Appendix B; Table B-3 - Exposure Unit 3

Corrective Measures Proposal

Union Carbide Corporation Institute Facility,

Institute, West Virginia

Analyte Name	Result Units	No. of Samples	No. of Locations	Detect Sample Count	Detect Location Count	Frequency of Detection	Minimum Non-Detect Result	Maximum Non-Detect Result	Minimum Detect Result	Maximum Detect Result	Average Detected Result
1,1,1,2-Tetrachloroethane	µg/L	1	1				5	5			
1,1,1-Trichloroethane	µg/L	1	1				5	5			
1,1,2,2-Tetrachloroethane	µg/L	32	9	1	1	0.03125	1	50	5.79	5.79	5.79
1,1,2-Trichloroethane	µg/L	32	9				1	50			
1,1-Dichloroethane	µg/L	32	9	3	1	0.09375	1	50	7.29	9.18	8.353333333
1,1-Dichloroethene	µg/L	32	9	4	1	0.125	1	50	5.12	7.66	6.78
1,1-Dichloropropene	µg/L	1	1				5	5			
1,2,3-Trichlorobenzene	µg/L	1	1				5	5			
1,2,3-Trichloropropane	µg/L	1	1				5	5			
1,2,4-Trichlorobenzene	µg/L	1	1				5	5			
1,2,4-Trimethylbenzene	µg/L	18	9				1	50			
1,2-Dibromo-3-chloropropane (DBCP)	µg/L	1	1				5	5			
1,2-Dibromoethane (EDB)	µg/L	1	1				5	5			
1,2-Dichlorobenzene	µg/L	1	1				5	5			
1,2-Dichloroethane	µg/L	32	9	2	1	0.0625	1	50	3.4	3.45	3.425
1,2-Dichloropropane	µg/L	32	9				1	50			
1,3,5-Trimethylbenzene	µg/L	18	9				1	50			
1,3-Dichlorobenzene	µg/L	18	9				1	50			
1,3-Dichloropropane	µg/L	1	1				5	5			
1,4-Dichlorobenzene	µg/L	32	9				1	50			
2,2-dichloropropane	µg/L	1	1				5	5			
2,4,5-Trichlorophenol	µg/L	1	1				5	5			
2,4,6-Trichlorophenol	µg/L	1	1				5	5			
2,4-Dichlorophenol	µg/L	1	1				5	5			
2,4-Dimethylphenol	µg/L	1	1				5	5			
2,4-Dinitrophenol	µg/L	1	1				25	25			
2,4-Dinitrotoluene	µg/L	1	1				5	5			
2,6-Dinitrotoluene	µg/L	1	1				5	5			
2-Butanone	µg/L	32	9				5	500			
2-Chloroethyl vinyl ether	µg/L	1	1				10	10			
2-Chloronaphthalene	µg/L	1	1				5	5			
2-Chlorophenol	µg/L	1	1				5	5			
2-Chlorotoluene	µg/L	1	1				5	5			
2-Hexanone	µg/L	18	9				5	250			
2-Methylnaphthalene	µg/L	1	1				5	5			
2-Methylphenol	µg/L	1	1				5	5			
2-Nitroaniline	µg/L	1	1				25	25			
2-Nitrophenol	µg/L	1	1				5	5			
3,3'-Dichlorobenzidine	µg/L	1	1				10	10			
3-Methylphenol	µg/L	1	1				5	5			
3-Nitroaniline	µg/L	1	1				25	25			
4,6-Dinitro-2-methylphenol	µg/L	1	1				25	25			
4-Bromophenyl phenyl ether	µg/L	1	1				5	5			
4-Chloro-3-methylphenol	µg/L	1	1				5	5			
4-Chloroaniline	µg/L	1	1				5	5			
4-Chlorophenyl phenyl ether	µg/L	1	1				5	5			
4-Chlorotoluene	µg/L	1	1				5	5			

Appendix B; Table B-3 - Exposure Unit 3

Corrective Measures Proposal

Union Carbide Corporation Institute Facility,

Institute, West Virginia

Analyte Name	Location (Date) of Max. Detect	Tap Water RSL	No. of Exceedances	Ratio of Max. Exceedance / RSL	MCL	No. of Exceedances	Ratio of Max. Exceedance / MCL	VISL	No. of Exceedances	Ratio of Max. Exceedance / VISL
1,1,1,2-Tetrachloroethane										
1,1,1-Trichloroethane										
1,1,2,2-Tetrachloroethane	TW-54B (10/23/2015)	0.076	1	76.2		0		200	0	
1,1,2-Trichloroethane										
1,1-Dichloroethane	TW-55 (10/29/2013)	2.8	3	3.3		0		430	0	
1,1-Dichloroethene	TW-55 (10/15/2012)	280	0		7	2	1.1	1000	0	
1,1-Dichloropropene										
1,2,3-Trichlorobenzene										
1,2,3-Trichloropropane										
1,2,4-Trichlorobenzene										
1,2,4-Trimethylbenzene										
1,2-Dibromo-3-chloropropane (DBCP)										
1,2-Dibromoethane (EDB)										
1,2-Dichlorobenzene										
1,2-Dichloroethane	TW-59B (10/22/2015)	0.17	2	20.3	5	0		130	0	
1,2-Dichloropropane										
1,3,5-Trimethylbenzene										
1,3-Dichlorobenzene										
1,3-Dichloropropane										
1,4-Dichlorobenzene										
2,2-dichloropropane										
2,4,5-Trichlorophenol										
2,4,6-Trichlorophenol										
2,4-Dichlorophenol										
2,4-Dimethylphenol										
2,4-Dinitrophenol										
2,4-Dinitrotoluene										
2,6-Dinitrotoluene										
2-Butanone										
2-Chloroethyl vinyl ether										
2-Chloronaphthalene										
2-Chlorophenol										
2-Chlorotoluene										
2-Hexanone										
2-Methylnaphthalene										
2-Methylphenol										
2-Nitroaniline										
2-Nitrophenol										
3,3'-Dichlorobenzidine										
3-Methylphenol										
3-Nitroaniline										
4,6-Dinitro-2-methylphenol										
4-Bromophenyl phenyl ether										
4-Chloro-3-methylphenol										
4-Chloroaniline										
4-Chlorophenyl phenyl ether										
4-Chlorotoluene										

Appendix B; Table B-3 - Exposure Unit 3

Corrective Measures Proposal

Union Carbide Corporation Institute Facility,

Institute, West Virginia

Analyte Name	Result Units	No. of Samples	No. of Locations	Detect Sample Count	Detect Location Count	Frequency of Detection	Minimum Non-Detect Result	Maximum Non-Detect Result	Minimum Detect Result	Maximum Detect Result	Average Detected Result
4-Methyl-2-pentanone	µg/L	32	9				5	250			
4-Nitroaniline	µg/L	1	1				25	25			
4-Nitrophenol	µg/L	1	1				25	25			
Acenaphthene	µg/L	1	1				5	5			
Acenaphthylene	µg/L	1	1				5	5			
Acetone	µg/L	32	9	2	2	0.0625	5	1250	32.1	35.1	33.6
Anthracene	µg/L	1	1				5	5			
Arsenic	mg/L	1	1	1	1	1			0.0616	0.0616	0.0616
Barium	mg/L	1	1	1	1	1			1.2	1.2	1.2
Benzene	µg/L	33	9	12	3	0.363636364	1	50	82.9	9520	3585.741667
Benzo (a) anthracene	µg/L	1	1				5	5			
Benzo (a) pyrene	µg/L	1	1				5	5			
Benzo (b) fluoranthene	µg/L	1	1				5	5			
Benzo (g,h,i) perylene	µg/L	1	1				5	5			
Benzo(k)fluoranthene	µg/L	1	1				5	5			
Benzoic Acid	µg/L	1	1				25	25			
Benzyl alcohol	µg/L	1	1				5	5			
Bis (2-chloroethoxy) methane	µg/L	1	1				5	5			
Bis (2-chloroethyl) ether	µg/L	1	1				5	5			
Bis (2-chloroisopropyl) ether	µg/L	1	1				5	5			
Bis (2-ethylhexyl) phthalate	µg/L	1	1				5	5			
Bromodichloromethane	µg/L	32	9				1	50			
Bromoform	µg/L	1	1				5	5			
Bromomethane	µg/L	32	9				1	50			
Butyl benzylphthalate	µg/L	1	1				5	5			
Cadmium	mg/L	1	1				0.01	0.01			
Carbon disulfide	µg/L	32	9	1	1	0.03125	1	50	156	156	156
Carbon tetrachloride	µg/L	32	9	24	6	0.75	5	50	41.5	1610	528.5833333
Chloride	mg/L	1	1	1	1	1			5	5	5
Chlorobenzene	µg/L	32	9				1	50			
Chlorobromomethane	µg/L	1	1				5	5			
Chloroethane	µg/L	1	1				10	10			
Chloroform	µg/L	32	9	31	8	0.96875	5	5	13.9	10100	1677.806452
Chloromethane	µg/L	32	9				1	50			
Chromium	mg/L	1	1	1	1	1			0.25	0.25	0.25
Chrysene	µg/L	1	1				5	5			
cis-1,2-Dichloroethylene	µg/L	32	9	6	2	0.1875	1	50	26.9	109	57.31666667
cis-1,3-Dichloropropene	µg/L	1	1				5	5			
Dibenzo (a,h) anthracene	µg/L	1	1				5	5			
Dibenzofuran	µg/L	1	1				5	5			
Dibromochloromethane	µg/L	32	9				1	50			
Dichlorodifluoromethane	µg/L	32	9	24	7	0.75	1	50	1.28	1570	301.1704167
Diethyl phthalate	µg/L	1	1				5	5			
Dimethyl phthalate	µg/L	1	1				5	5			
Di-n-butylphthalate	µg/L	1	1				5	5			
Di-n-octylphthalate	µg/L	1	1				5	5			
Ethyl ether	µg/L	17	8				10	500			

Appendix B; Table B-3 - Exposure Unit 3

Corrective Measures Proposal

Union Carbide Corporation Institute Facility,

Institute, West Virginia

Analyte Name	Location (Date) of Max. Detect	Tap Water RSL	No. of Exceedances	Ratio of Max. Exceedance / RSL	MCL	No. of Exceedances	Ratio of Max. Exceedance / MCL	VISL	No. of Exceedances	Ratio of Max. Exceedance / VISL
4-Methyl-2-pentanone										
4-Nitroaniline										
4-Nitrophenol										
Acenaphthene										
Acenaphthylene										
Acetone	TW-54B (1/14/2015)	14000	0			0		120000000	0	
Anthracene										
Arsenic	TW-20 (8/29/2000)	0.000052	1	1184.6	0.01	1	6.2		0	
Barium	TW-20 (8/29/2000)	3.8	0		2	0			0	
Benzene	TW-69A (10/31/2013)	0.46	12	20695.7	5	12	1904.0	92	11	103.5
Benzo (a) anthracene										
Benzo (a) pyrene										
Benzo (b) fluoranthene										
Benzo (g,h,i) perylene										
Benzo(k)fluoranthene										
Benzoic Acid										
Benzyl alcohol										
Bis (2-chloroethoxy) methane										
Bis (2-chloroethyl) ether										
Bis (2-chloroisopropyl) ether										
Bis (2-ethylhexyl) phthalate										
Bromodichloromethane										
Bromoform										
Bromomethane										
Butyl benzylphthalate										
Cadmium										
Carbon disulfide	TW-70B (10/23/2015)	810	0			0		6600	0	
Carbon tetrachloride	TW-59B (11/13/2014)	0.46	24	3500.0	5	24	322.0	24	24	67.1
Chloride	TW-20 (8/29/2000)		0			0			0	
Chlorobenzene										
Chlorobromomethane										
Chloroethane										
Chloroform	TW-42 (10/16/2012)	0.22	31	45909.1	80	22	126.3	46	23	219.6
Chloromethane										
Chromium	TW-20 (8/29/2000)		0		0.1	1	2.5		0	
Chrysene										
cis-1,2-Dichloroethylene	TW-54B (10/23/2015)	36	5	3.0	70	2	1.6		0	
cis-1,3-Dichloropropene										
Dibenzo (a,h) anthracene										
Dibenzofuran										
Dibromochloromethane										
Dichlorodifluoromethane	TW-70B (10/31/2013)	200	8	7.9		0		41	17	38.3
Diethyl phthalate										
Dimethyl phthalate										
Di-n-butylphthalate										
Di-n-octylphthalate										
Ethyl ether										

Appendix B; Table B-3 - Exposure Unit 3

Corrective Measures Proposal
Union Carbide Corporation Institute Facility,
Institute, West Virginia

Analyte Name	Result Units	No. of Samples	No. of Locations	Detect Sample Count	Detect Location Count	Frequency of Detection	Minimum Non-Detect Result	Maximum Non-Detect Result	Minimum Detect Result	Maximum Detect Result	Average Detected Result
Ethylbenzene	µg/L	32	9				1	50			
Fluoranthene	µg/L	1	1				5	5			
Fluorene	µg/L	1	1				5	5			
Hexachlorobenzene	µg/L	1	1				5	5			
Hexachlorobutadiene	µg/L	1	1				5	5			
Hexachlorocyclopentadiene	µg/L	1	1				5	5			
Hexachloroethane	µg/L	1	1				5	5			
Indeno (1,2,3-c,d) pyrene	µg/L	1	1				5	5			
Isophorone	µg/L	1	1				5	5			
Isopropylbenzene	µg/L	1	1				5	5			
Lead	mg/L	2	1	1	1	0.5	0.1	0.1	0.17	0.17	0.17
Mercury	mg/L	1	1	1	1	1			0.00023	0.00023	0.00023
Methylene bromide	µg/L	1	1				5	5			
Methylene chloride	µg/L	32	9				1	250			
Monobromobenzene	µg/L	1	1				5	5			
M-Xylene (1,3-Dimethylbenzene)	µg/L	1	1				5	5			
Naphthalene	µg/L	32	9				1	50			
n-Butylbenzene	µg/L	1	1				5	5			
Nitrate Nitrogen	mg/L	1	1	1	1	1			0.26	0.26	0.26
Nitrobenzene	µg/L	1	1				5	5			
n-Nitrosodi-n-propylamine	µg/L	1	1				5	5			
n-Nitrosodiphenylamine	µg/L	1	1				5	5			
n-Propylbenzene	µg/L	1	1				5	5			
o-Xylene	µg/L	1	1				5	5			
p-Cresol	µg/L	1	1				5	5			
Pentachlorophenol	µg/L	1	1				25	25			
Phenanthrene	µg/L	1	1				5	5			
Phenol	µg/L	1	1				5	5			
p-Isopropyltoluene	µg/L	1	1				5	5			
p-Xylene	µg/L	1	1				5	5			
Pyrene	µg/L	1	1				5	5			
sec-Butylbenzene	µg/L	1	1				5	5			
Selenium	mg/L	1	1				0.05	0.05			
Silver	mg/L	1	1				0.01	0.01			
Styrene	µg/L	32	9				1	50			
Sulfate (AS SO4)	mg/L	1	1	1	1	1			28	28	28
tert-Butylbenzene	µg/L	1	1				5	5			
Tetrachloroethene	µg/L	33	9	8	2	0.242424242	1	50	606	4240	3300.75
Toluene	µg/L	32	9				1	50			
Trans-1,2-Dichloroethylene	µg/L	32	9				1	50			
trans-1,3-Dichloropropene	µg/L	1	1				5	5			
Trichloroethylene	µg/L	33	9	3	1	0.090909091	1	50	13.2	24.2	19.7
Trichlorofluoromethane	µg/L	33	9	31	8	0.939393939	1	10	1.96	12200	2396.310968
Vinyl acetate	µg/L	1	1				10	10			
Vinyl chloride	µg/L	33	9				1	50			
VOCs, Total	µg/L	33	9	32	8	0.96969697	0	0	70	21467	6760.551563
Xylenes, Total	µg/L	31	8				1	250			

Appendix B; Table B-3 - Exposure Unit 3

Corrective Measures Proposal

Union Carbide Corporation Institute Facility,

Institute, West Virginia

Analyte Name	Location (Date) of Max. Detect	Tap Water RSL	No. of Exceedances	Ratio of Max. Exceedance / RSL	MCL	No. of Exceedances	Ratio of Max. Exceedance / MCL	VISL	No. of Exceedances	Ratio of Max. Exceedance / VISL
Ethylbenzene										
Fluoranthene										
Fluorene										
Hexachlorobenzene										
Hexachlorobutadiene										
Hexachlorocyclopentadiene										
Hexachloroethane										
Indeno (1,2,3-c,d) pyrene										
Isophorone										
Isopropylbenzene										
Lead	TW-20 (8/29/2000)		0		0.015	1	11.3		0	
Mercury	TW-20 (8/29/2000)	0.00063	0		0.002	0		0.0061	0	
Methylene bromide										
Methylene chloride										
Monobromobenzene										
M-Xylene (1,3-Dimethylbenzene)										
Naphthalene										
n-Butylbenzene										
Nitrate Nitrogen	TW-20 (8/29/2000)	32	0		10	0			0	
Nitrobenzene										
n-Nitrosodi-n-propylamine										
n-Nitrosodiphenylamine										
n-Propylbenzene										
o-Xylene										
p-Cresol										
Pentachlorophenol										
Phenanthrene										
Phenol										
p-Isopropyltoluene										
p-Xylene										
Pyrene										
sec-Butylbenzene										
Selenium										
Silver										
Styrene										
Sulfate (AS SO4)	TW-20 (8/29/2000)		0			0			0	
tert-Butylbenzene										
Tetrachloroethene	TW-54B (10/30/2013)	11	8	385.5	5	8	848.0	340	8	12.5
Toluene										
Trans-1,2-Dichloroethylene										
trans-1,3-Dichloropropene										
Trichloroethylene	TW-54B (10/23/2015)	0.49	3	49.4	5	3	4.8	29	0	
Trichlorofluoromethane	TW-70B (10/19/2012)	5200	5	2.3		0			0	
Vinyl acetate										
Vinyl chloride										
VOCs, Total	TW-70B (10/19/2012)		0			0			0	
Xylenes, Total										

Notes
µg/L = micrograms per liter
mg/L = milligrams per liter
RSL = USEPA Regional Screening Levels (November, 2015; https://www.epa.gov/risk/regional-screening-levels-rsls)
MCL = Maximum Contaminant Level
VISL = USEPA Vapor Intrusion Screening Level (November 2015; http://www.epa.gov/oswer/vaporintrusion/guidance.html#Item6) based on a commercial/industrial exposure scenario, a target cancer risk equal to -05, a non-cancer hazard quotient equal to 1, and a site-specific, average groundwater temperature equal to 19 degrees Celsius