01	6.93E-02	Revised value based on review of literature (Paustenbach et al. 1992; McLachlan et al. 1996; Hagenmaier et al. 1992)
Tetrachloroethylene	127-18-4	Br-rootveg	1.04E-03	1.04E+01	Calculated per HHRAP (Eqtn. A-3-13)
		RfC	3.5E-02	4.0E-01	NCEA provisional value
Tetrahydrofuran	109-99-9	S	ND	1.00E+06	U.S. EPA (1994b)
		H	ND	1.54E-05	Calculated per HHRAP (Eqtn. A3-1)
		Kow	U.S. EPA (1994g)	Karickhoff and Long (1995)	Incorrect reference cited
		Bv-ag	ND	1.08E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	ND	1.08E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		RfD	ND	2.0E-01	NCEA provisional value
		Oral CSF	ND	7.6E-03	NCEA provisional value
		RfC	ND	3.0E-01	NCEA provisional value
		URF	ND	1.9E-06	NCEA provisional value
		Inhalation CSF	ND	6.8E-03	NCEA provisional value
Thallium	7440-28-0	Kds	U.S. EPA (1996a)	U.S. EPA (1996b)	Incorrect reference cited
		BCF-fish	1.40E+03	1.00E+00	Revised per U.S. EPA (1999)
Toluidine, o-	95-53-4	URF	6.90E-02	6.9E-5	Extrapolated from oral CSF
Trichlorobenzene, 1,2,3-	87-61-6	Koc	2.02E+04	2.02E+03	Calculated per HHRAP (Eqtn. A-3-5)
		Kds	2.02E+02	2.02E+01	Calculated per HHRAP (Eqtn. A-3-8a)
		Kd-sw	1.52E+03	1.52E+02	Calculated per HHRAP (Eqtn. A-3-8b)
		Kd-bs	8.10E+02	8.10E+01	Calculated per HHRAP (Eqtn. A-3-8c)
		Br-rootveg	1.53E+00	1.53E+01	Calculated per HHRAP (Eqtn. A-3-13)
Trichloroethane	71-55-6	Da	2.64E+02	4.66E-02	Typographical error

Compound	CAS No	Parameter	Previous Value (July 1998)	Modified Value (May 1999)	Basis of Modification
Trichloroethylene	79-01-6	Inhalation CSF	1.1E-02	6.0E-03	NCEA provisional value
		Oral CSF	U.S. EPA 1995b	U.S. EPA 1985	Secondary source revised to primary source
Trimethylbenzene, 1,3,5-	108-67-8	RfC	1.8E-01	6.0E-03	NCEA provisional value
Trinitrotoluene, 2,4,6-	118-96-7	Vp	ND	2.63E-07	U.S. EPA (1994b)
		S	ND	1.30E+02	U.S. EPA (1994b)
		H	ND	4.59E-07	Calculated per HHRAP (Eqtn. A3-1)
		Fv	1.000	0.998	Calculated per HHRAP (Eqtns. A-3-10 and A-3-11)
		Bv-ag	ND	6.15E+00	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	ND	6.15E+00	Calculated per HHRAP (Eqtns. A-3-15a,b)
Vinyl Chloride	75-01-4	Koc	1.11E+02	1.11E+01	Calculated per HHRAP (Eqtn. A3-5)
		BCF-fish	4.37E+00	1.81E+00	Revised per U.S. EPA (1999) using Kow correlation presented in Bintein et al. (1993)
Xylenes, m-	108-38-3	CAS NO.	1330-20-7	108-38-3	Incorrect CAS No.
		Vp	1.39E-05	1.06E-02	U.S. EPA (1994c)
		S	1.60E+02	1.86E+02	U.S. EPA (1994c)
		H	9.26E-06	6.05E-03	Calculated per HHRAP (Eqtn. A3-1)
		Bv-ag	1.55E+01	2.37E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	1.55E+01	2.37E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
Xylene, o-	95-47-6	CAS NO.	1330-20-7	95-47-6	Incorrect CAS No.
		Vp	1.39E-05	1.06E-02	U.S. EPA (1994c)
		S	2.20E+02	1.86E+02	U.S. EPA (1994c)
		H	6.73E-06	6.05E-03	Calculated per HHRAP (Eqtn. A3-1)
		Bv-ag	1.79E+01	1.99E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	1.79E+01	1.99E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
Xylene, p-	106-42-3	Vp	1.39E-05	1.06E-02	U.S. EPA (1994c)
		S	2.15E+02	1.86E+02	U.S. EPA (1994c)
		H	6.89E-06	6.05E-03	Calculated per HHRAP (Eqtn. A3-1)
		Bv-ag	1.93E+01	2.20E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
		Bv-forage	1.93E+01	2.20E-02	Calculated per HHRAP (Eqtns. A-3-15a,b)
Zinc	7440-66-6	Kds	U.S. EPA (1996)	U.S. EPA (1996b)	Incorrect reference cited
		Br-ag	4.60E-02	7.20E-02	Calculation error
		BCF-fish	6.54E+02	2.06E+03	Revised per U.S. EPA (1999)

NOTES: ND

= Not Determined

NA = Not Applicable
IRIS = Integrated Risk Information System (1998)
NCEA = National Center for Environmental Assessment
HHRAP = Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (EPA530-D-98-001A)

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Changes to Volume 3, Appendix B

Loss Due to Volatilization from soil (ksv):

The following equation should be used to update the soil loss due to volatilization equations in Appendix B, Table B-3-6. This change is based on the document entitled “*Methodology for Assessing Health Risks Associated with Multiple Exposure Pathways to Combustor Emissions* (U.S. EPA In Press). This will replace the ksv default of 0 which is currently recommended.

The soil loss constant due to volatilization (ksv) is based on gas equilibrium coefficients (Ke) and gas phase mass transfer (Kt). The first order decay constant, Ksv, is obtained by adapting the Hwang and Falco equation for soil vapor phase diffusion (Hwang and Falco, 1986).

$$ksv = Ke K_t$$

where:

ksv	=	soil loss constant due to volatilization (yr ⁻¹)
Ke	=	equilibrium coefficient (s/yr-cm)
K _t	=	gas phase mass transfer coefficient (cm/s)

The equilibrium coefficient (Ke) is calculated using the following equation:

$$Ke = \frac{3.1536E+7 H}{Z_s K_{oc} f_{oc} R T BD}$$

where:

Ke	=	equilibrium coefficient (s/yr-cm)
3.1536E+7	=	units conversion factor ([3.1536E+7 sec/yr])
H	=	Henry’s Law constant (atm-m ³ /mol)
Z _s	=	soil mixing zone depth (cm)-- 1cm for untilled soil; 20 cm for tilled soil
K _{oc} *	=	organic carbon partition coefficient (mL/g)
f _{oc} *	=	fraction of organic carbon in soil (unitless)
R	=	ideal gas constant (atm-m ³ /mol-K) – 8.205 E -05 atm-m ³ /mol-K
T _a	=	temperature (K) – 298 K (ambient)
BD	=	bulk density of soil (g/cm ³) – 1.5 g/cm ³

*Note: K_{oc} x f_{oc} = Kds cm³/g – Kds values are COPC-specific and provided in Appendix A

The gas-phase mass transfer coefficient (K_t) is based on general soil properties (Hillel, 1980; Miller and Gardiner, 1998) which can be used to calculate the following equation:

$$K_t = \frac{D_a \theta_v}{Z_s}$$

where:

K_t	=	gas phase mass transfer coefficient (cm/s)
Z_s	=	soil mixing depth (cm)
D_a	=	diffusion coefficient of contaminant in air (cm ² /s)
θ_v	=	soil void fraction (cm ³ /cm ³)

The soil void fraction (θ_v) is the volumetric fraction of a soil that does not contain solids or water.

$$\theta_v = 1 - \left(\frac{BD}{\rho_s} \right) - \theta_{sw}$$

where:

θ_v	=	soil void fraction (cm ³ /cm ³)
θ_{sw}	=	volumetric soil water content (mL (=cm ³)/cm ³) – 0.2 mL/cm ³
BD	=	soil bulk density (g/cm ³) – 1.5 g/cm ³
ρ_s	=	solids particle density (g/cm ³) – 2.7 g/cm ³

The expression containing bulk density (BD) divided by solids particle density (ρ_s) gives the volume of soil occupied by pore space or voids (Miller and Gardiner, 1998). Soil bulk density is affected by the soil structure, such as looseness or compaction of the soil, depending on the water and clay content of the soil (Hillel 1980). A range of 0.83 to 1.84 was originally cited in Hoffman and Baes (1979). A default soil bulk density of 1.5 g/cm³ is recommended in the HHRAP based on a mean value for loam soil from Carsel et al. (1988). Blake and Hartge (1996) and Hillel (1980) both suggests that the mean density of solid particles is about 2.7 gm/cm³. The soil water content depends on both the available water and the soil structure of a particular soil. Values for θ_{sw} range from 0.03 to 0.40 mL/cm³ depending on soil type (Hoffman and Baes, 1979). The lower values are typical of sandy soils, which cannot retain much water; the higher values are typical of soils such as clay or loam soils which can retain water. A mid-point default value of 0.2 mL water/cm³ soil is recommended in the HHRAP. **Since the soil water content of soil is unique for each soil type, site-specific information is highly recommended.**

REFERENCES (for ksv)

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U.S. EPA. In Press. *Methodology for Assessing Health Risks Associated with Multiple Exposure Pathways to Combustor Emissions*. Environmental Criteria and Assessment Office. ORD.

Air Density:

In Table B-3-8 of Appendix B the density of air (ρ) default value should be changed from 0.0012 to 1200. The change is the result of a units correction from g/cm^3 to g/m^3 .

Mercury:

The loading of COPCs to the water body caused by pervious runoff (L_R) and erosion (L_E) is modeled by applying the equations in Table B-4-10 and Table B-4-11, respectively. These equations (as written) do not account for the increase in methylation that occurs as the divalent mercury fraction from pervious runoff and erosion enters the water body. Consequently, the following step are recommended.

To account for methylation of L_R (runoff load from pervious surfaces) entering the water body, values for $L_{R (Initial)}$ are calculated for divalent mercury (Hg^{2+} - modeled as mercuric chloride) and methyl mercury (MHg) using their respective C_s and K_d s values as entered into the equation in Table B-4-10. Then, as indicated below, $L_{R (Initial)}$ values should be apportioned based on an 85% Hg^{2+} and 15% MHg speciation split in the water body (consistent with Chapter 2 of the HHRAP) to obtain $L_{R (Final)}$ values.

$$L_{R \text{ Hg}^{2+} (Final)} = L_{R \text{ Hg}^{2+} (Initial)} * 0.85$$

$$L_{R \text{ MHg} (Final)} = L_{R \text{ MHg} (Initial)} + (L_{R \text{ Hg}^{2+} (Initial)} * 0.15)$$

To account for methylation of L_E (soil erosion load) entering the water body, values for $L_{E (Initial)}$ are calculated for divalent mercury (Hg^{2+} - modeled as mercuric chloride) and methyl mercury (MHg) using their respective C_s and K_d s values as entered into the equation in Table B-4-11. Then, as indicated below, $L_{E (Initial)}$ values can be apportioned based on an 85% Hg^{2+} and 15% MHg speciation split in the water body (consistent with Chapter 2 of the HHRAP) to obtain $L_{E (Final)}$ values.

$$L_{E \text{ Hg}^{2+}} (Final) = L_{E \text{ Hg}^{2+}} (Initial) * 0.85$$

$$L_{E \text{ MHg}} (Final) = L_{E \text{ MHg}} (Initial) + (L_{E \text{ Hg}^{2+}} (Initial) * 0.15)$$

After calculating species specific final L_R and L_E values, divalent and methyl mercury should continue to be modeled throughout Appendix B equations as individual COPCs.

Changes to Volume Three, Appendix C

COPC intake from soil:

In table C-1-1 of volume three, the soil consumption rate (CR_{soil}) for the adult and child should be changed to 0.0001kg/day and 0.0002 kg/day, respectively. These changes are based on the recommendation in the final draft of the *Exposure Factors Handbook* that a conservative estimate of the mean be used. The previous number was based on an earlier draft of the *Exposure Factors Handbook*, the new value reflects the recommendation made in the final draft.

REFERENCES (for CR_{soil})

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