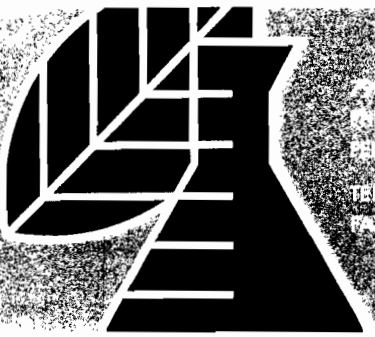
RISK ASSESSMENT SPECIALISTS



FINAL BASELINE HUMAN HEALTH RISK ASSESSMENT

Volume 2 (Appendices)

LIBERTY INDUSTRIAL FINISHING SITE
FARMINGDALE, NEW YORK

Prepared for

The Liberty Group

Prepared by

Eileen Mahoney Associates, Inc.

Under subcontract to
Dames & Moore
Job No. 35550-001

July 2000

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APPENDIX A

APPENDIX A

SUPPLEMENTAL TEXT TABLES

TABLE A 3-1
SURFACE SOIL SAMPLE LOCATIONS IN WESTERN PARCEL
LIBERTY INDUSTRIAL FINISHING SITE

Surface Soil in Western Parcel		
A-01-01 0.5-1	C-08-01 0.5-1	D-28-01-S
A-02-01 0.5-1	C-09-01 0.5-1	D-29-01-S
A-03-01 0.5-1	D-01-01 0.5-1	D-30-01-S
A-04-01 0.5-1	D-02-01 0.5-1	D-31-01-S
A-05-01 0.5-1	D-03-01 0.5-1	D-32-01-S
A-06-01 0.5-1	D-04-01 0.5-1	D-33-01-S
B-01-01 0.5-1	D-05-01 0.5-1	D-34-01-S
B-02-01 0.5-1	D-06-01 0.5-1	D-35-01-S
B-03-01 0.5-1	D-07-01 0.5-1	HA-36 0.5
B-04-01 0.5-1	D-08-03 0.5-1	L-02-01 0.5-1.5
B-05-01 0.5-1	D-09-03 0.5-1	L-03-03 0.5-1.5
B-06-01 0.5-1	D-10-03 0.5-1	SB-18-0-4.5
B-07-01 0.5-1	D-11-01 0.5-1	SB-22-0-3
B-08-01 0.5-1	D-12-01 0.5-1	SL-01 0.5-1.25
B-09-01 0.5-1	D-13-01 0.5-1	SS-15 0.0835
B-10-01 0.5-1	D-14-01 0.5-1	SS-6 0.0835
B-11-01 0.5-1	D-15-03 0.5-1	SS-7 0.0835
B-12-01 0.5-1	D-16-01 0.5-1	SS-8 0.0835
B-13-01 0.5-1	D-17-01 0.5-1	TP-15-0.5-1
B-14-01 0.5-1	D-18-01 0.5-1	TP-24-0.8-1
B-15-01 0.5-1	D-19-01 0.5-1	TP-31-0-1.5
B-16-01 0.5-1	D-20-01 0.5-1	TP-35-0.5-1.5
C-01-01 0.5-1	D-21-01 0.5-1	TP-36-0.5-1
C-02-01 0.5-1	D-22-01 0.5-1	TP-41-0-0.5
C-03-01 0.5-1	D-23-01 0.5-1	TP-42-0.6-1.5
C-04-01 0.5-1	D-24-01 0.5-1	TP-46-0-0.5
C-05-01 0.5-1	D-25-01 0.5-1	TP-48-0-0.5
C-06-01 0.5-1	D-26-01 0.5-1	TP-6-0-1.5
C-07-01 0.5-1	D-27-01-S	TP-9-0.75-1.5

TABLE A 3-2
MAP LOCATIONS OF TP SAMPLES
LIBERTY INDUSTRIAL FINISHING SITE

Sample ID	Map Location
TP-1-4.5-5.5	TP-3
TP-10-4.5-5	TP-19
TP-11-9-9.5	TP-19
TP-12-11-12	TP-41
TP-13-2.5-3.5	TP-38
TP-14-1-1.5	TP-44
TP-15-0.5-1	TP-44
TP-16-1.5-2	Ramp Excavation
TP-17-4-4.2	TP-48
TP-18-10-10.5	TP-47
TP-19-12-13	TP-48
TP-1O-4.5-5	TP-19
TP-2-3.5-4	TP-5
TP-20-3.5-4	TP-48
TP-21-10-11	TP-49
TP-22-1-2	TP-50
TP-23-4-4.5	TP-50
TP-24-0.8-1	TP-51A
TP-25-4-4.5	TP-51B
TP-26-8.5-9	TP-52
TP-27-8-8.5	TP-53
TP-28-1.5-2	TP-51C
TP-29-1.5-3	TP-55A
TP-3-6-7	TP-9
TP-30-1-3.5	TP-55B
TP-31-0-1.5	TP-55C
TP-32-6-6.5	TP-55D
TP-33-1.5-3.5	TP-55E
TP-34-2.5-3.5	TP-55F
TP-35-0.5-1.5	TP-54E
TP-36-0.5-1	TP-54A
TP-37-9-9.5	TP-59
TP-38-1-4	TP-63G
TP-39-3-4	TP-61
TP-4-11.3-11.8	TP-6
TP-40-1-3	TP-62M
TP-41-0-0.5	TP-62G
TP-42-0.6-1.5	TP-64E
TP-43-1-1.4	TP-64G
TP-44-2.5-3	TP-57
TP-45-1-1.5	TP-62D
TP-46-0-0.5	TP-31
TP-47-1-1.4	TP-27
TP-48-0-0.5	TP-66
TP-49-1-3.5	TP-54C
TP-5-6-8	TP-12
TP-50-2-2.5	TP-62J
TP-51-1.5-2	TP-62C
TP-52-3-4	TP-62D
TP-53-3.5-5	TP-69
TP-54-7-7.5	TP-69
TP-55-10-11	TP-69
TP-56-2.5-3	TP-90
TP-6-0-1.5	TP-12
TP-7-4-5	TP-18
TP-72-5-5.5	TP-72
TP-73-11-11.5	TP-73
TP-73-4-6	TP-73
TP-76-1-1.4	TP-76
TP-8-7-7.5	TP-26
TP-80-8-8.5	TP-80
TP-9-0.75-1.5	TP-29

TABLE A 3-3
SURFACE/SUBSURFACE SOIL SAMPLE LOCATIONS IN WESTERN PARCEL
LIBERTY INDUSTRIAL FINISHING SITE

Surface/Subsurface Soil in Western Parcel								
A-01-01 0.5-1	B-06-02 4.5-5.5	B-13-03 9.5-10	C-08-02-S	D-12-04 14.5-15.5	D-26-02 7.5-8	HA-35 14.5	L-03-05 11-12	SB-8-9.5-12
A-01-02 4.5-5.5	B-06-02-S	B-13-04 14.5-15.5	C-08-03 -	D-12-05 19.5-20	D-26-03 9.5-10	HA-35 4.5	S-01-SL	SB-9-10.5-12
A-01-02-S	B-06-03 9.5-10	B-13-05 19-20	C-08-04 -	D-13-01 0.5-1	D-26-04 14.5-15	HA-35 9.5	S-01-SL 1.5-2.5	SB-9-13.5-15
A-01-03 9-10	B-06-04 14.5-15.5	B-14-01 0.5-1	C-08-05 -	D-13-02 4.5-5	D-26-05 19.5-20	HA-36 0.5	SB-1-12-15	SL-01.0.5-1.25
A-01-04 14.5-15.5	B-06-05 19-20	B-14-02 5-6	C-09-01 0.5-1	D-13-03 9.5-10	D-27-01-S	L-01-01 2-4	SB-13-10.5-12	SS-10 1.5
A-01-05 19-20	B-06-SL 13-15	B-14-02-S	C-09-02 4.5-5.5	D-13-04 14.5-15	D-27-02-S	L-01-02 6-8	SB-13-15-16.5	SS-15 0.0835
A-02-01 0.5-1	B-06-SL 5-7	B-14-03 9.5-10	C-09-02-S	D-13-05 19.5-20	D-27-03-S	L-01-03 9.5-10	SB-14-13-17.5	SS-16 1.8
A-02-02 4.5-5.5	B-06-SL 7-11	B-14-04 15-16	C-09-03 9.5-10	D-14-01 0.5-1	D-27-04-S	L-01-04 14.5-15	SB-14-4-5.5	SS-17 1.6
A-02-03 9-10	B-07-01 0.5-1	B-14-05 19-20	C-09-04 14.5-15.5	D-14-02 4.5-5	D-27-05-S	L-01-05 19.5-20	SB-14-8.5-10	SS-20 1.9
A-02-04 14.5-15.5	B-07-02 5-6	B-15-01 0.5-1	C-09-05 19-20	D-14-03 9.5-10	D-28-01-S	L-02-01 0.5-1.5	SB-16-6-7.5	SS-5 1.5
A-02-05 19-20	B-07-02-S	B-15-02 4.5-5.5	D-01-01 0.5-1	D-14-04 14.5-15	D-28-02-S	L-02-02 5-6	SB-1-6-7.5	SS-6 0.0835
A-03-01 0.5-1	B-07-03 9.5-10	B-15-02-S	D-01-02	D-14-05 19-20	D-28-03-S	L-02-03 9.5-10.5	SB-17-1.5-3	SS-6 1.5
A-03-02 4.5-5.5	B-07-04 14.5-15.5	B-15-03 9-10	D-01-02 4-5	D-15-03 0.5-1	D-28-04-S	L-02-04 14-16	SB-17-4.5-6	SS-7 0.0835
A-03-02-S	B-07-05 19-20	B-15-04 14.5-16	D-01-03 9-10	D-15-04 6.5-7	D-28-05-S	L-02-05 18-20	SB-18-0-4.5	SS-8 0.0835
A-03-03 9-10	B-08-01 0.5-1	B-15-05 19-20	D-01-04 14-15	D-15-05 11.5-12	D-29-01-S	L-03-03 0.5-1.5	SB-18-4.5-6	TP-10-4.5-5
A-03-04 14.5-15.5	B-08-01 0.5-1	B-16-01 0.5-1	D-01-05 19-20	D-16-01 0.5-1	D-29-02-S	L-03-04 6.5-7.5	SB-19-1.5-4.5	TP-10-4.5-5
A-03-05 19-20	B-08-02 4.5-5.5	B-16-02 4.5-5.5	D-02-01 0.5-1	D-16-02 4.5-5	D-29-03-S	L-03-05 11-12	SB-19-6-7.5	TP-11-9-9.5
A-04-01 0.5-1	B-08-02 4.5-5.5	B-16-02-S	D-02-02 4-5	D-16-03 9.5-10	D-29-04-S	S-01-SL	SB-2 0.0835	TP-12-11-12
A-04-02 4.5-5.5	B-08-02-S	B-16-03 9-10	D-02-02-S	D-16-04 14.5-15	D-29-05-S	S-01-SL 1.5-2.5	SB-20-1.5-6	TP-13-2.5-3.5
A-04-02-S	B-08-02-S	B-16-04 15-16	D-02-03 9-10	D-16-05 19.5-20	D-30-01-S	SB-1-12-15	SB-20-6-7.5	TP-1-4.5-5.5
A-04-03 9-10	B-08-03 9-10	B-16-05 18.5-20	D-02-04 14-15	D-17-01 0.5-1	D-30-02-S	SB-13-10.5-12	SB-2-1.5-3	TP-14-1-1.5
A-04-04 14.5-15.5	B-08-03 9-10	C-01-01 0.5-1	D-02-05 -	D-17-02 4.5-5	D-30-03	SB-13-15-16.5	SB-21-1.5-3	TP-15-0.5-1
A-04-05 19-20	B-08-04 14.5-15	C-01-02 4.5-5.5	D-03-01 0.5-1	D-17-03 9.5-10	D-30-04-S	SB-14-13-17.5	SB-2-13.5-15	TP-16-1.5-2
A-05-01 0.5-1	B-08-04 14.5-15	C-01-02-S	D-03-02 7.5-8	D-17-04 14.5-15	D-30-05-S	SB-14-4-5.5	SB-21-3-6	TP-17-4-4.2
A-05-02 4.5-5.5	B-08-05 18.5-20	C-01-03 10-10.5	D-03-03 9.5-10	D-17-05 19.5-20	D-31-01-S	SB-14-8.5-10	SB-22-0-3	TP-19-12-13
A-05-03 9-10	B-08-05 18.5-20	C-01-04 14.5-15.5	D-03-04 14.5-15	D-18-01 0.5-1	D-31-02-S	SB-16-6-7.5	SB-22-3-6	TP-22-1-2
A-05-04 15-15.5	B-09-01 0.5-1	C-01-05 19-20	D-03-05 19.5-20	D-18-02 4.5-5	D-31-03-S	SB-1-6-7.5	SB-28-10.5-15	TP-2-3.5-4
A-05-05 19-20	B-09-01 0.5-1	C-02-01 0.5-1	D-04-01 0.5-1	D-18-03 9.5-10	D-31-04-S	SB-17-1.5-3	SB-28-10.5-15	TP-23-4-4.5
A-06-01 0.5-1	B-09-02 4.5-5.5	C-02-02 4.5-5.5	D-04-02 4.5-5.5	D-18-04 14.5-15.5	D-31-05-S	SB-17-4.5-6	SB-31-9-10.5	TP-24-0.8-1
A-06-02 4.5-5.5	B-09-02 4.5-5.5	C-02-02-S	D-04-02-S	D-18-05 19.5-20	D-32-01-S	SB-18-0-4.5	SB-34-10.5-12	TP-25-4-4.5
A-06-02-S	B-09-02-S	C-02-03 9.5-10	D-04-03 9.5-10	D-19-01 0.5-1	D-32-02-S	SB-18-4.5-6	SB-34-10.5-12	TP-26-8.5-9
A-06-03 9-10	B-09-02-S	C-02-04 14.5-15.5	D-04-04 14.5-15.5	D-19-02 4.5-5	D-32-03-S	SB-19-1.5-4.5	SB-34-15-16.5	TP-28-1.5-2
A-06-04 14.5-15.5	B-09-03 9.5-10	C-02-05 19-20	D-04-05 19-20	D-19-03 9.5-10	D-32-04-S	SB-19-6-7.5	SB-36-12-13.5	TP-29-1.5-3
A-06-05 19-20	B-09-03 9.5-10	C-03-01 0.5-1	D-05-01 0.5-1	D-19-04 14.5-15	D-32-05	SB-2 0.0835	SB-38-10-11.5	TP-30-1-3.5
B-01-01 0.5-1	B-09-04 14.5-15.5	C-03-02 4-5	D-05-02 4.5-5	D-19-05 19.5-20	D-33-01-S	SB-20-1.5-6	SB-38-13-16	TP-31-0-1.5
B-01-02	B-09-04 14.5-15.5	C-03-02-S	D-05-03 9.5-10	D-20-01 0.5-1	D-33-02-S	SB-20-6-7.5	SB-39-11.5-14.5	TP-32-6-6.5
B-01-02-S	B-09-05 19-20	C-03-03 9.5-10	D-05-04 14.5-15.5	D-20-02 4.5-5	D-33-03-S	SB-2-1.5-3	SB-39-14.5-16	TP-33-1.5-3.5
B-01-03 9.5-10	B-09-05 19-20	C-03-04 14.5-15	D-05-05 19-20	D-20-03 9.5-10	D-33-04-S	SB-21-1.5-3	SB-40-4.5-6	TP-34-2.5-3.5
B-01-04 14.5-15.5	B-10-01 0.5-1	C-03-05 19.5-20	D-06-01 0.5-1	D-20-04 14.5-15	D-33-05-S	SB-2-13.5-15	SB-41 4.75	TP-35-0.5-1.5
B-01-05 19-20	B-10-01 0.5-1	C-04-01 0.5-1	D-06-02 5-5.5	D-21-01 0.5-1	D-34-01-S	SB-21-3-6	SB-41 9.75	TP-36-0.5-1
B-02-01 0.5-1	B-10-02 4.5-5.5	C-04-02 4.5-5.5	D-06-03 10-10.5	D-21-02 4.5-5	D-34-02-S	SB-22-0-3	SB-42 14.75	TP-3-6-7
B-02-02 4-5.5	B-10-02 4.5-5.5	C-04-02-S	D-06-04 14.5-15	D-21-03 9.5-10	D-34-03-S	SB-22-3-6	SB-42 4.75	TP-37-9-9.5
B-02-02-S	B-10-02-S	C-04-03 9.5-10	D-06-05 19.5-20	D-21-04 14.5-15	D-34-04-S	SB-28-10.5-15	SB-42 9.75	TP-38-1-4
B-02-03 9.5-10	B-10-02-S	C-04-04 14.5-16	D-07-01 0.5-1	D-21-05 19.5-20	D-34-05-S	SB-28-10 5-15	SB-44 4.75 (1)	TP-39-3-4
B-02-04 14.5-15.5	B-10-03 9.5-10	C-04-05 19-20	D-07-02 4.5-5	D-22-01 0.5-1	D-35-01-S	SB-31-9-10.5	SB-44 4.75 (2)	TP-40-1-3

TABLE A 3-3
SURFACE/SUBSURFACE SOIL SAMPLE LOCATIONS IN WESTERN PARCEL
LIBERTY INDUSTRIAL FINISHING SITE

Surface/Subsurface Soil in Western Parcel								
B-02-05 19-20	B-10-03 9.5-10	C-05-01 0.5-1	D-07-03 9.5-10	D-22-02 4.5-5	D-35-02-S	SB-34-10.5-12	SB-44 9.75 (1)	TP-41-0-0.5
B-03-01 0.5-1	B-10-04 14.5-15.5	C-05-02 4.5-5.5	D-07-04 14.5-15.5	D-22-03 9.5-10	D-35-03	SB-34-10.5-12	SB-44 9.75 (2)	TP-4-11.3-11.8
B-03-02 4.5-5.5	B-10-04 14.5-15.5	C-05-02-S	D-07-05 19-20	D-22-04 14.5-15	D-35-04-S	SB-34-15-16.5	SB-45 4.75	TP-42-0.6-1.5
B-03-02-S	B-10-05 19-20	C-05-03 9.5-10.5	D-08-03 0.5-1	D-22-05 19.5-20	D-35-05-S	SB-36-12-13.5	SB-46 10	TP-43-1-1.4
B-03-03 9.5-10	B-10-05 19-20	C-05-04 14.5-15	D-08-04 6.5-7	D-23-01 0.5-1	HA-30 10	SB-38-10-11.5	SB-46 12	TP-44-2.5-3
B-03-04 14.5-15.5	B-11-01 0.5-1	C-05-05 19.5-20	D-08-05 11.5-12	D-23-02 4.5-5	HA-30 5	SB-38-13-16	SB-48 14.75	TP-45-1-1.5
B-03-05 19-20	B-11-02 4.5-5.5	C-06-01 0.5-1	D-09-03 0.5-1	D-23-03 9.5-10	HA-31 5 (1)	HA-35 9.5	SB-48 4.75	TP-46-0-0.5
B-04-01 0.5-1	B-11-02-S	C-06-02 4.5-5.5	D-09-04 6.5-7	D-23-04 14.5-15	HA-31 5 (2)	HA-36 0.5	SB-48 9.75	TP-47-1-1.4
B-04-02 4.5-5.5	B-11-03 9.5-10	C-06-02-S	D-09-05 11.5-12	D-23-05 19.5-20	HA-31 7.5	L-01-01 2-4	SB-53 14.75	TP-48-0-0.5
B-04-02-S	B-11-04 14.5-15.5	C-06-03 9.5-10	D-10-03 0.5-1	D-24-01 0.5-1	HA-31 8	L-01-02 6-8	SB-53 4.75	TP-49-1-3.5
B-04-03 9.5-10	B-11-05 19-20	C-06-04 14.5-15.5	D-10-04 6.5-7	D-24-02 4.5-5	HA-32 10	L-01-03 9.5-10	SB-53 9.75	TP-50-2-2.5
B-04-04 14.5-16	B-12-01 0.5-1	C-06-05 19-20	D-10-05 11.5-12	D-24-03 9.5-10	HA-32 5 (1)	L-01-04 14.5-15	SB-56 1-1.5	TP-51-1.5-2
B-04-05 19-20	B-12-02 4.5-6	C-07-01 0.5-1	D-11-01 0.5-1	D-24-04 14.5-15	HA-32 5 (2)	L-01-05 19.5-20	SB-57 1-1.5	TP-52-3-4
B-05-01 0.5-1	B-12-02-S	C-07-02 4.5-6	D-11-02 4.5-5	D-24-05 19.5-20	HA-32 9	L-02-01 0.5-1.5	SB-58 1-1.5	TP-5-6-8
B-05-02 4.5-5.5	B-12-03 9.5-10	C-07-02-S	D-11-03 9.5-10	D-25-01 0.5-1	HA-33 5 (1)	L-02-02 5-6	SB-59 1-1.5	TP-6-0-1.5
B-05-02-S	B-12-04 14.5-15.5	C-07-03 9.5-10	D-11-04 14.5-15	D-25-02 4.5-5	HA-33 5 (2)	L-02-03 9.5-10.5	SB-60 1-1.5	TP-73-11-11.5
B-05-03 9-10	B-12-05 19-20	C-07-04 14.5-15.5	D-11-05 19.5-20	D-25-03 9.5-10	HA-33 7	L-02-04 14-16	SB-6-13.5-15.5	TP-73-4-6
B-05-04 14.5-15.5	B-13-01 0.5-1	C-07-05 19-20	D-12-01 0.5-1	D-25-04 14.5-15	HA-33 7.5	L-02-05 18-20	SB-6-7.5-9	TP-7-4-5
B-05-05 19-20	B-13-02 4.5-5.5	C-08-01 -	D-12-02 4.5-5	D-25-05 19.5-20	HA-34 5	L-03-03 0.5-1.5	SB-8-7.5-9.5	TP-76-1-1.4
B-06-01 0.5-1	B-13-02-S	C-08-02 -	D-12-03 9.5-10	D-26-01 0.5-1	HA-34 9	L-03-04 6.5-7.5	SB-8-7.5-9.5	TP-8-7-7.5
								TP-9-0.75-1.5

TABLE A 3-4
GROUNDWATER SAMPLE LOCATIONS INCLUDED IN WESTERN PARCEL
LIBERTY INDUSTRIAL FINISHING SITE

Onsite Upper Glacial Aquifer	Onsite Magothy Aquifer
MW-1	MW-2C
MW-18	MW-6D
MW-2A	
MW-2B	
MW-2C	
MW-6A	
MW-6B	
MW-6D	
MW-7A	
MW-7B	
MW-21	

TABLE A 3-5
SURFACE/SUBSURFACE SOIL SAMPLE LOCATIONS IN EASTERN PARCEL
LIBERTY INDUSTRIAL FINISHING SITE

Surface/Subsurface Soil in Eastern Parcel			
B-02-SL 12-16	TP-27-8-8.5	E-08-02 4.5-5	E-19-02-S
B-02-SL 4-8	TP-53-3.5-5	E-08-03 9.5-10	E-19-03-S
B-03A-SL 13-15	TP-54-7-7.5	E-08-04 14.5-15.5	E-19-04-S
B-03A-SL 15-17	TP-55-10-11	E-08-05 19-20	E-19-05-S
B-04-SL 3-7	TP-56-2.5-3	E-09-01 0.5-1	E-20-01-S
B-04-SL 9-11	TP-72-5-5.5	E-09-02 4.5-5	E-20-02-S
B-05-SL 5-7	TP-80-8-8.5	E-09-03 9.5-10	E-20-03-S
B-05-SL 9-11	L-04-01 0.5-1	E-09-04 14.5-15.5	E-20-04-S
B-07-SL 11-13	L-04-02 4.5-5	E-09-05 19-20	E-20-05-S
B-07-SL 3-5	L-04-03 9.5-10	E-11-01 0.5-1	E-21-01-S
S-02-SL 6-10	L-04-04 14.5-15	E-11-01-S	E-21-02-S
S-03-SL 11-13	L-04-05 19.5-20	E-11-02 4.5-5	E-21-03-S
S-04-SL 13-15	E-01-01 0.5-1	E-11-02-S	E-21-04-S
S-05-SL 5-7	E-01-02 4.5-5	E-11-03 9.5-10	E-21-05-S
S-06-SL 11-13	E-01-03 9.5-10	E-11-03-S	E-22-01-S
S-06-SL 5-7	E-01-04 14.5-15	E-11-04 14.5-15.5	E-22-02-S
S-07-SL 14-16	E-01-05 19.5-20	E-11-05 19-20	E-22-03-S
S-07-SL 8-10	E-02-01 0.5-1	E-12-01 0.5-1	E-22-04-S
S-11-SL 11-13	E-02-02 4.5-5	E-12-02 4.5-5	E-22-05-S
SB-10 13.5-15	E-02-03 9.5-10	E-12-03 9.5-10	E-23-01-S
SB-10 9-10.5	E-02-04 14.5-15.5	E-12-04 14.5-15.5	E-23-02-S
SB-11 10.5-11.5	E-02-05 19-20	E-12-05 19-20	E-23-03-S
SB-11 13.5-14.5	E-03-01 0.5-1	E-13-01 0.5-1	E-23-04-S
SB-12 1.7-3.8	E-03-02 4.5-5	E-13-02 4.5-5	E-23-05-S
SB-12 1-1.7	E-03-03 9.5-10	E-13-03 9.5-10	E-24-04-S
SB-15 9-10.5	E-03-04 14.5-15.5	E-13-04 14.5-15.5	E-24-05-S
SB-24 10.5-15	E-03-05 19-20	E-13-05 19-20	E-25-01-S
SB-24 15-18	E-04-01 0.5-1	E-15-01 0.5-1	E-25-02-S
SB-25 7-9	E-04-02 4.5-5	E-15-02 4.5-5	E-25-03-S
SB-26 12-13.5	E-04-03 9.5-10	E-15-03 9.5-10	E-25-04-S
SB-26 13.5-15	E-04-04 14.5-15.5	E-15-04 14.5-15.5	E-25-05-S
SB-27 13.5-16.5	E-04-05 19-20	E-15-05 19-20	E-26-01-S
SB-29 10.5-13.5	E-05-01 0.5-1	E-16-01 0.5-1	E-26-02-S
SB-30 1.5-4.5	E-05-02 4.5-5	E-16-02 4.5-5	E-26-03-S
SB-30 12-15	E-05-03 9.5-10	E-16-03 9.5-10	E-26-04-S
SB-3 13.5-15	E-05-04 14.5-15	E-16-04 14.5-15.5	E-26-05-S
SB-33 11-14	E-05-05 19.5-20	E-16-05 19-20	E-27-01-S
SB-3 3-6	E-06-01 0.5-1	E-17-01-S	E-27-02-S
SB-35 8.5-10	E-06-02 4.5-5	E-17-02-S	E-27-03-S
SB-3 7.5-9	E-06-03 9.5-10	E-17-03-S	E-27-04-S
SB-37 12-13.5	E-06-04 14.5-15.5	E-17-04-S	E-27-05-S
SB-37 15-16.5	E-06-05 19-20	E-17-05-S	E-28-01-S
SB-4 12-15	E-07-01 0.5-1	E-18-01-S	E-28-02-S
SB-4 3-6	E-07-02 4.5-5	E-18-02-S	E-28-03-S
SB-5 6-7.5	E-07-03 9.5-10	E-18-03-S	E-28-04-S
SB-7 6-9	E-07-04 14.5-15.5	E-18-04-S	E-28-05-S
TP-18-10-10.5	E-07-05 19-20	E-18-05-S	
TP-20-3.5-4	E-08-01 0.5-1	E-19-01-S	
TP-21-10-11			

TABLE A 3-6
SOLID AND LIQUID WASTE (FEATURES) SAMPLE LOCATIONS IN EASTERN PARCEL
LIBERTY INDUSTRIAL FINISHING SITE

Indoors in Currently Occupied Building		All Feature Locations	
Solid Waste	**Liquid Waste**	**Solid Waste**	**Liquid Waste**
SF-SL-01	SF-AQ-01	SF-SL-01	SF-AQ-01
SF-SL-04	SF-AQ-03	SF-SL-04	SF-AQ-03
SF-SL-06	SF-AQ-04	SF-SL-06	SF-AQ-04
SF-SL-07	SF-AQ-05	SF-SL-07	SF-AQ-05
	SF-AQ-07	SF-SL-08	SF-AQ-07
		SF-SL-09	SF-AQ-12
		SF-SL-12	SF-AQ-16
		SF-SL-13	SF-AQ-17
		SF-SL-19	SF-AQ-22
		SF-SL-21	SF-AQ-25
		SF-SL-22	SF-AQ-26
		SF-SL-24	SF-AQ-28
		SF-SL-25	SF-AQ-31
		SF-SL-26	SF-AQ-33
		SF-SL-27	SF-AQ-35
		SF-SL-28	
		SF-SL-30	
		SF-SL-31	
		SF-SL-33	
		SF-SL-41	
		SF-SL-42	
		SF-SL-43	
		SF-SL-45	
		SF-SL-45W	
		SF-SL-49	
		SF-SL-50	
		STD-01	
		STD-02	
		STD-03	
		STD-04	
		STD-05	

TABLE A 3-7
SUBSURFACE SOIL SAMPLE LOCATIONS
IN ELLSWORTH ALLEN PARK
LIBERTY INDUSTRIAL FINISHING SITE

Ellworth Allen Park Disturbed Area
HA-1
HA-2
HA-3
HA-4
HA-5
HA-6
HA-7
HA-8
HA-9
HA-10

TABLE A 3-8
GROUNDWATER SAMPLE LOCATIONS IN OFFSITE RESIDENTIAL AREAS
LIBERTY INDUSTRIAL FINISHING SITE

Offsite Upper Glacial Aquifer	Offsite Magothy Aquifer
MW-10A	MW-10C
MW-10B	MW-11C
MW-11A	MW-11D
MW-11B	MW-25C
MW-13	MW-26C
MW-17A	MW-29C
MW-17B	MW-29D
MW-23B	MW-37C
MW-25B	MW-37D
MW-29B	MW-9C
MW-9A	MW-9D
MW-9B	
MWE-3	
MWE-4	
MWE-5	
MWE-6	
MWE-7	

TABLE A 3-9
SAMPLE LOCATIONS INCLUDED AS BACKGROUND
LIBERTY INDUSTRIAL FINISHING SITE

Soil, Solid Features, and Liquid Features	Groundwater-Upper Glacial	Groundwater-Magothy	Surface Water	Sediment	Fish
None	MW-04 (1998 only)	S-08C S-08D	MP-01 MP-02 SW-8 SW-9 SW-10	MP-01 MP-02 SD-8 SD-9 SD-10	R1-01

TABLE A 3-10
BACKGROUND CONCENTRATIONS USED IN COPC SELECTION
LIBERTY INDUSTRIAL FINISHING SITE

Parameter	Soil and Solid Features		Groundwater (Upper Glacial Aquifer)		Groundwater (Magothy Aquifer)		Surface Water		Sediment		Fish	
	Eastern USA Background Range (unless otherwise noted) [1] (mg/kg)	Concentration Used for Screening (mg/kg)[2]	Range (ug/l)	Concentration Used for Screening (ug/l)	Range (ug/l)	Concentration Used for Screening (ug/l)	Range (ug/l)	Concentration Used for Screening (ug/l)	Range (mg/kg)	Concentration Used for Screening (mg/kg)	Range (mg/kg)	Concentration Used for Screening (mg/kg)
Aluminum	33000	33000 [b]	254-451	451	NU	NU	103-201	201	941-8470	8470	N/A	N/A
Antimony	N/A	N/A	N/A	N/A	NU	NU	N/A	N/A	N/A	N/A	N/A	N/A
Arsenic	3-12 [a]	7.5	N/A	N/A	NU	NU	N/A	N/A	2-10.3	10.3	N/A	N/A
Barium	15-600	300	26.2-30	30	NU	NU	22.9-44.6	44.6	15.3-198	198	N/A	N/A
Beryllium	0-1.75	0.16 [d]	N/A	N/A	NU	NU	N/A	N/A	0.83-0.93	0.93	N/A	N/A
Cadmium	0.1-1	1 [c]	N/A	N/A	NU	NU	N/A	N/A	1.1-7	7	N/A	N/A
Calcium	130-35000 [a]	35000 [b]	16600-18400	18400	NU	NU	10000-18700	18700	199-5660	5660	N/A	N/A
Chromium	1.5-40 [a]	40 [c]	3.8-14	14	NU	NU	N/A	N/A	4.3-39.5	39.5	N/A	N/A
Chromium VI	N/A	N/A	N/A	N/A	NU	NU	N/A	N/A	2-4.6	4.6	N/A	N/A
Cobalt	2.5-60 [a]	30	1.4-1.4	1.4	NU	NU	5.1-5.1	5.1	5-35.2	35.2	N/A	N/A
Copper	1-50	25	N/A	N/A	NU	NU	N/A	N/A	3.9-90	90	N/A	N/A
Iron	2000-550000	2000	436-821	821	NU	NU	57.2-1590	1590	6370-31500	31500	N/A	N/A
Lead	200-500	400	N/A	N/A	NU	NU	2.6-7	7	70.6-485	485	0.43-0.47	0.47
Magnesium	100-5000	5000 [b]	2410-2520	2520	NU	NU	2060-4810	4810	158-1980	1980	N/A	N/A
Manganese	50-5000	5000 [b]	10.9-17.1	17.1	NU	NU	11-587	587	401-4510	4510	N/A	N/A
Mercury	0.001-0.2	0.1	N/A	N/A	NU	NU	N/A	N/A	0.18-0.31	0.31	N/A	N/A
Nickel	0.5-25	13	4.8-11.5	11.5	NU	NU	N/A	N/A	11.3-42.4	42.4	N/A	N/A
Potassium	8500-43000 [a]	43000 [b]	1910-2360	2360	NU	NU	1660-8280	8280	172-570	570	N/A	N/A
Selenium	0.1-3.9	2	N/A	N/A	NU	NU	N/A	N/A	0.14-0.14	0.14	N/A	N/A
Silver	N/A	N/A	N/A	N/A	NU	NU	N/A	N/A	N/A	N/A	N/A	N/A
Sodium	6000-8000	8000 [b]	24800-26700	26700	NU	NU	22400-52600	52600	34.2-338	338	N/A	N/A
Thallium	N/A	N/A	N/A	N/A	NU	NU	6.2-7.3	7.3	0.32-0.32	0.32	N/A	N/A
Vanadium	1-300	150	N/A	N/A	NU	NU	N/A	N/A	5.5-48.1	48.1	N/A	N/A
Zinc	9-50	20	15.8-30.2	30.2	NU	NU	5-110	110	21.5-528	528	N/A	N/A
1,1,1-Trichloroethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0008-0.0008	0.0008	N/A	N/A
1,1-Dichloroethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bromochloromethane	N/A	N/A	N/A	N/A	0.21-0.21	0.21	N/A	N/A	N/A	N/A	N/A	N/A
Chloroform	N/A	N/A	0.2-0.6	0.6	0.49-0.72	0.72	0.3-0.3	0.3	N/A	N/A	N/A	N/A
cis-1,2-Dichloroethene	N/A	N/A	N/A	N/A	N/A	N/A	0.1-0.1	0.1	N/A	N/A	N/A	N/A
Dibromochloromethane	N/A	N/A	N/A	N/A	0.24-0.24	0.24	N/A	N/A	N/A	N/A	N/A	N/A
Methylene chloride	N/A	N/A	N/A	N/A	0.45-1.3	1.3	N/A	N/A	N/A	N/A	N/A	N/A
MTBE	N/A	N/A	N/A	N/A	N/A	N/A	3-40	40	N/A	N/A	N/A	N/A
Tetrachloroethene	N/A	N/A	0.3-0.3	0.3	0.81-0.81	0.81	0.5-1	1	0.002-0.003	0.003	N/A	N/A
TIC Concentration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Toluene	N/A	N/A	N/A	N/A	0.2-0.84	0.84	0.6-0.6	0.6	N/A	N/A	N/A	N/A

[1] From New York State Department of Conservation, *Proposed Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels* (TAGM), Appendix A. 1995.
[2] TAGM recommended background soil cleanup objective, unless otherwise noted.
[a] New York state background, from TAGM
[b] No recommended soil cleanup objective provided by TAGM - used maximum of TAGM range
[c] Recommended TAGM soil cleanup objective was greater than background range: Used maximum of background range instead of cleanup objective
[d] TAGM indicates that the recommended background soil cleanup objective is from HEAST

NU = background samples from S-08C and S-08C not used for inorganics due to high turbidity.
N/A = constituent was not detected or not analyzed for

TABLE A 4-1
AIR MODELING APPROACHES USED FOR DERIVATION OF AIR CONCENTRATIONS
LIBERTY INDUSTRIAL FINISHING SITE

Exposure Pathway	Outdoor Air Modeling Approach	Indoor Air Modeling Approach
Particulate Emissions from Surface Soil (Western Parcel)	SSL Particulate Emissions Factor	NA
Particulate Emissions from Surface/Subsurface Soil (Western and Eastern Parcel)	SSL Particulate Emissions Factor	NA
Vapor Emissions from Surface and Subsurface Soil (Western and Eastern Parcel)	SSL Volatilization Factor/SSL Mass-Limit Volatilization Factor	J&E Tier II for Subsurface Soil Vapor Intrusion into Buildings
Particulate Emissions from Solid Waste in Features	SSL Particulate Emissions Factor	NA
Vapor Emissions from Solid Waste in Features	ASTM Mass-Limit Volatilization Factor for Surface Soil	Modified ASTM Mass-Limit Volatilization Factor for Surface Soil
Vapor Emissions from Liquid Waste in Features	TSDF Two-Phase Resistance Model/Mass-Limit Volatilization Factor	TSDF Two-Phase Resistance Model/Mass-Limit Volatilization Factor
Vapor Emissions from Groundwater in Upper Glacial Aquifer	ASTM Volatilization Factor for Groundwater to Ambient Air	J&E Tier II for Groundwater Vapor Intrusion into Buildings
Vapor Emmissions from Groundwater in Magothy Aquifer During Bathing	NA	RAGS Part B Volatilization Factor

NA = Not applicable
ASTM = ASTM, 1995. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites. E 1739-95.
J&E = EPA, 1997. User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings. OERR, September 1997.
SSL = EPA, 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95.
TSDF = EPA, 1989. Hazardous Waste Treatment, Storage and Disposal Facilities (TSDF) - Air Emissions Models. OAQPS, November 1989.

TABLE A 4-2
INTAKE EQUATIONS
LIBERTY INDUSTRIAL FINISHING SITE

Exposure Route	No.	Equation
Ingestion of Soil, Solid Waste, and Sediment	1	$ADD\ or\ LADD\ (mg/kg-day) = \frac{CS\ x\ IR - S\ x\ EF\ x\ ED\ x\ CF1}{BW\ x\ AT}$
Ingestion of Groundwater and Surface Water	2	$ADD\ or\ LADD\ (mg/kg-day) = \frac{CW\ x\ IR - W\ x\ EF\ x\ ED\ x\ CF2}{BW\ x\ AT}$
Dermal Contact with Soil, Solid Waste, and Sediment	3	$DAD\ (mg/kg-day) = \frac{CS\ x\ AF\ x\ ABS\ x\ SA\ x\ EV\ x\ EF\ x\ ED\ x\ CF1}{BW\ x\ AT}$
Dermal Contact with Groundwater, Liquid Waste, and Surface Water	4	$DAD\ (mg/kg-day) = \frac{DA_{event}\ x\ SA\ x\ EV\ x\ EF\ x\ ED}{BW\ x\ AT}$
Inhalation of Volatiles and Particulates	5	$ADD\ or\ LADD\ (mg/kg-day) = \frac{CA\ x\ IR - A\ x\ ET\ x\ EF\ x\ ED}{BW\ x\ AT}$

ADD	=	Average daily dose (mg/kg-day)
LADD	=	Lifetime average daily dose (mg/kg-day)
DAD	=	Dermally absorbed dose (mg/kg-day)
CS	=	Concentration in soil (mg/kg)
CW	=	Concentration in water (ug/l)
CA	=	Concentration in air (mg/m^3)
IR-S	=	Soil ingestion rate (mg/day)
IR-W	=	Water ingestion rate (l/day)
IR-A	=	Inhalation rate (m^3/day)
AF	=	Adherence factor of soil to skin (mg/cm^2-event)
ABS	=	Dermal absorption fraction (unitless)
SA	=	Skin surface area available for contact (cm^2)
DA_{event}	=	Dose Absorbed per event (mg/cm^2-event)
EV	=	Event frequency (events/day)
ET	=	Exposure time (hours/day or hours/event)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (years)
BW	=	Body weight (kg)
AT	=	Averaging time (days)
CF1	=	Conversion factor 1 (10^{-6} kg/mg)
CF2	=	Conversion factor 2 (10^{-3} mg/ug)

TABLE A 4-3
EQUATIONS FOR DOSE ABSORBED PER EVENT (AQUEOUS MEDIA)
LIBERTY INDUSTRIAL FINISHING SITE

Parameter	No.	Equation
DA_{event} for inorganic compounds	1	$DA_{event} = K_p \; x \; CW \; x \; ET \; x \; CF4 \; x \; CF5$
DA_{event} for organics where $t_{event} \leq t^*$	2	$DA_{event} = 2 \; K_p \; x \; (CW \; x \; CF4 \; x \; CF5) \sqrt{\frac{6 \; \tau_{event} \; x \; t_{event}}{\pi}}$
DA_{event} for organics where $t_{event} > t^*$	3	$DA_{event} = K_p \; x \; (CW \; x \; CF4 \; x \; CF5) \left[\frac{t_{event}}{1+B} + 2 \; \tau_{event} \left(\frac{1+3B+3B^2}{(1+B)^2} \right) \right]$
K_p for organics (empirical predictive correlation)	4	$\log K_p = -2.80 + 0.67 \log K_{ow} - 0.0056 \; MW$
Boundaries of effective predictive domain for K_p	5	$-0.069 \leq 0.508 \; x \; 10^{-4} \; MW + 0.0565 \log K_{ow} \leq 0.559$ and $-0.301 \leq -0.508 \; x \; 10^{-4} \; MW + 0.0565 \log K_{ow} \leq 0.146$
$K_{p,max}$	6	$K_{p,max} = \frac{K_p}{1+B}$
B	7	$B = K_p \frac{\sqrt{MW}}{2.6}$
D_{sc}	8	$D_{sc} = 10^{(-2.80 - 0.0056 \; MW)} \; x \; l_{sc}$
τ_{event}	9	$\tau_{event} = \frac{l_{sc}^{\;2}}{6 \; D_{sc}}$
t^* where $B \leq 0.6$	10	$t^* = 2.4 \; \tau_{event}$
t^* where $B > 0.6$	11	$t^* = \left(b - \sqrt{b^2 - c^2} \right) \frac{l_{sc}}{D_{sc}}$
b	12	$b = \frac{2(1+B)^2}{\pi} - c$
c	13	$c = \frac{1+3B+3B^2}{3(1+B)}$

TABLE A 4-3
EQUATIONS FOR DERMALLY ABSORBED DOSE (AQUEOUS MEDIA)
LIBERTY INDUSTRIAL FINISHING SITE

DA_{event}	=	Dose absorbed per event (mg/cm^2-event)
K_p	=	Dermal permeability coefficient in water (cm/hour)
CW	=	Concentration in water (ug/l)
CF4	=	Conversion factor 4 (mg/ug)
CF5	=	Conversion factor 5 (l/cm^3)
τ_{event}	=	Lag time per event (hour/event)
t_{event}	=	Event duration (hour/event)
t	=	Time to reach steady state (hour)
B	=	Dimensionless ratio of permeability through stratum corneum to permeability across viable epidermis (unitless)
K_{ow}	=	Octanol/water partition coefficient (unitless)
MW	=	Molecular weight
$K_{p,max}$	=	Maximum dermal permeability coefficient in water (cm/hour)
D_{sc}	=	Effective diffusivity for chemical transfer through skin (cm^2/hour)
l_{sc}	=	Apparent thickness of skin (10^{-3} cm)
b	=	Undefined factor (unitless)
c	=	Undefined factor (unitless)

TABLE A 5-1
DERMAL ROUTE CHEMICAL-SPECIFIC FACORS
LIBERTY INDUSTRIAL FINISHING SITE

Constituent of Potential Concern	ABS (unitless)	Rationale	Kp (cm/hr)	Rationale
1,1,2-Trichloroethane	NA	No recommended ABS	8.4E-03	USEPA 1992
1,1-Dichloroethane	NA	No recommended ABS	8.9E-03	USEPA 1992
1,1-Dichloroethene	NA	No recommended ABS	1.6E-02	USEPA 1992
1,1,1-Trichloroethane	NA	No recommended ABS	1.7E-02	USEPA 1992
1,2-Dichloroethane	NA	No recommended ABS	5.3E-03	USEPA 1992
1,2-Dichloroethene (total)	NA	No recommended ABS	1.0E-02	USEPA 1992
1,4-Dichlorobenzene	NA	No recommended ABS	6.2E-02	USEPA 1992
2-Hexanone	NA	No recommended ABS	NA	Not a COPC for this media
4,4'-DDD	0.03	ABS for DDT (1)	2.8E-01	USEPA 1992
4,4'-DDE	0.03	ABS for DDT (1)	2.4E-01	USEPA 1992
4,4'-DDT	0.03	ABS for DDT (1)	4.3E-01	USEPA 1992
4-Methylnaphthalene	0.13	ABS for PAHs (1)	6.9E-02	Based on naphthalene (USEPA 1992)
4-Methylphenol	0.1	ABS for semivolatiles (1)	8.0E-03	Calculated (see Table 6.4)
Acetone	NA	No recommended ABS	5.2E-04	Calculated (see Table 6.4)
Aluminum	NA	No recommended ABS	1.0E-03	Default for metals (1)
Antimony	NA	No recommended ABS	1.0E-03	Default for metals (1)
Aroclor-1248	0.14	ABS for PCBs (1)	7.1E-01	Kp for PCB-hexachlorobiphenyl (USEPA 1992)
Aroclor-1254	0.14	ABS for PCBs (1)	7.1E-01	Kp for PCB-hexachlorobiphenyl (USEPA 1992)
Aroclor-1260	0.14	ABS for PCBs (1)	7.1E-01	Kp for PCB-hexachlorobiphenyl (USEPA 1992)
Arsenic	0.03	ABS for arsenic (1)	1.0E-03	Default for metals (1)
Barium	NA	No recommended ABS	1.0E-03	Default for metals (1)
Benzene	NA	No recommended ABS	2.1E-02	USEPA 1992
Benz(a)anthracene	0.13	ABS for PAHs (1)	8.1E-01	USEPA 1992
Benzo(a)pyrene	0.13	ABS for PAHs (1)	1.2E+00	USEPA 1992
Benzo(b)fluoranthene	0.13	ABS for PAHs (1)	1.2E+00	USEPA 1992
Benzo(g,h,I)perylene	0.13	ABS for PAHs (1)	NA	Not a COPC for this media
Benzo(k)fluoranthene	0.13	ABS for PAHs (1)	1.2E+00	Kp for benzo(b)fluoranthene (USEPA 1992)
Beryllium	NA	No recommended ABS	1.0E-03	Default for metals (1)
bis(2-Ethylhexyl)phthalate	0.1	ABS for semivolatiles (1)	3.3E-02	USEPA 1992
Bromodichloromethane	NA	No recommended ABS	5.8E-03	USEPA 1992
Cadmium	0.001	ABS for Cadmium (1)	1.0E-03	USEPA 1992
Carbazole	0.1	ABS for Semivolatiles (1)	4.7E-02	Calculated (see Table 6.4)
Carbon tetrachloride	NA	No recommended ABS	2.2E-02	USEPA 1992
Chlordane, alpha	0.04	ABS for Chlordane	4.6E-02	USEPA 1992
Chlordane, gamma	0.04	ABS for Chlordane	4.6E-02	USEPA 1992
Chlorobenzene	NA	No recommended ABS	4.1E-02	USEPA 1992
Chloroethane	NA	No recommended ABS	8.0E-03	USEPA 1992
Chloroform	NA	No recommended ABS	8.9E-03	USEPA 1992
Chromium III	NA	No recommended ABS	1.0E-03	USEPA 1992
Chromium VI	NA	No recommended ABS	2.0E-03	USEPA 1992
Chrysene	0.13	ABS for PAHs (1)	8.1E-01	USEPA 1992
cis-1,2-Dichloroethene	NA	No recommended ABS	1.0E-02	USEPA 1992
Copper	NA	No recommended ABS	1.0E-03	Default for metals (1)
Cyanide	NA	No recommended ABS	NA	Not a COPC for this media
Dibenz(a,h)anthracene	0.13	ABS for PAHs (1)	2.7E+00	USEPA 1992
Dibenzofuran	0.1	ABS for semivolatiles (1)	NA	Not a COPC for this media
Dibromochloromethane	NA	No recommended ABS	2.8E-03	Calculated (see Table 6.4)
Dieldrin	0.1	ABS for semivolatiles (1)	1.6E-02	USEPA 1992
Di-n-octyl phthalate	0.1	ABS for semivolatiles (1)	NA	Not a COPC for this media
Endrin aldehyde	NA	No recommended ABS	1.6E-02	Based on Endrin (USEPA 1992)
Ethylbenzene	NA	No recommended ABS	5.2E-02	Calculated (see Table 6.4)
Fluoranthene	0.13	ABS for PAHs (1)	3.6E-01	USEPA 1992
Heptachlor epoxide	0.1	ABS for semivolatiles (1)	1.1E-02	Based on Heptachlor (USEPA 1992)

TABLE A 5-1
DERMAL ROUTE CHEMICAL-SPECIFIC FACORS
LIBERTY INDUSTRIAL FINISHING SITE

Constituent of Potential Concern	ABS (unitless)	Rationale	Kp (cm/hr)	Rationale
Indeno(1,2,3-cd)pyrene	0.13	ABS for PAHs (1)	1.9E+00	USEPA 1992
Iron	NA	No recommended ABS	NA	Not a COPC for this media
Lead	NA	No recommended ABS	4.0E-06	USEPA 1992
Manganese	NA	No recommended ABS	1.0E-03	Default for metals (1)
Mercury	NA	No recommended ABS	1.0E-03	USEPA 1992
Methylene chloride	NA	No recommended ABS	4.5E-03	USEPA 1992
Naphthalene	0.13	ABS for PAHs (1)	6.9E-02	USEPA 1992
Nickel	NA	No recommended ABS	1.0E-04	USEPA 1992
Pentachlorophenol	0.25	ABS for Pentachloropheno	6.5E-01	USEPA 1992
Phenanthrene	0.13	ABS for PAHs (1)	2.3E-01	USEPA 1992
Phenol	0.1	ABS for semivolatiles (1)	5.5E-03	USEPA 1992
Pyrene	0.13	ABS for PAHs (1)	3.1E-01	Calculated (see Table 6.4)
Silver	NA	No recommended ABS	6.0E-04	USEPA 1992
Tetrachloroethene	NA	No recommended ABS	4.8E-02	USEPA 1992
Thallium	NA	No recommended ABS	1.0E-03	Default for metals (1)
TICs (volatile)	NA	No recommended ABS	NA	Not a COPC for this media
Toluene	NA	No recommended ABS	4.5E-02	USEPA 1992
trans-1,2-Dichloroethene	NA	No recommended ABS	1.0E-02	USEPA 1992
Trichloroethene	NA	No recommended ABS	1.6E-02	USEPA 1992
Vanadium	NA	No recommended ABS	1.0E-03	Default for metals (1)
Vinyl chloride	NA	No recommended ABS	7.3E-03	USEPA 1992
Xylenes (total)	NA	No recommended ABS	8.0E-02	Based on m-xylene (USEPA 1992)
Zinc	NA	No recommended ABS	6.0E-04	USEPA 1992

(1) Personal communication.
Michael Sivak. 4/19/00.

TABLE A 5-2
CALCULATION OF Kp
LIBERTY INDUSTRIAL FINISHING SITE

Constituent of Potential Concern	MW	Log Kow	Reference for Kow	log Kp	Kp	Boundary Condition 1	Boundary Condition 2	Within predictive domain according to text p. A-11?
Ethylbenzene	106.16	3.14	(1)	-1.29	5.2E-02	0.183	0.172	Yes
Carbazole	167	3.59	(1)	-1.33	4.7E-02	0.211	0.194	Yes
Dibromochloromethane	206	2.09	(2)	-2.55	2.8E-03	0.129	0.108	Yes
Pyrene	202.26	5.11	(2)	-0.51	3.1E-01	0.299	0.278	No
Acetone	58.08	-0.24	(2)	-3.29	5.2E-04	-0.011	-0.017	Yes
4-methylphenol	108.13	1.95	(2)	-2.10	8.0E-03	0.116	0.105	Yes

(1) EPA, 1996. *Soil Screening Guidance: Technical Background Document*. EPA/540/R-95.
(2) Hazardous Substances DataBank (HSDB), 1999. National Library of Medicine.

TABLE A 5-3
CALCULATION OF INPUTS FOR DA_{event} FOR ORGANICS
LIBERTY INDUSTRIAL FINISHING SITE

COPC	Log K_{ow} [1] (dimensionless)	K_p	MW	B (dimensionless)	D_{sc} (cm^2/hour)	τ_{event} (hr/event)	c	b	t* (hr)
1,1,2-Trichloroethane	2.05	6.6E-03	133	2.9E-02	2.9E-07	5.8E-01	3.5E-01	3.2E-01	1.40
1,1,1-Trichloroethane	2.48	1.7E-02	133	7.6E-02	2.8E-07	5.9E-01	3.9E-01	3.5E-01	1.41
1,1-Dichloroethane	1.79	8.9E-03	99	3.4E-02	4.4E-07	3.8E-01	3.6E-01	3.2E-01	0.90
1,1-Dichloroethene	2.13	1.2E-02	97	4.5E-02	4.5E-07	3.7E-01	3.6E-01	3.3E-01	0.88
1,2-Dichloroethane	1.48	4.2E-03	99	1.6E-02	4.4E-07	3.8E-01	3.4E-01	3.1E-01	0.90
1,4-Dichlorobenzene	3.42	4.5E-02	147	2.1E-01	2.4E-07	7.0E-01	4.9E-01	4.5E-01	1.68
4,4'-DDD	5.80	2.1E-01	320	1.4E+00	2.6E-08	6.5E+00	1.6E+00	2.2E+00	25.80
4,4'-DDE	5.69	1.8E-01	318	1.2E+00	2.6E-08	6.3E+00	1.4E+00	1.8E+00	24.82
4,4'-DDT	6.36	3.2E-01	355	2.3E+00	1.6E-08	1.0E+01	2.4E+00	4.6E+00	42.28
4-Methylphenol	1.95	8.0E-03	108	3.2E-02	3.9E-07	4.2E-01	3.5E-01	3.2E-01	1.02
Acetone	-0.24	5.2E-04	58.08	1.5E-03	7.5E-07	2.2E-01	3.3E-01	3.0E-01	0.53
Aroclor-1260	6.72	5.2E-01	370	3.8E+00	1.3E-08	1.2E+01	3.9E+00	1.1E+01	53.45
Benzene	2.13	1.5E-02	78	5.1E-02	5.8E-07	2.9E-01	3.7E-01	3.4E-01	0.69
Benz(a)anthracene	5.66	5.5E-01	228	3.2E+00	8.3E-08	2.0E+00	3.3E+00	7.9E+00	8.48
Benzo(a)pyrene	6.10	8.3E-01	252	5.1E+00	6.1E-08	2.7E+00	5.1E+00	1.8E+01	11.93
Benzo(b)fluoranthene	6.12	8.3E-01	252	5.1E+00	6.1E-08	2.7E+00	5.1E+00	1.8E+01	11.94
Benzo(k)fluoranthene	6.12	8.3E-01	252	5.1E+00	6.1E-08	2.7E+00	5.1E+00	1.8E+01	11.94
bis(2-Ethylhexyl)phthalate	7.30	8.0E-01	312	5.4E+00	2.8E-08	5.9E+00	5.5E+00	2.1E+01	25.87
Bromodichloromethane	2.09	4.7E-03	164	2.3E-02	1.9E-07	8.7E-01	3.5E-01	3.2E-01	2.09
Carbazole	3.59	4.7E-02	167	2.3E-01	1.8E-07	9.1E-01	5.0E-01	4.6E-01	2.18
Carbon tetrachloride	2.83	1.7E-02	154	8.1E-02	2.2E-07	7.7E-01	3.9E-01	3.5E-01	1.84
Chlorobenzene	2.84	3.0E-02	113	1.2E-01	3.7E-07	4.5E-01	4.2E-01	3.8E-01	1.08
Chloroethane	1.43	6.0E-03	65	1.9E-02	6.9E-07	2.4E-01	3.5E-01	3.1E-01	0.58
Chloroform	1.92	8.9E-03	119	3.7E-02	3.4E-07	4.9E-01	3.6E-01	3.3E-01	1.18
Chrysene	5.66	5.5E-01	228	3.2E+00	8.3E-08	2.0E+00	3.3E+00	7.9E+00	8.48
cis-1,2-Dichloroethene	1.86	7.8E-03	97	3.0E-02	4.5E-07	3.7E-01	3.5E-01	3.2E-01	0.88
Dibenz(a,h)anthracene	6.84	1.8E+00	278	1.2E+01	4.4E-08	3.8E+00	1.2E+01	8.9E+01	17.33
Dibromochloromethane	2.09	2.8E-03	208	1.6E-02	1.1E-07	1.5E+00	3.4E-01	3.1E-01	3.69
Dieldrin	5.37	1.6E-02	381	1.2E-01	1.2E-08	1.4E+01	4.2E-01	3.8E-01	34.33
Endrin aldehyde	4.00	1.6E-02	381	1.2E-01	1.2E-08	1.4E+01	4.2E-01	3.8E-01	34.30
Ethylbenzene	3.14	5.2E-02	106.16	2.0E-01	4.0E-07	4.1E-01	4.8E-01	4.4E-01	0.99
Heptachlor epoxide	4.27	9.6E-03	389	7.3E-02	1.1E-08	1.6E+01	3.8E-01	3.5E-01	38.06
Indeno(1,2,3-cd)pyrene	6.58	1.3E+00	276	8.3E+00	4.5E-08	3.7E+00	8.3E+00	4.7E+01	16.69
Methylene chloride	1.25	3.5E-03	85	1.2E-02	5.3E-07	3.1E-01	3.4E-01	3.1E-01	0.76
Naphthalene	3.36	6.9E-02	128	3.0E-01	3.0E-07	5.5E-01	5.6E-01	5.2E-01	1.32
Pentachlorophenol	5.86	4.6E-01	266	2.9E+00	5.1E-08	3.3E+00	3.0E+00	6.6E+00	13.75
Phenanthrene	4.46	1.6E-01	178	8.2E-01	1.6E-07	1.0E+00	1.0E+00	1.1E+00	4.02
Phenol	1.48	5.5E-03	94	2.1E-02	4.7E-07	3.5E-01	3.5E-01	3.2E-01	0.85
Pyrene	5.11	3.1E-01	202	1.7E+00	1.2E-07	1.4E+00	1.8E+00	2.8E+00	5.73
Tetrachloroethene	3.40	3.6E-02	166	1.8E-01	1.9E-07	8.9E-01	4.6E-01	4.2E-01	2.14
Toluene	2.73	3.2E-02	92	1.2E-01	4.8E-07	3.4E-01	4.2E-01	3.8E-01	0.83
trans-1,2-Dichloroethene	1.86	7.8E-03	97	3.0E-02	4.5E-07	3.7E-01	3.5E-01	3.2E-01	0.88
Trichloroethene	2.42	1.2E-02	131	5.3E-02	2.9E-07	5.7E-01	3.7E-01	3.4E-01	1.37
Vinyl chloride	1.36	5.6E-03	63	1.7E-02	7.0E-07	2.4E-01	3.4E-01	3.1E-01	0.57
Xylenes (total)	3.17	8.0E-02	1.1E+02	3.2E-01	4.0E-07	4.1E-01	5.7E-01	5.3E-01	0.99

[1] From (1) unless otherwise noted on Table ...
[2] Kow from EPA, 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95.
[3] Kow from (2) Hazardous Substances DataBank (HSDB), 1999. National Library of Medicine.

TABLE A 5-4
TOXICITY DATA FOR LEAD AND CHROMIUM
LIBERTY INDUSTRIAL FINISHING SITE

Chemical of Potential Concern	Scenario	Media	No Observable Adverse Effect Level (NOAEL) for Contact Dermatitis	Units	Screening Level	Units	Primary Target Organ	Sources of Data	Date
Chromium III	All	Soil	4300	mg/kg	NA	NA	Skin	Kligman	1966
Lead	Trespasser/Construction Worker/Recreational User	Soil & Sediment	NA	NA	400	mg/kg	CNS	EPA OSWER Directive 9355.4-12	1994
	Commercial/Industrial Worker	Soil	NA	NA	778	mg/kg	CNS	EPA Adult Lead Model	1996
	Trespasser/Construction Worker/Commercial&Industrial Worker/Recreational User	Air	NA	NA	0.0015	mg/m^3	CNS	NAAQS	40 CFR 50.12

NA = Not applicable

CNS = Central nervous system

NAAQS = National Ambient Air Quality Standard

Kligman, 1966: Kligman, A.M. 1966. J. Invest. Dermatology 47 (5): 393-405.

EPA OSWER Directive 9355.4-12: "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities." Office of Solid Waste and Emergency Response, Washington, D.C., OSWER Directive #9355.4-12.

EPA Adult Lead Model: Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. Technical Review Workgroup for Lead, December 1996.

TABLE A 6-1
SUMMARY OF LEAD EXPOSURE CONCENTRATIONS
LIBERTY INDUSTRIAL FINISHING SITE

Exposure Media	Receptor Population	Exposure Pathway [a]	Average Lead Concentration (EPC) [b]	Units	Lead Screening Level [b]	Average Concentration Exceeds Screening Level?
Western Parcel Surface Soil	Trespasser	Oral	271	mg/kg	400	No
Western Parcel Surface/Subsurface Soil	Commercial/Industrial	Oral	145	mg/kg	778	No
	Construction Worker	Oral	145	mg/kg	400	No
	Recreational User	Oral	145	mg/kg	400	No
Eastern Parcel Surface/Subsurface Soil	Commercial/Industrial	Oral	63	mg/kg	778	No
	Construction Worker	Oral	63	mg/kg	400	No
Solid Waste in Features	Construction Worker	Oral	692	mg/kg	400	Yes
Western Parcel Surface Soil - Particulates	Trespasser	Inhalation	6.86E-07	mg/m^3	1.50E-03	No
Western Parcel Surface/Subsurface Soil - Particulates	Commercial/Industrial	Inhalation	1.83E-07	mg/m^3	1.50E-03	No
	Construction Worker	Inhalation	3.67E-07	mg/m^3	1.50E-03	No
	Recreational User	Inhalation	1.83E-07	mg/m^3	1.50E-03	No
Eastern Parcel Surface/Subsurface Soil - Particulates	Commercial/Industrial	Inhalation	8.02E-08	mg/m^3	1.50E-03	No
	Construction Worker	Inhalation	1.60E-07	mg/m^3	1.50E-03	No
Solid Waste in Features - Particulates	Construction Worker	Inhalation	1.75E-06	mg/m^3	1.50E-03	No
Liquid Waste in Features	Construction Worker	None	---	---	---	---
Groundwater in Magothy Aquifer	Child, Adult Resident	Oral	Not a COPC	---	---	---
Surface Water in Massapequa Preserve	Recreational User	Oral	Not a COPC	---	---	---
Sediment in Massapequa Preserve	Recreational User	Oral	385	mg/kg	400	No
Fish in Massapequa Preserve	Child, Adult Fisher	Oral	0.8	mg/kg	---	No screening level

[a] Dermal pathway not included: Dermal uptake of lead is insignificant

[b] Oral: criteria from "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities" (USEPA, 1994). Inhalation: criteria is NAAQS. Shaded cells exceed criteria

TABLE A 6-2
CALCULATION OF RECEPTOR-SPECIFIC SCREENING LEVELS FOR LEAD
LIBERTY INDUSTRIAL FINISHING SITE

Exposure Media	Receptor Population	Average Lead Concentration (EPC)	Units	Receptor-Specific Screening Level	EPC Exceeds Screening Level?
Solid Waste in Features	Construction Worker (Pregnant Female)	692	mg/kg	471	Yes
	Construction Worker (Non-Pregnant Worker)	692	mg/kg	2,245	No

Shaded cells exceed the screening level

TABLE A 6-3
COMPARISON OF PREDICTED BLOOD LEAD LEVELS WITH AND WITHOUT INGESTION OF FISH FROM MASSAPEQUA PRESERVE
LIBERTY INDUSTRIAL FINISHING SITE

Age Range	Default IEUBK Blood Lead Levels (ug/dl)	IEUBK Blood Lead Levels with 0.8 mg/kg Lead in Recreational Fish (ug/dl)
0.5 - 1	4.2	4.7
1 - 2	4.6	5.6
2 - 3	4.3	5.4
3 - 4	4.1	5.2
4 - 5	3.5	4.6
5 - 6	3.0	4.2
6 - 7	2.8	3.9

TABLE A 6-4
PERCENT OF SAMPLES EXCEEDING CHROMIUM III NOAEL FOR CONTACT DERMATITIS
LIBERTY INDUSTRIAL FINISHING SITE

Exposure Medium	Number of Samples	Number Exceeding NOAEL	Percent Exceeding NOAEL	Range of Concentrations Exceeding NOAEL (mg/kg)	Locations of Exceedances [1]
Western parcel surface soil	77	2	3%	10,350 - 12,900	B-07-01, TP-54E
Western parcel surface/subsurface soil	409	9	2%	4,425 - 32,475	SB-2, SB-41, B-07-02, TP-50, TP-51C, TP-54E, TP-55A, Ramp Excavation
Eastern parcel surface/subsurface soil	135	1	1%	7,800 - 7,800	TP-69
Solid waste in features	30	0	0%	---	---
Sediment in Massapequa Preserve	45	0	0%	---	---

NOAEL = No Observable Adverse Effects Level = 4,300 mg/kg
[1] TPs are test pit locations, not sample ID numbers.

APPENDIX B

APPENDIX B

DATA TABLES

Paper copies are not included in this submittal; equivalent tables may be found in the Final RI Report (Weston, 1994), the Final Report Soil Sampling Investigation (Weston 1997), and the Draft CRI Report (Dames & Moore, 1999)

(Electronic copy available on Final BHHRA CD-ROM submittal and upon request)

APPENDIX C

APPENDIX C

LOCAL ORDINANCES

ARTICLE IV

NASSAU COUNTY PUBLIC HEALTH ORDINANCE

PRIVATE DRINKING SYSTEMS

EFFECTIVE AUGUST 1, 1987

(Amended: September 8, 1987)
(Amended: April 13, 1988)

NASSAU COUNTY DEPARTMENT OF HEALTH

Thomas S. Gulotta
County Executive

George Pickett, M.D., M.P.H.
Commissioner

closets, urinals, bathtubs, shower baths, wash basins, laundry tubs, kitchen sinks, and similar plumbing fixtures.

HISTORICAL NOTE: Sec. Adopted May 20, 1987, eff. August 1, 1987; Amended September 8, 1987, eff. October 1, 1987.

Section 4. Approval of Plans for Land Development

(a) Realty Subdivisions - Plans for realty subdivisions which are located within areas served by public water systems will only be approved by the Department if such plans call for connection to the public water system.

(b) Other Land Developments - No municipality within Nassau County shall approve plans for new land development requiring drinking water service or otherwise sanction or authorize such development in areas served by a public water system unless such plans call for connection to the public water system.

Section 5. Powers of the Commissioner

(a) The Commissioner may make or cause to be made any investigation or study which, in his opinion, is required for enforcing the provisions of this Article.

(b) The Commissioner may waive the application of the provisions of this Article in specific cases, for both realty subdivisions and other land developments, where such waivers are consistent with the purpose and intent of this Article and as restrictive or more restrictive than the New York State Uniform Fire Prevention and Building Code.

(c) The Commissioner may suspend the sale, offer for sale, lease, offer for lease, construction, or occupancy of any properties developed in contradiction of this Article until such time as public water supply service is available and accessible.

HISTORICAL NOTE: Sec. Adopted May 20, 1987, eff. August 1, 1987; Amended April 13, 1988, eff. May 1, 1988

Section 6. Water Quality

No person, firm, corporation, or agent thereof, shall provide or maintain a private water system to be used for drinking water by any person, other than the owner thereof, unless such water supply shall be potable, protected against pollution, and in compliance with the water quality maximum contaminant levels of Part 5, New York State Sanitary Code, 10 NYCRR, Chapter I as amended as well as all New York State Department of Health Guidelines for Organic Chemicals in Drinking Water. Furthermore, any such person, firm, corporation, or agent thereof, who shall provide or maintain a private water system for drinking water by any person other than the owner thereof, shall submit to the Commissioner a report of water quality examination of such

effective April 1, 1984. New Article IV adopted May 20, 1987 effective August 1, 1987; amended September 8, 1987, effective October 1, 1987; amended April 13, 1988, effective May 1, 1988.

2387H

ARTICLE VI

NASSAU COUNTY PUBLIC HEALTH ORDINANCE

PUBLIC DRINKING WATER SUPPLY

EFFECTIVE FEBRUARY 1, 1990

NASSAU COUNTY DEPARTMENT OF HEALTH

Thomas S. Gulotta
County Executive

George Pickett, M.D., M.P.H.
Commissioner

Section 6. - Maximum Contaminant Levels

(a) Public water suppliers shall comply with maximum contaminant levels (MCL) as required by 10 NYCRR Subpart 5-1.

(b) Compliance with MCLs does not relieve public water supplies from compliance with additional water quality requirements contained in this Article.

Section 7. - Sampling and Analysis of Water Quality

(a) Water suppliers shall collect samples and conduct analyses as well as prepare and retain records in accordance with 10 NYCRR Section 5-1.72.

(b) Additionally, public water suppliers shall collect such samples, perform analyses, and prepare and maintain records as may be required by the Commissioner to ensure adequate control of the quality of the water supply.

(c) Schedules for sampling of water in the distribution system shall be representative of water quality in the entire distribution system, both in terms of selection of sampling points and the sampling protocol to be used, and shall be approved by the Department.

Section 8. - Operation of Public Water Systems

(a) The supplier of water shall:

(1) Operate a public water system in accordance with 10 NYCRR Section 5-1.72 and the additional requirements contained in this Article.

(5) Comply with all of the safety requirements for water plant operations identified in Section 5.3 of Bulletin 42, Recommended Standards for Water Works, 1987 edition, and as further identified in 10 NYCRR Section 5-1.22(b) and as they may be amended.

(b) Water pumps with a mercury seal shall not be approved by the Department for new installations or major modifications to existing water systems. Additionally, the water supplier shall remove and replace existing pumps containing mercury seals no later than December 31, 1992 in accordance with procedures of Section 4. Removal of such pumps shall use methods which will prevent contamination of wells by the release of mercury.

(c) Oil lubricated well pumps shall be permitted to operate only if the following actions are taken by the supplier of water to prevent contamination of drinking water:

(1) Lubricating oil used shall meet the U.S. Food and Drug Administration requirements for mineral oil use as an indirect food additive under 21CFR 178.3620(c) dated April 1, 1985 and as it may be amended, and

(2) Water level within the well shall be continuously monitored and provided with an audible alarm system and automatic well pump shut-off valve to be actuated when the water level drops to a predetermined critical level, or well shall be equipped with a backpressure valve and the water level within the well shall be inspected on at least a quarterly interval.

(c) The supplier of water shall forward to the Department copies of all reports of analyses of water samples conducted by a laboratory approved by the N.Y. State Department of Health as soon as feasible after the analyses are completed and no later than 30 days thereafter. Analyses which exceed MCL values identified in Section 6 shall be reported to the Department by the most expeditious means available after the laboratory analysis is completed but within 48 hours for MCL exceedances and within 24 hours for MCL violations.

Section 10. - Water Treatment

(a) Public water suppliers shall provide treatment facilities as needed to ensure that the water delivered to consumers does not exceed the MCLs identified in Section 6.

(b) All public water supplies shall, as a minimum, be disinfected in accordance with provisions of 10 NYCRR Subpart 5-1 except as follows:

(1) Those public water systems granted a waiver from disinfection treatment under Section 11 and under 10 NYCRR Section 5-1.30, shall not be required to provide disinfection treatment continuously but shall maintain facilities and equipment to perform disinfection treatment during emergencies and shall at all times maintain a minimum of a three-day supply of disinfection chemicals.

(2) Disinfection treatment facilities and equipment provided for emergency conditions shall be inspected and tested by the supplier of water as often as needed to maintain proper operational conditions.

manganese exceed 1.0 mg/l and using sodium silicate, where the combined concentrations exceed 1.5 mg/l.

(2) Sequestering treatment in existing applications where raw water quality exceeds the criteria of Section 10(d)(1) and in any application, shall be discontinued on a reasonable schedule determined by the Commissioner where a review of water quality data at point of use and the incidence of consumer complaints related to precipitation of iron from drinking water demonstrates that the treatment is not effective in providing water quality meeting all standards for color and turbidity, applied at the point of use.

Section 11. - Waivers from Disinfection Treatment

Waivers from disinfection treatment shall be recommended by the Department to the New York State Department of Health in accordance with 10 NYCRR, Sectior 5-1.30 and additional criteria established by the Commissioner as authorizec under that section.

Section 12. Safety Controls

(a) The supplier of water shall provide safety controls at all chemical treatment facilities in the water supply system in order to prevent introduction of excessive amounts of treatment chemicals into the water distribution system. Devices to provide safety controls shall be designed, installed, operated, and tested in accordance with this Secti and Section 4.

(b) Safety devices shall prevent energizing of chemical feeding equipment during such times that the corresponding well or booster pump is not

compromised or otherwise rendered ineffective as a result of activities associated with operation, repair, servicing, or maintenance of facilities at well stations. Such procedures shall be approved by the Department.

Section 13. - Water Storage

(a) The water supplier shall provide storage capacity in the water distribution system sufficient to supply the average daily flow plus fire flow and to maintain a minimum system pressure of 20 psi and a normal working pressure of at least 35 psi as required by Section 14. Well capacity in excess of the average daily flow may be substituted for water storage capacity.

(b) Existing distribution storage facilities shall comply with 10 NYCRR Section 5-1.32 and uncovered storage facilities shall be provided with additional protection consisting of fencing and other means adequate to prevent trespassing, vandalism, and sabotage.

(c) New storage facilities shall be covered and otherwise comply with Section 4 and 10 NYCRR Section 5-1.32.

Section 14. - Water Distribution

(a) The supplier of water shall operate and maintain the public water system to assure a minimum working pressure of 20 pounds per square inch (psi) at all points in the distribution system, measured at ground level. Such minimum pressure shall be maintained under all conditions of flow. Normal working pressure shall not be less than 35 psi.

(d) Use is prohibited of new water service lines made of lead and the use of lead/tin solder for joining of copper pipes, fittings, and fixtures which are a part of the water supply plumbing.

(e) Suppliers of water shall provide interconnections between abutting public water supply distribution systems and maintain formal agreements between affected suppliers of water, in order to permit flow of water from one system to another during periods of emergency so that an adequate supply of water at satisfactory water pressures can be maintained insofar as possible during such emergencies. Valves and other appurtenances at each interconnection facility shall be maintained in an operating condition continuously and be inspected and tested on at least an annual basis simultaneously by both water suppliers affected in order to insure that they are operational. A report of each such inspection and the test results are to be included in the monthly operation reports forwarded to the Department.

(f) The installation of new dead-end mains and extension or expansion of any portion of the water distribution system which are designed and constructed so as to substantially diminish the circulation of drinking water within portions of a water distribution system and/or deliver water not meeting all quality standards, are prohibited except as otherwise provided in Section 14(f)(1) and (2).

(1) New dead-end mains shall be approved by the Department only under the following circumstances:

the nature of existing hydraulic conditions or arrangement of the water main network, shall be approved only under the following conditions:

(i) The supplier of water shall demonstrate that the portion of the distribution system for which a new water main is proposed cannot be modified by water main connections to other mains to improve water circulation, and

(ii) There is no record of consumer complaints or other indication of water quality which exceeds values for maximum contaminant levels for one or more contaminants including turbidity, odor, and color, which may be caused or aggravated by inadequate circulation of water in the vicinity of the proposed extension or expansion.

Section 15. - Cross-Connection Control

(a) The supplier of water shall protect the public water system by containing potential contamination within the premises of the user in accordance with the provisions of 10 NYCRR Section 5-1.31 and of this Section.

(b) The supplier of water shall establish and enforce formal requirements for the implementation of a cross-connection control program which shall be applicable to all water services within the public water system.

and a residence used in part for business purposes shall be considered to be non-residential.

(3) Rating of the degree of hazard shall be in accordance with 10 NYCRR Section 5-1.31.

(4) Within 30 days after the determination that a premises requires a backflow prevention device, the supplier of water shall notify the owner and require that an approved RPZ or DCV device as appropriate be installed and maintained by the owner in accordance with the requirements in effect.

(d) No backflow prevention device may be installed until engineering plans for each proposed backflow prevention installation are approved by both the supplier of water and the Department. Plans are to be prepared either by a professional engineer or a registered architect.

(1) Backflow prevention devices must be of type and manufacture specifically approved by the New York State Department of Health.

(2) Typical engineering plans for the installation of backflow prevention devices may be provided or adopted by the supplier of water for use in specific installations. Such typical plans must be approved by the Department before use in specific applications.

(e) Cross connection control at both existing and new public well stations shall be provided in the following manner:

(b) Water supply emergency plans shall address specific procedures to be followed by a water supplier for each type of emergency which may occur including, but not limited to, natural disasters, accidents, general power failures, unusual weather conditions, vandalism, and sabatoge.

(c) Water supply emergency plans shall be prepared in a format which can be readily and quickly implemented when an emergency arises. All employees and agents of a water supplier with responsibility for implementing the plan shall be instructed regarding its provisions and the plan shall be tested at least annually by the supplier of water, in an office setting, involving key personnel, responding to a typical simulated emergency. Copies of the plan shall be readily available to all key personnel of the water supplier at all times and at all offices and stations of the supplier located within the water service area which are manned either routinely or occasionally.

(d) Water supply emergency plans shall conform to the requirements of 10 NYCRR Section 5.133 except where the provisions of this Section are more restrictive.

Section 17. - Emergencies

(a) The supplier of water shall notify the Department by the most expeditious means feasible when a condition exists that may constitute a public health hazard. Such notification shall be in addition to any notification required in 10 NYCRR Sections 5-1.12, 5-1.23, 5-1.51, 5-1.52, and 5-1.77.

Section 19. - Effective Date

This Article shall become effective on February 1, 1990.

HISTORICAL NOTE: Adopted November 17, 1989, effective February 1, 1990.

FVP:no
ID# 0863

Appendix C

Local Ordinances

Paper copies are included in EPA Copy 1, NYSDEC Copy 1, Weston Copy 1, and Project File

(Electronic copy available on BHHRA CD-ROM submittal and upon request)

ARTICLE IV

NASSAU COUNTY PUBLIC HEALTH ORDINANCE

PRIVATE DRINKING SYSTEMS

EFFECTIVE AUGUST 1, 1987

(Amended: September 8, 1987)
(Amended: April 13, 1988)

NASSAU COUNTY DEPARTMENT OF HEALTH

Thomas S. Gulotta
County Executive

George Pickett, M.D., M.P.H.
Commissioner

closets, urinals, bathtubs, shower baths, wash basins, laundry tubs, kitchen sinks, and similar plumbing fixtures.

HISTORICAL NOTE: Sec. Adopted May 20, 1987, eff. August 1, 1987; Amended September 8, 1987, eff. October 1, 1987.

Section 4. Approval of Plans for Land Development

(a) Realty Subdivisions - Plans for realty subdivisions which are located within areas served by public water systems will only be approved by the Department if such plans call for connection to the public water system.

(b) Other Land Developments - No municipality within Nassau County shall approve plans for new land development requiring drinking water service or otherwise sanction or authorize such development in areas served by a public water system unless such plans call for connection to the public water system.

Section 5. Powers of the Commissioner

(a) The Commissioner may make or cause to be made any investigation or study which, in his opinion, is required for enforcing the provisions of this Article.

(b) The Commissioner may waive the application of the provisions of this Article in specific cases, for both realty subdivisions and other land developments, where such waivers are consistent with the purpose and intent of this Article and as restrictive or more restrictive than the New York State Uniform Fire Prevention and Building Code.

(c) The Commissioner may suspend the sale, offer for sale, lease, offer for lease, construction, or occupancy of any properties developed in contradiction of this Article until such time as public water supply service is available and accessible.

HISTORICAL NOTE: Sec. Adopted May 20, 1987, eff. August 1, 1987; Amended April 13, 1988, eff. May 1, 1988

Section 6. Water Quality

No person, firm, corporation, or agent thereof, shall provide or maintain a private water system to be used for drinking water by any person, other than the owner thereof, unless such water supply shall be potable, protected against pollution, and in compliance with the water quality maximum contaminant levels of Part 5, New York State Sanitary Code, 10 NYCRR, Chapter I as amended as well as all New York State Department of Health Guidelines for Organic Chemicals in Drinking Water. Furthermore, any such person, firm, corporation, or agent thereof, who shall provide or maintain a private water system for drinking water by any person other than the owner thereof, shall submit to the Commissioner a report of water quality examination of such

effective April 1, 1984. New Article IV adopted May 20, 1987 effective August 1, 1987; amended September 8, 1987, effective October 1, 1987; amended April 13, 1988, effective May 1, 1988.

2387H

ARTICLE VI

NASSAU COUNTY PUBLIC HEALTH ORDINANCE

PUBLIC DRINKING WATER SUPPLY

EFFECTIVE FEBRUARY 1, 1990

NASSAU COUNTY DEPARTMENT OF HEALTH

Thomas S. Gulotta
County Executive

George Pickett, M.D., M.P.H.
Commissioner

Section 6. - Maximum Contaminant Levels

(a) Public water suppliers shall comply with maximum contaminant levels (MCL) as required by 10 NYCRR Subpart 5-1.

(b) Compliance with MCLs does not relieve public water supplies from compliance with additional water quality requirements contained in this Article.

Section 7. - Sampling and Analysis of Water Quality

(a) Water suppliers shall collect samples and conduct analyses as well as prepare and retain records in accordance with 10 NYCRR Section 5-1.72.

(b) Additionally, public water suppliers shall collect such samples, perform analyses, and prepare and maintain records as may be required by the Commissioner to ensure adequate control of the quality of the water supply.

(c) Schedules for sampling of water in the distribution system shall be representative of water quality in the entire distribution system, both in terms of selection of sampling points and the sampling protocol to be used, and shall be approved by the Department.

Section 8. - Operation of Public Water Systems

(a) The supplier of water shall:

(1) Operate a public water system in accordance with 10 NYCRR Section 5-1.72 and the additional requirements contained in this Article.

(5) Comply with all of the safety requirements for water plant operations identified in Section 5.3 of Bulletin 42, Recommended Standards for Water Works, 1987 edition, and as further identified in 10 NYCRR Section 5-1.22(b) and as they may be amended.

(b) Water pumps with a mercury seal shall not be approved by the Department for new installations or major modifications to existing water systems. Additionally, the water supplier shall remove and replace existing pumps containing mercury seals no later than December 31, 1992 in accordance with procedures of Section 4. Removal of such pumps shall use methods which will prevent contamination of wells by the release of mercury.

(c) Oil lubricated well pumps shall be permitted to operate only if the following actions are taken by the supplier of water to prevent contamination of drinking water:

(1) Lubricating oil used shall meet the U.S. Food and Drug Administration requirements for mineral oil use as an indirect food additive under 21CFR 178.3620(c) dated April 1, 1985 and as it may be amended, and

(2) Water level within the well shall be continuously monitored and provided with an audible alarm system and automatic well pump shut-off valve to be actuated when the water level drops to a predetermined critical level, or well shall be equipped with a backpressure valve and the water level within the well shall be inspected on at least a quarterly interval.

(c) The supplier of water shall forward to the Department copies of all reports of analyses of water samples conducted by a laboratory approved by the N.Y. State Department of Health as soon as feasible after the analyses are completed and no later than 30 days thereafter. Analyses which exceed MCL values identified in Section 6 shall be reported to the Department by the most expeditious means available after the laboratory analysis is completed but within 48 hours for MCL exceedances and within 24 hours for MCL violations.

Section 10. - Water Treatment

(a) Public water suppliers shall provide treatment facilities as needed to ensure that the water delivered to consumers does not exceed the MCLs identified in Section 6.

(b) All public water supplies shall, as a minimum, be disinfected in accordance with provisions of 10 NYCRR Subpart 5-1 except as follows:

(1) Those public water systems granted a waiver from disinfection treatment under Section 11 and under 10 NYCRR Section 5-1.30, shall not be required to provide disinfection treatment continuously but shall maintain facilities and equipment to perform disinfection treatment during emergencies and shall at all times maintain a minimum of a three-day supply of disinfection chemicals.

(2) Disinfection treatment facilities and equipment provided for emergency conditions shall be inspected and tested by the supplier of water as often as needed to maintain proper operational conditions.

manganese exceed 1.0 mg/l and using sodium silicate, where the combined concentrations exceed 1.5 mg/l.

(2) Sequestering treatment in existing applications where raw water quality exceeds the criteria of Section 10(d)(1) and in any application, shall be discontinued on a reasonable schedule determined by the Commissioner where a review of water quality data at point of use and the incidence of consumer complaints related to precipitation of iron from drinking water demonstrates that the treatment is not effective in providing water quality meeting all standards for color and turbidity, applied at the point of use.

Section 11. - Waivers from Disinfection Treatment

Waivers from disinfection treatment shall be recommended by the Department to the New York State Department of Health in accordance with 10 NYCRR, Sectior 5-1.30 and additional criteria established by the Commissioner as authorizec under that section.

Section 12. Safety Controls

(a) The supplier of water shall provide safety controls at all chemical treatment facilities in the water supply system in order to prevent introduction of excessive amounts of treatment chemicals into the water distribution system. Devices to provide safety controls shall be designed, installed, operated, and tested in accordance with this Secti and Section 4.

(b) Safety devices shall prevent energizing of chemical feeding equipment during such times that the corresponding well or booster pump is not

compromised or otherwise rendered ineffective as a result of activities associated with operation, repair, servicing, or maintenance of facilities at well stations. Such procedures shall be approved by the Department.

Section 13. - Water Storage

(a) The water supplier shall provide storage capacity in the water distribution system sufficient to supply the average daily flow plus fire flow and to maintain a minimum system pressure of 20 psi and a normal working pressure of at least 35 psi as required by Section 14. Well capacity in excess of the average daily flow may be substituted for water storage capacity.

(b) Existing distribution storage facilities shall comply with 10 NYCRR Section 5-1.32 and uncovered storage facilities shall be provided with additional protection consisting of fencing and other means adequate to prevent trespassing, vandalism, and sabotage.

(c) New storage facilities shall be covered and otherwise comply with Section 4 and 10 NYCRR Section 5-1.32.

Section 14. - Water Distribution

(a) The supplier of water shall operate and maintain the public water system to assure a minimum working pressure of 20 pounds per square inch (psi) at all points in the distribution system, measured at ground level. Such minimum pressure shall be maintained under all conditions of flow. Normal working pressure shall not be less than 35 psi.

(d) Use is prohibited of new water service lines made of lead and the use of lead/tin solder for joining of copper pipes, fittings, and fixtures which are a part of the water supply plumbing.

(e) Suppliers of water shall provide interconnections between abutting public water supply distribution systems and maintain formal agreements between affected suppliers of water, in order to permit flow of water from one system to another during periods of emergency so that an adequate supply of water at satisfactory water pressures can be maintained insofar as possible during such emergencies. Valves and other appurtenances at each interconnection facility shall be maintained in an operating condition continuously and be inspected and tested on at least an annual basis simultaneously by both water suppliers affected in order to insure that they are operational. A report of each such inspection and the test results are to be included in the monthly operation reports forwarded to the Department.

(f) The installation of new dead-end mains and extension or expansion of any portion of the water distribution system which are designed and constructed so as to substantially diminish the circulation of drinking water within portions of a water distribution system and/or deliver water not meeting all quality standards, are prohibited except as otherwise provided in Section 14(f)(1) and (2).

(1) New dead-end mains shall be approved by the Department only under the following circumstances:

the nature of existing hydraulic conditions or arrangement of the water main network, shall be approved only under the following conditions:

(i) The supplier of water shall demonstrate that the portion of the distribution system for which a new water main is proposed cannot be modified by water main connections to other mains to improve water circulation, and

(ii) There is no record of consumer complaints or other indication of water quality which exceeds values for maximum contaminant levels for one or more contaminants including turbidity, odor, and color, which may be caused or aggravated by inadequate circulation of water in the vicinity of the proposed extension or expansion.

Section 15. - Cross-Connection Control

(a) The supplier of water shall protect the public water system by containing potential contamination within the premises of the user in accordance with the provisions of 10 NYCRR Section 5-1.31 and of this Section.

(b) The supplier of water shall establish and enforce formal requirements for the implementation of a cross-connection control program which shall be applicable to all water services within the public water system.

and a residence used in part for business purposes shall be considered to be non-residential.

(3) Rating of the degree of hazard shall be in accordance with 10 NYCRR Section 5-1.31.

(4) Within 30 days after the determination that a premises requires a backflow prevention device, the supplier of water shall notify the owner and require that an approved RPZ or DCV device as appropriate be installed and maintained by the owner in accordance with the requirements in effect.

(d) No backflow prevention device may be installed until engineering plans for each proposed backflow prevention installation are approved by both the supplier of water and the Department. Plans are to be prepared either by a professional engineer or a registered architect.

(1) Backflow prevention devices must be of type and manufacture specifically approved by the New York State Department of Health.

(2) Typical engineering plans for the installation of backflow prevention devices may be provided or adopted by the supplier of water for use in specific installations. Such typical plans must be approved by the Department before use in specific applications.

(e) Cross connection control at both existing and new public well stations shall be provided in the following manner:

(b) Water supply emergency plans shall address specific procedures to be followed by a water supplier for each type of emergency which may occur including, but not limited to, natural disasters, accidents, general power failures, unusual weather conditions, vandalism, and sabatoge.

(c) Water supply emergency plans shall be prepared in a format which can be readily and quickly implemented when an emergency arises. All employees and agents of a water supplier with responsibility for implementing the plan shall be instructed regarding its provisions and the plan shall be tested at least annually by the supplier of water, in an office setting, involving key personnel, responding to a typical simulated emergency. Copies of the plan shall be readily available to all key personnel of the water supplier at all times and at all offices and stations of the supplier located within the water service area which are manned either routinely or occasionally.

(d) Water supply emergency plans shall conform to the requirements of 10 NYCRR Section 5.133 except where the provisions of this Section are more restrictive.

Section 17. - Emergencies

(a) The supplier of water shall notify the Department by the most expeditious means feasible when a condition exists that may constitute a public health hazard. Such notification shall be in addition to any notification required in 10 NYCRR Sections 5-1.12, 5-1.23, 5-1.51, 5-1.52, and 5-1.77.

Section 19. - Effective Date

This Article shall become effective on February 1, 1990.

HISTORICAL NOTE: Adopted November 17, 1989, effective February 1, 1990.

FYP:no
ID# 0863

Appendix C

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ARTICLE IV

NASSAU COUNTY PUBLIC HEALTH ORDINANCE

PRIVATE DRINKING SYSTEMS

EFFECTIVE AUGUST 1, 1987

(Amended: September 8, 1987)
(Amended: April 13, 1988)

NASSAU COUNTY DEPARTMENT OF HEALTH

Thomas S. Gulotta
County Executive

George Pickett, M.D., M.P.H.
Commissioner

closets, urinals, bathtubs, shower baths, wash basins, laundry tubs, kitchen sinks, and similar plumbing fixtures.

HISTORICAL NOTE: Sec. Adopted May 20, 1987, eff. August 1, 1987; Amended September 8, 1987, eff. October 1, 1987.

Section 4. Approval of Plans for Land Development

(a) Realty Subdivisions - Plans for realty subdivisions which are located within areas served by public water systems will only be approved by the Department if such plans call for connection to the public water system.

(b) Other Land Developments - No municipality within Nassau County shall approve plans for new land development requiring drinking water service or otherwise sanction or authorize such development in areas served by a public water system unless such plans call for connection to the public water system.

Section 5. Powers of the Commissioner

(a) The Commissioner may make or cause to be made any investigation or study which, in his opinion, is required for enforcing the provisions of this Article.

(b) The Commissioner may waive the application of the provisions of this Article in specific cases, for both realty subdivisions and other land developments, where such waivers are consistent with the purpose and intent of this Article and as restrictive or more restrictive than the New York State Uniform Fire Prevention and Building Code.

(c) The Commissioner may suspend the sale, offer for sale, lease, offer for lease, construction, or occupancy of any properties developed in contradiction of this Article until such time as public water supply service is available and accessible.

HISTORICAL NOTE: Sec. Adopted May 20, 1987, eff. August 1, 1987; Amended April 13, 1988, eff. May 1, 1988

Section 6. Water Quality

No person, firm, corporation, or agent thereof, shall provide or maintain a private water system to be used for drinking water by any person, other than the owner thereof, unless such water supply shall be potable, protected against pollution, and in compliance with the water quality maximum contaminant levels of Part 5, New York State Sanitary Code, 10 NYCRR, Chapter I as amended as well as all New York State Department of Health Guidelines for Organic Chemicals in Drinking Water. Furthermore, any such person, firm, corporation, or agent thereof, who shall provide or maintain a private water system for drinking water by any person other than the owner thereof, shall submit to the Commissioner a report of water quality examination of such

effective April 1, 1984. New Article IV adopted May 20, 1987 effective August 1, 1987; amended September 8, 1987, effective October 1, 1987; amended April 13, 1988, effective May 1, 1988.

2387H

ARTICLE VI

NASSAU COUNTY PUBLIC HEALTH ORDINANCE

PUBLIC DRINKING WATER SUPPLY

EFFECTIVE FEBRUARY 1, 1990

NASSAU COUNTY DEPARTMENT OF HEALTH

Thomas S. Gulotta
County Executive

George Pickett, M.D., M.P.H.
Commissioner

Section 6. - Maximum Contaminant Levels

(a) Public water suppliers shall comply with maximum contaminant levels (MCL) as required by 10 NYCRR Subpart 5-1.

(b) Compliance with MCLs does not relieve public water supplies from compliance with additional water quality requirements contained in this Article.

Section 7. - Sampling and Analysis of Water Quality

(a) Water suppliers shall collect samples and conduct analyses as well as prepare and retain records in accordance with 10 NYCRR Section 5-1.72.

(b) Additionally, public water suppliers shall collect such samples, perform analyses, and prepare and maintain records as may be required by the Commissioner to ensure adequate control of the quality of the water supply.

(c) Schedules for sampling of water in the distribution system shall be representative of water quality in the entire distribution system, both in terms of selection of sampling points and the sampling protocol to be used, and shall be approved by the Department.

Section 8. - Operation of Public Water Systems

(a) The supplier of water shall:

(1) Operate a public water system in accordance with 10 NYCRR Section 5-1.72 and the additional requirements contained in this Article.

(5) Comply with all of the safety requirements for water plant operations identified in Section 5.3 of Bulletin 42, Recommended Standards for Water Works, 1987 edition, and as further identified in 10 NYCRR Section 5-1.22(b) and as they may be amended.

(b) Water pumps with a mercury seal shall not be approved by the Department for new installations or major modifications to existing water systems. Additionally, the water supplier shall remove and replace existing pumps containing mercury seals no later than December 31, 1992 in accordance with procedures of Section 4. Removal of such pumps shall use methods which will prevent contamination of wells by the release of mercury.

(c) Oil lubricated well pumps shall be permitted to operate only if the following actions are taken by the supplier of water to prevent contamination of drinking water:

(1) Lubricating oil used shall meet the U.S. Food and Drug Administration requirements for mineral oil use as an indirect food additive under 21CFR 178.3620(c) dated April 1, 1985 and as it may be amended, and

(2) Water level within the well shall be continuously monitored and provided with an audible alarm system and automatic well pump shut-off valve to be actuated when the water level drops to a predetermined critical level, or well shall be equipped with a backpressure valve and the water level within the well shall be inspected on at least a quarterly interval.

(c) The supplier of water shall forward to the Department copies of all reports of analyses of water samples conducted by a laboratory approved by the N.Y. State Department of Health as soon as feasible after the analyses are completed and no later than 30 days thereafter. Analyses which exceed MCL values identified in Section 6 shall be reported to the Department by the most expeditious means available after the laboratory analysis is completed but within 48 hours for MCL exceedances and within 24 hours for MCL violations.

Section 10. - Water Treatment

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(b) All public water supplies shall, as a minimum, be disinfected in accordance with provisions of 10 NYCRR Subpart 5-1 except as follows:

(1) Those public water systems granted a waiver from disinfection treatment under Section 11 and under 10 NYCRR Section 5-1.30, shall not be required to provide disinfection treatment continuously but shall maintain facilities and equipment to perform disinfection treatment during emergencies and shall at all times maintain a minimum of a three-day supply of disinfection chemicals.

(2) Disinfection treatment facilities and equipment provided for emergency conditions shall be inspected and tested by the supplier of water as often as needed to maintain proper operational conditions.

manganese exceed 1.0 mg/l and using sodium silicate, where the combined concentrations exceed 1.5 mg/l.

(2) Sequestering treatment in existing applications where raw water quality exceeds the criteria of Section 10(d)(1) and in any application, shall be discontinued on a reasonable schedule determined by the Commissioner where a review of water quality data at point of use and the incidence of consumer complaints related to precipitation of iron from drinking water demonstrates that the treatment is not effective in providing water quality meeting all standards for color and turbidity, applied at the point of use.

Section 11. - Waivers from Disinfection Treatment

Waivers from disinfection treatment shall be recommended by the Department to the New York State Department of Health in accordance with 10 NYCRR, Sectior 5-1.30 and additional criteria established by the Commissioner as authorizec under that section.

Section 12. Safety Controls

(a) The supplier of water shall provide safety controls at all chemical treatment facilities in the water supply system in order to prevent introduction of excessive amounts of treatment chemicals into the water distribution system. Devices to provide safety controls shall be designed, installed, operated, and tested in accordance with this Secti and Section 4.

(b) Safety devices shall prevent energizing of chemical feeding equipment during such times that the corresponding well or booster pump is not

compromised or otherwise rendered ineffective as a result of activities associated with operation, repair, servicing, or maintenance of facilities at well stations. Such procedures shall be approved by the Department.

Section 13. - Water Storage

(a) The water supplier shall provide storage capacity in the water distribution system sufficient to supply the average daily flow plus fire flow and to maintain a minimum system pressure of 20 psi and a normal working pressure of at least 35 psi as required by Section 14. Well capacity in excess of the average daily flow may be substituted for water storage capacity.

(b) Existing distribution storage facilities shall comply with 10 NYCRR Section 5-1.32 and uncovered storage facilities shall be provided with additional protection consisting of fencing and other means adequate to prevent trespassing, vandalism, and sabotage.

(c) New storage facilities shall be covered and otherwise comply with Section 4 and 10 NYCRR Section 5-1.32.

Section 14. - Water Distribution

(a) The supplier of water shall operate and maintain the public water system to assure a minimum working pressure of 20 pounds per square inch (psi) at all points in the distribution system, measured at ground level. Such minimum pressure shall be maintained under all conditions of flow. Normal working pressure shall not be less than 35 psi.

(d) Use is prohibited of new water service lines made of lead and the use of lead/tin solder for joining of copper pipes, fittings, and fixtures which are a part of the water supply plumbing.

(e) Suppliers of water shall provide interconnections between abutting public water supply distribution systems and maintain formal agreements between affected suppliers of water, in order to permit flow of water from one system to another during periods of emergency so that an adequate supply of water at satisfactory water pressures can be maintained insofar as possible during such emergencies. Valves and other appurtenances at each interconnection facility shall be maintained in an operating condition continuously and be inspected and tested on at least an annual basis simultaneously by both water suppliers affected in order to insure that they are operational. A report of each such inspection and the test results are to be included in the monthly operation reports forwarded to the Department.

(f) The installation of new dead-end mains and extension or expansion of any portion of the water distribution system which are designed and constructed so as to substantially diminish the circulation of drinking water within portions of a water distribution system and/or deliver water not meeting all quality standards, are prohibited except as otherwise provided in Section 14(f)(1) and (2).

(1) New dead-end mains shall be approved by the Department only under the following circumstances:

the nature of existing hydraulic conditions or arrangement of the water main network, shall be approved only under the following conditions:

(i) The supplier of water shall demonstrate that the portion of the distribution system for which a new water main is proposed cannot be modified by water main connections to other mains to improve water circulation, and

(ii) There is no record of consumer complaints or other indication of water quality which exceeds values for maximum contaminant levels for one or more contaminants including turbidity, odor, and color, which may be caused or aggravated by inadequate circulation of water in the vicinity of the proposed extension or expansion.

Section 15. - Cross-Connection Control

(a) The supplier of water shall protect the public water system by containing potential contamination within the premises of the user in accordance with the provisions of 10 NYCRR Section 5-1.31 and of this Section.

(b) The supplier of water shall establish and enforce formal requirements for the implementation of a cross-connection control program which shall be applicable to all water services within the public water system.

and a residence used in part for business purposes shall be considered to be non-residential.

(3) Rating of the degree of hazard shall be in accordance with 10 NYCRR Section 5-1.31.

(4) Within 30 days after the determination that a premises requires a backflow prevention device, the supplier of water shall notify the owner and require that an approved RPZ or DCV device as appropriate be installed and maintained by the owner in accordance with the requirements in effect.

(d) No backflow prevention device may be installed until engineering plans for each proposed backflow prevention installation are approved by both the supplier of water and the Department. Plans are to be prepared either by a professional engineer or a registered architect.

(1) Backflow prevention devices must be of type and manufacture specifically approved by the New York State Department of Health.

(2) Typical engineering plans for the installation of backflow prevention devices may be provided or adopted by the supplier of water for use in specific installations. Such typical plans must be approved by the Department before use in specific applications.

(e) Cross connection control at both existing and new public well stations shall be provided in the following manner:

(b) Water supply emergency plans shall address specific procedures to be followed by a water supplier for each type of emergency which may occur including, but not limited to, natural disasters, accidents, general power failures, unusual weather conditions, vandalism, and sabatoge.

(c) Water supply emergency plans shall be prepared in a format which can be readily and quickly implemented when an emergency arises. All employees and agents of a water supplier with responsibility for implementing the plan shall be instructed regarding its provisions and the plan shall be tested at least annually by the supplier of water, in an office setting, involving key personnel, responding to a typical simulated emergency. Copies of the plan shall be readily available to all key personnel of the water supplier at all times and at all offices and stations of the supplier located within the water service area which are manned either routinely or occasionally.

(d) Water supply emergency plans shall conform to the requirements of 10 NYCRR Section 5.133 except where the provisions of this Section are more restrictive.

Section 17. - Emergencies

(a) The supplier of water shall notify the Department by the most expeditious means feasible when a condition exists that may constitute a public health hazard. Such notification shall be in addition to any notification required in 10 NYCRR Sections 5-1.12, 5-1.23, 5-1.51, 5-1.52, and 5-1.77.

Section 19. - Effective Date

This Article shall become effective on February 1, 1990.

HISTORICAL NOTE: Adopted November 17, 1989, effective February 1, 1990.

FVP:no
ID# 0863

APPENDIX D

APPENDIX D

AIR EMISSIONS MODELING

(Electronic copy available on Final BHHRA CD-ROM submittal and upon request)

APPENDIX D
DERIVATION OF AIR CONCENTRATIONS
LIBERTY INDUSTRIAL FINISHING SITE

1.0 INTRODUCTION

Air emissions modeling was conducted to determine air concentrations for use in the Baseline Risk Assessment for Liberty Industrial Finishing Site. Air concentrations were calculated for both the reasonable maximum exposure (RME) and the central tendency exposure (CTE). Modeling was conducted for the following media:

- Particulate emissions from soil in the eastern and western parcels and solid waste in features;
- Volatile emissions from soil in the western and eastern parcels to outdoor air;
- Volatile emissions from soil in the western and eastern parcels to indoor air;
- Volatile emissions from Upper Glacial Aquifer groundwater to indoor air;
- Volatile emissions from Upper Glacial Aquifer groundwater to outdoor air;
- Volatile emissions from solid waste in features to outdoor air;
- Volatile emissions from solid waste in features to indoor air;
- Volatile emissions from liquid waste in features to outdoor air;
- Volatile emissions from liquid waste in features to indoor air; and
- Volatile emissions from Magothy Aquifer groundwater during tap water use.

Table D-1 summarizes the modeling approaches used for each media. Attached to this appendix are the spreadsheets used to calculate emissions and air concentrations. Attachment D-1 contains all the RME spreadsheets. Attachment D-2 contains all the CTE spreadsheets. Each modeling approach is described in this Appendix.

1.1 Modeling Inputs

Chemical/physical characteristics of each constituent of potential concern (COPC) included in the modeling are tabulated in Table D-2. All modeling inputs used for the site are listed in Table D-3. These values were derived from the U.S. Environmental Protection Agency (EPA) or American Society of Testing and Materials (ASTM) guidance documents, or site-specific information when available. Input values taken from guidance documents are intended to be conservative (upper-bound) estimates that are consistent with Superfund s RME.

2.0 PARTICULATE EMISSIONS FROM SOIL AND SOLID WASTE

The approach used to estimate particulate air concentrations for soil in the western and eastern parcels, and solid waste in features, was obtained from EPA *s Soil Screening Guidance: Technical Background Document* (May, 1996) (SSL). The SSL guidance was

designed to provide standardized equations for the development of screening levels to evaluate soil contaminant levels under a residential land use scenario.

2.1 Particulate Emission Factor

The Particulate Emission Factor (PEF) used in the screening level equation for surface soil can also be used to estimate site-specific air concentrations. The PEF relates the concentration of contaminant in soil to the concentration of dust particles in air. The PEF represents an annual average emission rate based on wind erosion. The emissions portion of the PEF equation is based on the "unlimited reservoir" model developed to estimate particulate emissions due to wind erosion (Cowherd et al., 1985). A site-specific dispersion model (Q/C) is then selected . The Q/C term is derived from modeling results determined using meteorological data from 29 locations across the United States. The use of the Q/C methodology has the advantage of the following characteristics:

Dispersion modeling from a ground-level area source;
Onsite receptor;
A long term/annual average exposure point concentration; and
Algorithms for calculating the exposure point concentration for area sources of different shapes and sizes.

The Q/C value used for the modeling for the Liberty Industrial site was derived from the results predicted using EPA s AREA-ST model in the Industrial Source Complex Model (ISC2) algorithm using input from one full year of meteorological data for a 10-acre source area located in Philadelphia. The equation for the PEF is as follows:

$$PEF\ (m^3/kg) = Q/C\ x\ \frac{3600\ s/h}{0.036\ x\ (1-V)\ x\ (Um/Ut)^3\ x\ F(x)}$$

where:

PEF = Particulate Emission Factor (m^3/kg)
Q/C = Inverse of mean concentration at center of source (g/m^2-s per kg/m^3)
V = Fraction of vegetative cover (unitless)
Um = Mean annual wind speed (m/s)
Ut = Equivalent threshold value of wind speed at 7 m (m/s) = 11.32
F(x) = Function dependent on Um/U t derived using Cowherd et al. (1985) = 0.194

2.2 Air Concentration

The air concentration (C_a) is derived by dividing the medium exposure point concentration (EPC) for soil or solid waste by the PEF. EPCs for both the RME case and the CTE case are detailed in the RAGS Part D Tables 3.1 – 3.20 (Appendix A). The equation for C_a is:

$$C_a\ (mg/m^3) = \frac{EPC\ (mg/kg)}{PEF\ (m^3/kg)}$$

The following spreadsheets within Attachments D-1 and D-2 show the derivation of air concentrations due to particulate emissions:

- Spreadsheet 1: western parcel surface soil;
- Spreadsheet 2: western parcel surface/subsurface soil;
- Spreadsheet 3: eastern parcel surface/subsurface soil;
- Spreadsheet 4: solid waste.

3.0 VOLATILE EMISSIONS FROM SOIL TO OUTDOOR AIR

The approach used to estimate air concentrations due to volatilization from subsurface soil in the western and eastern parcels was also obtained from EPA *s Soil Screening Guidance: Technical Background Document* (May, 1996).

3.1 Volatilization Factor

3.1.1 Infinite Source VF

The soil-to-air volatilization factor (VF) is used to define the relationship between the concentration of the COPC in soil and the flux of the volatilized COPC to air. The VF equation can be broken into an emissions model and a dispersion model (reduced to the term Q/C) that simulates the dispersion of contaminants in ambient air. The Q/C term is described in Section 2.1. The emission model is based on a simplified equation developed by Jury et al. (1984). The Jury model calculates the maximum flux of a contaminant from contaminated soil and considers soil moisture conditions in calculating a VF. The VF is based on the following assumptions:

- Vapor phase diffusion is the only transport mechanism moving contaminants from the soil column to the soil surface;
- No transport via non-vapor phase diffusion or mass flow due to capillary action within the soil column;
- Linear equilibrium partitioning within the soil matrix between sorbed, dissolved, and vapor-phases; and
- No loss of chemical as it diffuses towards the surface such as biodegradation.

The VF factor is a function of the chemical-specific properties and soil characteristics and is calculated as follows:

$$VF\ (m^3/kg) = \frac{Q/C\ x\ (3.14\ x\ D_A\ x\ \tau)^{1/2}\ x\ 10^{-4}\ (m^2/cm^2)}{(2\ x\ \rho_b\ x\ D_A)}$$

$$D_A = \frac{[(\theta_a^{10/3} D_a H' + \theta_w^{10/3} D_w)/\theta_T^{\,2}]}{\rho_b K_d + \theta_w + \theta_a H'}$$

$$K_d = K_{oc} \; x \; f_{oc}$$

where:

VF = Soil to air volatilization factor (m^3/kg)
Q/C = Inverse of mean concentration at center of source (g/m^2-s per kg/m^3)
τ = Exposure interval (sec)
ρ_b = Dry soil bulk density (g/cm^3)
θ_a = Air filled soil porosity (cm^3/cm^3)
θ_w = Water filled soil porosity (cm^3/cm^3)
θ_T = Total soil porosity (cm^3/cm^3)
D_a = Diffusivity in air (cm^2/s)
D_w = Diffusivity in water (cm^2/s)
H' = Dimensionless Henry's Law Constant
K_d = Soil-water partition coefficient (cm_3/g)
K_{oc} = Soil organic carbon partition coefficient (cm_3/g)
f_{oc} = Fraction organic carbon in soil (g/g)

3.1.2 Mass-Limit VF

Use of infinite source models to estimate volatilization and migration to groundwater can violate mass balance considerations, especially for small sources. To address this concern the SSL guidance includes models for calculating mass-limit VFs that provide an upper limit to the VF when the area and depth of the source are known or can be reliably estimated. This mass-limit VF represents a time averaged emission when the entire volume of contamination volatilizes over the exposure period. Following is the mass-limit VF equation:

$$VF = Q/C \; x \; \frac{[\tau \; x \; (3.15 \; x \; 10^7 \; s/year)]}{(\rho_b \; x \; d_s \; x \; 10^6 \; g/mg)}$$

where:

VF = Soil to air volatilization factor (m^3/kg)
Q/C = Inverse of mean concentration at center of source (g/m^2-s per kg/m^3)
τ = Exposure interval (year)
ρ_b = Dry soil bulk density (g/cm^3)
d_s = average source depth (m)

VFs based on both an unlimited source (Section 3.1.1) and a mass-limit approach were calculated for the site. The lower of the two VFs was used to calculate air concentrations.

3.1 Air Concentrations

The air concentration (C_a) is derived by dividing the medium exposure point concentration (EPC) for soil or solid waste by the VF. EPCs for both the RME case and the CTE case are detailed in the RAGS Part D Tables 3.1 – 3.20 (Appendix A). The equation for C_a is:

$$C_a\ (mg/m^3) = \frac{EPC\ (mg/kg)}{VF\ (m^3/kg)}$$

The following spreadsheets within Attachments D-1 and D-2 show the derivation of air concentrations due to volatile emissions from soil:

- Spreadsheet 5: western parcel surface/subsurface soil; and
- Spreadsheet 6: eastern parcel surface/subsurface soil.

4.0 VOLATILE EMISSIONS FROM SOIL TO INDOOR AIR

Johnson and Ettinger (1991) introduced a screening-level model which incorporates both convective and diffusive mechanisms for estimating the transport of contaminant vapors emanating from either subsurface soils or groundwater into indoor spaces located directly above or in close proximity to the source of contamination. The Johnson and Ettinger model is a one-dimensional analytical solution to convective and diffusive vapor transport into indoor spaces and provides an estimated attenuation coefficient that relates the vapor concentration in the indoor space to the vapor concentration at the source of contamination. The model assumes:

- Contaminant vapors enter the structure primarily through cracks and openings in the walls and foundation;
- Convective transport occurs primarily within the building zone of influence and vapor velocities decrease rapidly with increasing distance from the structure;
- Diffusion dominates vapor transport between the source of contamination and the building zone of influence;
- All vapors originating from below the building will enter the building unless the floors and walls are perfect vapor barriers;
- All soil properties in any horizontal plane are homogeneous;
- The contaminant is homogeneously distributed within the zone of contamination;
- The areal extent of contamination is greater than that of the building floor in contact with the soil;

- Vapor transport occurs in the absence of convective water movement within the soil column (i.e., evaporation or infiltration), and in the absence of mechanical dispersion;
- The model does not account for transformation processes (e.g., biodegradation, hydrolysis, etc.); and
- The soil layer in contact with the structure floor and walls is isotropic with respect to permeability.

The model was provided by EPA's Office of Emergency and Remedial Response, Toxics Integration Branch in EXCEL format, and is documented in *User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings* (September, 1997). The model is constructed as both a steady-state solution to vapor transport (infinite or nondiminishing source) and as a quasi-steady-state solution (finite or diminishing source). The finite source model was used for estimating air concentrations for the Liberty Industrial site. The reader is referred to the User's Guide for specific equations used in the model.

The Johnson and Ettinger model is designed to calculate risks and/or cleanup criteria for a site. As part of these calculations, a number of intermediate terms are calculated. One of these intermediate terms is the indoor air concentration. Air concentrations used in the Baseline Risk Assessment for the Liberty Industrial site were obtained from the intermediate calculation sheets. EPCs for both the RME case and the CTE case are detailed in the RAGS Part D Tables 3.1 – 3.20 (Appendix A).

The following spreadsheets in Attachments D-1 and D-2 document the user inputs and intermediate calculations:

- Spreadsheets 7 and 8: western parcel surface/subsurface soil volatilization to indoor air onsite; and
- Spreadsheet 9: eastern parcel surface/subsurface soil volatilization to indoor air onsite.

5.0 VOLATILE EMISSIONS FROM GROUNDWATER TO INDOOR AIR

Johnson and Ettinger's model, described above, was used to estimate volatile emissions from groundwater in the Upper Glacial Aquifer to indoor air onsite and offsite. The model for groundwater is constructed as a steady-state solution to vapor transport for an infinite source. The reader is referred to the User's Guide for specific equations used in the model.

Air concentrations used in the Baseline Risk Assessment for the Liberty Industrial site were obtained from the intermediate calculation sheets. EPCs for both the RME case and the CTE case are detailed in the RAGS Part D Tables 3.1 – 3.20 (Appendix A).

The following spreadsheets in Attachments D-1 and D-2 document the user inputs and intermediate calculations:

- Spreadsheets 10-17: onsite groundwater in the Upper Glacial Aquifer volatilization to commercial/industrial indoor air;
- Spreadsheets 18-25: offsite groundwater in the Upper Glacial Aquifer volatilization to residential indoor air; and
- Spreadsheets 26-33: offsite groundwater in the Upper Glacial Aquifer volatilization to indoor air in Woodward Parkway School.

6.0 VOLATILE EMISSIONS FROM GROUNDWATER TO OUTDOOR AIR

The approach used to estimate volatile emissions from groundwater in the Upper Glacial Aquifer to outdoor air was obtained from ASTMs *Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites* (September, 1995) (RBCA). The RBCA guidance was designed to provide standardized equations for the development of risk-based screening levels (RBSLs) to evaluate soil and groundwater contaminant levels under various land use scenario.

6.1 Volatilization Factor

The Volatilization Factor (VF) used in the RBSL equation for groundwater can also be used to estimate site-specific air concentrations. The VF relates the concentration of COPC in groundwater to the concentration of COPC in air. The groundwater modeling assumptions in RBCA are based on the following principles:

A constant dissolved chemical concentration in groundwater;
Linear equilibrium partitioning between dissolved chemicals in groundwater and chemical vapors at the groundwater table;
Steady-state vapor- and liquid-phase diffusion through the capillary fringe and vadose zones to ground surface;
No loss of chemical as it diffuses towards ground surface such that biodegradation will not occur; and
Steady well-mixed atmospheric dispersion of the emanating vapors within the breathing zone as modeled using the simplistic Box Model for air dispersion.

The volatilization factor from groundwater to ambient air is defined as:

$$VF\ (L/m^3) = \frac{H}{1+\left(\frac{U_{air} \times \delta_{air} \times L_{GW}}{W \times D_{ws}^{eff}}\right)} \times 10^3 \frac{L}{m^3}$$

The effective diffusion coefficient between groundwater and soil surface (D_{ws}^{eff}) is:

$$D_{ws}^{eff}\left[\frac{cm^2}{s}\right] = (h_{cap} + h_v)\, x \left(\frac{h_{cap}}{D_{cap}^{eff}} + \frac{h_v}{D_s^{eff}}\right)^{-1}$$

The effective diffusion coefficient through the capillary fringe (D_{cap}^{eff}) is defined as:

$$D_{cap}^{eff}\left[\frac{cm^2}{s}\right] = D_a\, x \frac{\theta_{acap}^{3.33}}{\theta_T^2} + D_w\, x \frac{1}{H} x \frac{\theta_{wcap}^{3.33}}{\theta_T^2}$$

and the effective diffusion coefficient in soil based on vapor-phase concentration (D_s^{eff}) is:

$$D_{eff}^{s}\left[\frac{cm^2}{s}\right] = D_a\, x \frac{\theta_a^{3.33}}{\theta_T^2} + D_w\, x \frac{1}{H} x \frac{\theta_w^{3.33}}{\theta_T^2}$$

where:

VF = Groundwater to air volatilization factor (L/m^3)
θ_a = Air filled soil porosity in vadose zone (cm^3/cm^3)
θ_w = Water filled soil porosity in vadose zone (cm^3/cm^3)
θ_{acap} = Air filled soil porosity in capillary zone (cm^3/cm^3)
θ_{wcap} = Water filled soil porosity in capillary zone (cm^3/cm^3)
θ_T = Total soil porosity (cm^3/cm^3)
D_a = Diffusivity in air (cm^2/s)
D_w = Diffusivity in water (cm^2/s)
H' = Dimensionless Henry's Law Constant
h_v = Thickness of vadose zone (cm)
h_{cap} = Thickness of capillary zone (cm)
U_{air} = Wind speed in ambient mixing zone (cm/s)
δ_{air} = Ambient air mixing zone height (cm)
L_{GW} = Depth to groundwater (cm)
W = Width of source are parallel to wind direction

6.2 Air Concentration

The air concentration (C_a) is derived by multiplying the medium exposure point concentration (EPC) for groundwater by the VF. EPCs for both the RME case and the CTE case are detailed in the RAGS Part D Tables 3.1 – 3.20 (Appendix A). The equation for C_a is:

$$C_a\ (mg/m^3) = EPC\ (ug/L)\ x\ VF\ (L/m^3)\ x\ 10^{-3}\ ug/mg$$

The following spreadsheets within Attachments D-1 and D-2 show the derivation of air concentrations due to volatile emissions from groundwater to outdoor air:

- Spreadsheet 34: onsite groundwater in the Upper Glacial Aquifer volatilization to outdoor air; and
- Spreadsheet 35: offsite groundwater in the Upper Glacial Aquifer volatilization to outdoor air.

7.0 VOLATILE EMISSIONS FROM SOLID WASTE TO OUTDOOR AIR

Features at the Liberty Industrial site are assumed to be at the surface for the purpose of estimating volatilization. As such, it is presumed that the entire mass of COPCs present in the features could volatilize into the ambient air during the exposure period. While this assumption may be overly conservative, it assures that the risks associated with features will not be underestimated.

7.1 Volatilization Factor

The Volatilization Factor (VF) for volatilization from surface soil was taken from ASTM's RBCA guidance. The mass-balance equation for surface soil was used to provide an upper limit to the VF. The dimensions of a typical site feature are assumed to be one foot by two feet, with a depth of 2 feet. The mass-limit VF represents a time averaged emission when the entire volume of COPC volatilizes over the exposure period and mixes within a "box" the same dimensions as the emission area. This steady well-mixed atmospheric dispersion of the emanating vapors within the breathing zone is modeled using the simplistic Box Model for air dispersion. The mass-limit VF equation is:

$$VF\ (kg/m^3) = \frac{W\ x\ \rho_s\ x\ d}{U_{air}\ x\ \delta_{air}\ x\ \tau}\ x\ 10^3\ \frac{cm^3 - kg}{m^3 - g}$$

where:

VF = Solid waste to air volatilization factor (kg/m^3)
ρ_b = Dry soil bulk density (g/cm^3)
d = Lower depth of contamination (cm)
W = Width of source are parallel to wind direction
U_{air} = Wind speed in ambient mixing zone (cm/s)
δ_{air} = Ambient air mixing zone height (cm)
τ = Exposure interval (sec)

7.2 Air Concentration

The air concentration (C_a) is derived by multiplying the medium exposure point concentration (EPC) for solid waste by the VF. EPCs for both the RME case and the

CTE case are detailed in the RAGS Part D Tables 3.1 – 3.20 (Appendix A). The equation for C_a is:

$$C_a\ (mg/m^3) = EPC\ (mg/kg)\ x\ VF\ (kg/m^3)$$

The following spreadsheet within Attachments D-1 and D-2 shows the derivation of air concentrations due to volatile emissions from solid waste to outdoor air:

- Spreadsheet 36: solid waste in features volatilization to outdoor air.

8.0 VOLATILE EMISSIONS FROM SOLID WASTE TO INDOOR AIR

8.1 Volatilization Factor

Volatilization from solid waste to indoor air was estimated using a similar approach as for outdoor air. The ASTM RBCA mass-balance equation was modified to account for mixing within an indoor space. The Box Model was combined with a mass-balance approach to simulate the volatilization into indoor air and mixing with the indoor air. The mass-balance equation for indoor air is:

$$VF\ (kg/m^3) = \frac{W\ x\ L\ x\ \rho_s\ x\ d}{ER\ x\ W_B\ x\ L_B\ x\ H_B\ x\ \tau}\ x\ 10^3\ \frac{cm^3 - kg}{m^3 - g}$$

where:

VF = Solid waste to air volatilization factor (kg/m^3)
ρ_b = Dry soil bulk density (g/cm^3)
d = Lower depth of contamination (cm)
W = Width of source (cm)
L = Length of source (cm)
ER = Air exchange rate (sec^{-1})
W_B = Width of building (cm)
L_B = Length of building (cm)
H_B = Height of building (cm)
τ = Exposure interval (sec)

8.2 Air Concentration

The air concentration (C_a) is derived by multiplying the medium exposure point concentration (EPC) for solid waste by the VF. In addition, the air concentration is multiplied by the number of features present in a building (N) to account for accumulation of COPCs from multiple sources. The air concentration for current indoor air is multiplied by four since there are four features in the currently occupied building. The air concentration for future indoor air is multiplied by 100 to provide an upper bound

estimate on the number of features that could be present in a future building. EPCs for both the RME case and the CTE case are detailed in the RAGS Part D Tables 3.1 – 3.20 (Appendix A). The equation for the total C_a is:

$$C_a\ (mg/m^3) = EPC\ (mg/kg)\ x\ VF\ (kg/m^3)\ x\ N$$

The following spreadsheets within Attachments D-1 and D-2 show the derivation of air concentrations due to volatile emissions from solid waste to indoor air:

- Spreadsheet 37: solid waste in features volatilization to current indoor air; and
- Spreadsheet 38: solid waste in features volatilization to future indoor air.

9.0 VOLATILE EMISSIONS FROM LIQUID WASTE TO OUTDOOR AIR

9.1 Volatilization Factor

A mass balance approach similar to that used for solid wastes was used for liquid wastes as well. The mass-balance equation for liquid waste was used to provide an upper limit to the VF. The dimensions of a typical site feature are assumed to be one foot by two feet, with a depth of 2 feet. The mass-limit VF represents a time averaged emission when the entire volume of COPC volatilizes over the exposure period and mixes within a "box" the same dimensions as the emission area. The mass-limit VF equation is:

$$VF\ (L/m^3) = \frac{W\ x\ d}{U_{air}\ x\ \delta_{air}\ x\ \tau}\ x\ 10^{-3}\ \frac{L}{m^3}$$

where:

VF = Solid waste to air volatilization factor (L/m^3)
d = Lower depth of contamination (cm)
W = Width of source are parallel to wind direction
U_{air} = Wind speed in ambient mixing zone (cm/s)
δ_{air} = Ambient air mixing zone height (cm)
τ = Exposure interval (sec)

9.2 Air Concentration

The air concentration (C_a) is derived by multiplying the medium exposure point concentration (EPC) for liquid waste by the VF. EPCs for both the RME case and the CTE case are detailed in the RAGS Part D Tables 3.1 – 3.20 (Appendix A). The equation for C_a is:

$$C_a\ (mg/m^3) = EPC\ (ug/L)\ x\ VF\ (L/m^3)\ x\ 10^{-3}\ mg/ug$$

The following spreadsheet within Attachments D-1 and D-2 shows the derivation of air concentrations due to volatile emissions from liquid waste to outdoor air:

- Spreadsheet 39: liquid waste in features volatilization to outdoor air.

10.0 VOLATILE EMISSIONS FROM LIQUID WASTE TO INDOOR AIR

10.1 Volatilization Factor

Volatilization from liquid waste to indoor air was also estimated using a mass-balance equation modified to account for mixing within an indoor space. The mass-balance equation for indoor air is:

$$VF\ (L/m^3) = \frac{W\ x\ L\ x\ d}{ER\ x\ W_B\ x\ L_B\ x\ H_B\ x\ \tau}\ x\ 10^{-3}\ \frac{L}{m^3}$$

where:

VF = Solid waste to air volatilization factor (L/m^3)
d = Lower depth of contamination (cm)
W = Width of source (cm)
L = Length of source (cm)
ER = Air exchange rate (sec^{-1})
W_B = Width of building (cm)
L_B = Length of building (cm)
H_B = Height of building (cm)
τ = Exposure interval (sec)

10.2 Air Concentration

The air concentration (C_a) is derived by multiplying the medium exposure point concentration (EPC) for liquid waste by the VF. In addition, the air concentration is multiplied by the number of features present in a building (N) to account for accumulation of COPCs from multiple sources. The air concentration for future indoor air is multiplied by 100 to provide an upper bound estimate on the number of features that could be present in a future building. EPCs for both the RME case and the CTE case are detailed in the RAGS Part D Tables 3.1 – 3.20 (Appendix A). The equation for the total C_a is:

$$C_a\ (mg/m^3) = EPC\ (ug/L)\ x\ VF\ (kg/m^3)\ x\ N\ x\ 10^{-3}\ mg/ug$$

The following spreadsheet within Attachments D-1 and D-2 shows the derivation of air concentrations due to volatile emissions from liquid waste to indoor air:

- Spreadsheet 40: liquid waste in features volatilization to future indoor air.

11.0 VOLATILE EMISSIONS FROM MAGOTHY AQUIFER GROUNDWATER DURING TAP WATER USE

The volatilization of COPCs from tap water during bathing was evaluated using a unitless volatilization constant (K) presented in EPA's *Risk Assessment Guidance for Superfund: Volume I – Human Health Evaluation Manual (Part B: Development of Risk-Based Preliminary Remediation Goals)* (December, 1991) (RAGS Part B). The volatilization factor is based primarily on experimental data on the volatilization of radon from household uses of water. K was developed by Andelman (1990), and defines the relationship between the concentration of a COPC in household water and the average concentration of the volatilized COPC in air. The reader is referred to RAGS Part B or Andelman (1990) for a discussion of the derivation of K.

The air concentration (C_a) is derived by multiplying the medium exposure point concentration (EPC) for groundwater by K. EPCs for both the RME case and the CTE case are detailed in the RAGS Part D Tables 3.1 – 3.20 (Appendix A). The equation for the total C_a is:

$$C_a\ (mg/m^3) = EPC\ (ug/L)\ x\ K\ x\ 10^3\ L/m^3\ x\ 10^{-3}\ mg/ug$$

The following spreadsheet within Attachments D-1 and D-2 shows the derivation of air concentrations due to volatile emissions from groundwater during tap water use:

- Spreadsheet 41: Magothy Aquifer groundwater volatilization during tap water use.

12.0 REFERENCES

American Society for Testing and Materials (ASTM), 1995. "Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites." ASTM Designation E 1739-95. November, 1995.

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TABLE D-1
AIR MODELING APPROACHES USED FOR DERIVATION OF AIR CONCENTRATIONS
LIBERTY INDUSTRIAL FINISHING SITE

Exposure Pathway	Outdoor Air Modeling Approach	Indoor Air Modeling Approach
Particulate Emissions from Surface Soil (Western Parcel)	SSL Particulate Emissions Factor	NA
Particulate Emissions from Surface/Subsurface Soil (Western and Eastern Parcel)	SSL Particulate Emissions Factor	NA
Vapor Emissions from Surface and Subsurface Soil (Western and Eastern Parcel)	SSL Volatilization Factor/SSL Mass-Limit Volatilization Factor	J&E Tier II for Subsurface Soil Vapor Intrusion into Buildings
Particulate Emissions from Solid Waste in Features	SSL Particulate Emissions Factor	NA
Vapor Emissions from Solid Waste in Features	ASTM Mass-Limit Volatilization Factor for Surface Soil	Modified ASTM Mass-Limit Volatilization Factor for Surface Soil
Vapor Emissions from Liquid Waste in Features	TSDF Two-Phase Resistance Model/Mass-Limit Volatilization Factor	TSDF Two-Phase Resistance Model/Mass-Limit Volatilization Factor
Vapor Emissions from Groundwater in Upper Glacial Aquifer	ASTM Volatilization Factor for Groundwater to Ambient Air	J&E Tier II for Groundwater Vapor Intrusion into Buildings
Vapor Emmissions from Groundwater in Magothy Aquifer During Bathing	NA	RAGS Part B Volatilization Factor

NA = Not applicable
ASTM = ASTM, 1995. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites. E 1739-95.
J&E = EPA, 1997. User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings. OERR, September 1997.
SSL = EPA, 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95.
TSDF = EPA, 1989. Hazardous Waste Treatment, Storage and Disposal Facilities (TSDF) - Air Emissions Models. OAQPS, November 1989.

TABLE D-2
CHEMICAL/PHYSICAL PROPERTIES OF VOLATILE COPCS
LIBERTY INDUSTRIAL FINISHING SITE

CAS No.	Constituent	Organic carbon partition coefficient, Koc (cm3/g)	Diffusivity in air, Da (cm2/s)	Diffusivity in water, Dw (cm2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm-m3/mol)	Henry's law constant reference temperature, T_R (°C)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Enthalpy of vaporization at the normal boiling point, $\vartheta H_{v,b}$ (cal/mol)
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.05E-01	1.72E-02	2.50E+01	3.47E+02	5.45E+02	7.14E+03
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.74E-02	9.12E-04	2.50E+01	3.86E+02	6.02E+02	8.32E+03
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	2.50E+01	3.31E+02	5.23E+02	6.90E+03
75354	1,1-Dichloroethene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.61E-02	2.50E+01	3.05E+02	5.76E+02	6.25E+03
107062	1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.01E-02	9.78E-04	2.50E+01	3.57E+02	5.61E+02	7.64E+03
106467	1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.38E+01	9.96E-02	2.43E-03	2.50E+01	4.47E+02	6.85E+02	9.27E+03
208968	Acenaphthylene [1]	2.50E+03	8.30E-02	6.60E-06	1.00E+01	6.05E-02	1.48E-03	2.50E+01	5.43E+02	8.03E+02	1.22E+04
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.88E-05	2.50E+01	3.29E+02	5.08E+02	6.96E+03
120127	Anthracene	2.95E+04	3.24E-02	7.74E-06	4.34E-02	2.67E-03	6.51E-05	2.50E+01	6.15E+02	8.73E+02	1.31E+04
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.75E+03	2.28E-01	5.56E-03	2.50E+01	3.53E+02	5.62E+02	7.34E+03
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.56E-02	1.80E-03	2.50E+01	3.63E+02	5.86E+02	7.00E+03
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.25E+00	3.05E-02	2.50E+01	3.50E+02	5.57E+02	7.13E+03
108907	Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.52E-01	3.71E-03	2.50E+01	4.05E+02	6.32E+02	8.41E+03
75003	Chloroethane [2]	3.71E+02	1.27E-01	1.53E-06	5.74E+03	7.36E+01	1.80E+00	NA	NA	NA	NA
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	2.50E+01	3.34E+02	5.36E+02	6.99E+03
156592	cis-1,2-Dichloroethene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	2.50E+01	3.34E+02	5.44E+02	7.19E+03
124481	Dibromochloromethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.21E-02	7.83E-04	2.50E+01	4.16E+02	6.78E+02	8.00E+03
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.98E-02	2.19E-03	2.50E+01	3.13E+02	5.10E+02	6.71E+03
85018	Phenanthrene [2]	5.01E+04	3.33E-02	7.47E-06	1.28E+00	7.68E+00	1.88E-01	NA	NA	NA	NA
127184	Tetrachloroethene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.54E-01	1.84E-02	2.50E+01	3.94E+02	6.20E+02	8.29E+03
NA	TIC Concentration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
108883	Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.63E-03	2.50E+01	3.84E+02	5.92E+02	7.93E+03
156605	trans-1,2-Dichloroethene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.85E-01	9.39E-03	2.50E+01	3.21E+02	5.17E+02	6.72E+03
79016	Trichloroethene	1.66E+02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	1.03E-02	2.50E+01	3.60E+02	5.44E+02	7.51E+03
75014	Vinyl chloride	1.86E+01	1.06E-01	1.23E-06	2.76E+03	1.11E+00	2.71E-02	2.50E+01	2.59E+02	4.32E+02	5.25E+03

Notes:
Source of all parameters is EPA's "Johnson & Ettinger Model for Subsurface Vapor Intrusion into Buildings," (September, 1997), except where otherwise noted.
NA = Not available and not necessary for applicable modeling.
[1] Koc and H: EPA, 1986; Da: estimated; Dw and S: Montgomery, 1990; H': H/41; T_B: HSDB; T_C and ϑH: used acenapthene as a surrogate.
NOTE - epa 1988 IS sphem, Montgomery=Groundwater chem desk ref
[2] EPA, 1998.
Note -epa 1998=Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities.

TABLE D-2
CHEMICAL/PHYSICAL PROPERTIES OF VOLATILE COPCS
LIBERTY INDUSTRIAL FINISHING SITE

CAS No.	Constituent	Organic carbon partition coefficient, Koc (cm3/g)	Diffusivity in air, Da (cm2/s)	Diffusivity in water, Dw (cm2/s)	Pure component water solubility, S (mg/L)	Henry's law constant H' (unitless)	Henry's law constant at reference temperature, H (atm-m3/mol)	Henry's law constant reference temperature, T_R (°C)	Normal boiling point, T_B (°K)	Critical temperature, T_C (°K)	Enthalpy of vaporization at the normal boiling point, $\vartheta H_{v,b}$ (cal/mol)
71556	1,1,1-Trichloroethane	1.10E+02	7.80E-02	8.80E-06	1.33E+03	7.05E-01	1.72E-02	2.50E+01	3.47E+02	5.45E+02	7.14E+03
79005	1,1,2-Trichloroethane	5.01E+01	7.80E-02	8.80E-06	4.42E+03	3.74E-02	9.12E-04	2.50E+01	3.86E+02	6.02E+02	8.32E+03
75343	1,1-Dichloroethane	3.16E+01	7.42E-02	1.05E-05	5.06E+03	2.30E-01	5.61E-03	2.50E+01	3.31E+02	5.23E+02	6.90E+03
75354	1,1-Dichloroethene	5.89E+01	9.00E-02	1.04E-05	2.25E+03	1.07E+00	2.61E-02	2.50E+01	3.05E+02	5.76E+02	6.25E+03
107062	1,2-Dichloroethane	1.74E+01	1.04E-01	9.90E-06	8.52E+03	4.01E-02	9.78E-04	2.50E+01	3.57E+02	5.61E+02	7.64E+03
106467	1,4-Dichlorobenzene	6.17E+02	6.90E-02	7.90E-06	7.38E+01	9.96E-02	2.43E-03	2.50E+01	4.47E+02	6.85E+02	9.27E+03
208968	Acenaphthylene [1]	2.50E+03	8.30E-02	6.60E-06	1.00E+01	6.05E-02	1.48E-03	2.50E+01	5.43E+02	8.03E+02	1.22E+04
67641	Acetone	5.75E-01	1.24E-01	1.14E-05	1.00E+06	1.59E-03	3.88E-05	2.50E+01	3.29E+02	5.08E+02	6.96E+03
120127	Anthracene	2.95E+04	3.24E-02	7.74E-06	4.34E-02	2.67E-03	6.51E-05	2.50E+01	6.15E+02	8.73E+02	1.31E+04
71432	Benzene	5.89E+01	8.80E-02	9.80E-06	1.75E+03	2.28E-01	5.56E-03	2.50E+01	3.53E+02	5.62E+02	7.34E+03
75274	Bromodichloromethane	5.50E+01	2.98E-02	1.06E-05	6.74E+03	6.56E-02	1.60E-03	2.50E+01	3.63E+02	5.86E+02	7.00E+03
56235	Carbon tetrachloride	1.74E+02	7.80E-02	8.80E-06	7.93E+02	1.25E+00	3.05E-02	2.50E+01	3.50E+02	5.57E+02	7.13E+03
108907	Chlorobenzene	2.19E+02	7.30E-02	8.70E-06	4.72E+02	1.52E-01	3.71E-03	2.50E+01	4.05E+02	6.32E+02	8.41E+03
75003	Chloroethane [2]	3.71E+02	1.27E-01	1.53E-06	5.74E+03	7.36E+01	1.80E+00	NA	NA	NA	NA
67663	Chloroform	3.98E+01	1.04E-01	1.00E-05	7.92E+03	1.50E-01	3.66E-03	2.50E+01	3.34E+02	5.36E+02	6.99E+03
156592	cis-1,2-Dichloroethene	3.55E+01	7.36E-02	1.13E-05	3.50E+03	1.67E-01	4.07E-03	2.50E+01	3.34E+02	5.44E+02	7.19E+03
124481	Dibromochloromethane	6.31E+01	1.96E-02	1.05E-05	2.60E+03	3.21E-02	7.83E-04	2.50E+01	4.16E+02	6.78E+02	8.00E+03
75092	Methylene chloride	1.17E+01	1.01E-01	1.17E-05	1.30E+04	8.98E-02	2.19E-03	2.50E+01	3.13E+02	5.10E+02	6.71E+03
85018	Phenanthrene [2]	5.01E+04	3.33E-02	7.47E-06	1.28E+00	7.68E+00	1.88E-01	NA	NA	NA	NA
127184	Tetrachloroethene	1.55E+02	7.20E-02	8.20E-06	2.00E+02	7.54E-01	1.84E-02	2.50E+01	3.94E+02	6.20E+02	8.29E+03
NA	TIC Concentration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
108883	Toluene	1.82E+02	8.70E-02	8.60E-06	5.26E+02	2.72E-01	6.63E-03	2.50E+01	3.84E+02	5.92E+02	7.93E+03
156605	trans-1,2-Dichloroethene	5.25E+01	7.07E-02	1.19E-05	6.30E+03	3.85E-01	9.39E-03	2.50E+01	3.21E+02	5.17E+02	6.72E+03
79016	Trichloroethene	1.66E+02	7.90E-02	9.10E-06	1.10E+03	4.22E-01	1.03E-02	2.50E+01	3.60E+02	5.44E+02	7.51E+03
75014	Vinyl chloride	1.86E+01	1.06E-01	1.23E-06	2.76E+03	1.11E+00	2.71E-02	2.50E+01	2.59E+02	4.32E+02	5.25E+03

Notes:
Source of all parameters is EPA's "Johnson & Ettinger Model for Subsurface Vapor Intrusion into Buildings," (September, 1997), except where otherwise noted.
NA = Not available and not necessary for applicable modeling.
[1] Koc and H: EPA, 1986; Da: estimated; Dw and S: Montgomery, 1990; H': H/41; T_B: HSDB; T_C and ϑH: used acenapthene as a surrogate.
NOTE - epa 1986 IS sphem, Montgomery=Groundwater chem desk ref
[2] EPA, 1998.
Note -epa 1998=Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities.

TABLE D-3
VOLATILE AND PARTICULATE EMISSIONS MODELING INPUTS
LIBERTY INDUSTRIAL FINISING SITE

General Site Parameters	Code	Value Used	Units	Reference
Western Parcel				
Acreage	---	12	acres	Site-specific
Average Depth to Soil Contamination	L_t or L_s	15	cm	Assumed to be near surface
Average Depth to Bottom of Soil Contamination	L_b or d_S	228	cm	Site-specific
Fraction of Current Vegetative Cover	V	0	unitless	Site-specific
Fraction of Future Vegetative Cover (recreation, comm/ind)	V	0.5	unitless	SSL
Fraction of Future Vegetative Cover (construction)	V	0	unitless	Assumed to be bare soil during construction
Eastern Parcel				
Acreage	---	18	acres	Site-specific
Average Depth to Soil Contamination	L_t or L_s	15	cm	Assumed to be near surface
Average Depth to Bottom of Soil Contamination	L_b or d	152	cm	Site-specific
Fraction of Future Vegetative Cover (comm/ind)	V	0.5	unitless	SSL
Fraction of Future Vegetative Cover (construction)	V	0	unitless	Assumed to be bare soil during construction
Features				
Typical Length of Features	L	30	cm	Site-specific typical value
Typical Width of Features	W	60	cm	Site-specific typical value
Average Depth to Bottom of Solid Waste	L_b or d	60	cm	Site-specific typical value
Fraction of Future Vegetative Cover (comm/ind)	V	0.5	unitless	SSL
Fraction of Future Vegetative Cover (construction)	V	0	unitless	Assumed to be bare soil during construction
Construction Excavation				
Width of Construction Excavation	W	1441	cm	Same as commercial/industrial building width
Depth of Construction Excavation	d	300	cm	Depth needed for building with basesment
Wind				
Wind Speed for RBCA analysis	U_{air}	225	cm/sec	ASTM
Wind Speed for SSL analysis	U_m	4.69	m/s	SSL
Equivalent threshold windspeed at 7 meters	U_t	11.32	m/s	SSL
Function Dependent on U_m/U_t	F(x)	0.194	unitless	SSL
Inverse of Conc. at Center of Source	Q/C	54.5	g/m^2-s per kg/m^3	SSL (10 acres/Philadelphia)
Mixing Height	δ_{air}	200	cm	ASTM
Prevailing Wind Direction	---	NW	---	Site-specific
Averaging Times				
Emission Rate Averaging Time (Trespassers)	τ	9	years	Same as exposure duration
Emission Rate Averaging Time (Workers)	τ	25	years	Same as exposure duration
Emission Rate Averaging Time (Construction)	τ	1	years	Same as exposure duration
Emission Rate Averaging Time (Recreational User)	τ	13	years	Same as exposure duration

TABLE D-3
VOLATILE AND PARTICULATE EMISSIONS MODELING INPUTS
LIBERTY INDUSTRIAL FINISING SITE

Building Parameters	Code	Value Used	Units	Reference
Currently Occupied Onsite Building				
Length	L_B	15240	cm	Site-specific
Width	W_B	3658	cm	Site-specific
Height	H_B	610	cm	Site-specific
Depth to Bottom of Foundation	L_F	23	cm	Site-specific
Foundation Thickness	L_{crack}	23	cm	Site-specific
Air exchange Rate	ER	0.83	1/hour	ASTM
Floor to Wall Seam Crack Width	w	0.1	cm	J&E
Pressure differential	ΔP	40	g/cm-s^2	J&E
Future Commercial/Industrial Building & School				
Length	L_B	1441	cm	3/2 x residential default (ASTM)
Width	W_B	1441	cm	3/2 x residential default (ASTM)
Height	H_B	633	cm	3/2 x residential default (ASTM)
Depth to Bottom of Foundation (Comm/Ind)	L_F	15	cm	J&E (no basement)
Depth to Bottom of Foundation (School)	L_F	200	cm	J&E (basement)
Foundation Thickness	L_{crack}	15	cm	J&E
Air exchange Rate	ER	0.83	1/hour	ASTM
Floor to Wall Seam Crack Width	w	0.1	cm	J&E
Pressure differential	ΔP	40	g/cm-s^2	J&E
Residential Structure				
Length	L_B	961	cm	J&E
Width	W_B	961	cm	J&E
Height	H_B	488	cm	J&E
Depth to Bottom of Foundation	L_F	200	cm	J&E (basement)
Foundation Thickness	L_{crack}	15	cm	J&E
Air exchange Rate	ER	0.45	1/hour	J&E
Floor to Wall Seam Crack Width	w	0.1	cm	J&E
Pressure differential	ΔP	40	g/cm-s^2	J&E

TABLE D-3
VOLATILE AND PARTICULATE EMISSIONS MODELING INPUTS
LIBERTY INDUSTRIAL FINISING SITE

Soil Parameters	Code	Value Used	Units	Reference
Soil Particle Density	ρ_s	2.65	kg/l	SSL
Thickness of Capillary Fringe	h_{cap}	5	cm	ASTM
Volumetric Air Content in Capillary Fringe	θ_{acap}	0.043	cm^3/cm^3	10% of site-specific porosity
Volumetric Water Content	θ_{wcap}	0.387	cm^3/cm^3	90% of site-specific porosity
Soil Stratum 1 (at Surface)				
Thickness Onsite for Groundwater Evaluation	h_A	30	cm	Site-specific average
Thickness Offsite for Groundwater Evaluation	h_A	0	cm	Stratum not relevant (basement assumed)
Thickness Onsite for Soil Evaluation	h_A	15	cm	Top of contamination
SCS Soil Type	---	LS	---	Site-specific
Saturated Hydraulic Conductivity	K_s^A	540	m/yr	SSL
Dry Soil Bulk Density	ρ_b^A	1.5	g/cm^3	SSL
Fraction Organic Content	f_{oc}^A	0.03	g/g	Site-specific
Total Porosity	n^A	0.43	cm^3/cm^3	$1-(\rho_b/\rho_s)$
Volumetric Air Content	θ_a^A	0.19	cm^3/cm^3	$n\theta_w$
Volumetric Water Content	θ_w^A	0.24	cm^3/cm^3	$n(I/K_s)^{1/(2b+3)}$
Soil Stratum 2				
Thickness Onsite for Groundwater Evaluation	h_B	518	cm	Site-specific average
Thickness Offsite for Groundwater Evaluation	h_B	305	cm	Depth to groundwater
Thickness Onsite for Soil Evaluation	h_B	0	cm	Stratum starts below top of contamination
SCS Soil Type	---	S	---	Site-specific
Saturated Hydraulic Conductivity	K_s^B	1830	m/yr	SSL
Dry Soil Bulk Density	ρ_b^B	1.5	g/cm^3	SSL
Fraction Organic Content	f_{oc}^B	0.0022	g/g	Site-specific
Total Porosity	n^B	0.43	cm3/cm3	$1-(\rho_b/\rho_s)$
Volumetric Air Content	θ_a^B	0.226	cm3/cm3	$n\theta_w$
Volumetric Water Content	θ_w^B	0.208	cm3/cm3	$n(I/Ks)^{1/(2b+3)}$

TABLE D-3
VOLATILE AND PARTICULATE EMISSIONS MODELING INPUTS
LIBERTY INDUSTRIAL FINISING SITE

Groundwater Parameters	Code	Value Used	Units	Reference
Average Temperature of Shallow Groundwater	T_S	11	degrees K	J&E
Recharge Rate (Infiltration Rate)	I	0.52	m/year	Peterson
Onsite				
Average Depth to Groundwater	L_{gw} or L_{WT}	548	cm	Site-specific
Width of Plume Parallel to Flow	W	12192	cm	Site-specific
Thickness of Vadose Zone	h_v	543	cm	L_{gw} - h_{cap}
Offsite				
Average Depth to Groundwater	L_{gw} or L_{WT}	305	cm	Site-specific
Width of Plume Parallel to Flow	W	12192	cm	Site-specific
Thickness of Vadose Zone	h_v	300	cm	L_{gw} - h_{cap}

References:

ASTM = ASTM, 1995. Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites. E 1739-95.
J&E = EPA, 1997. User's Guide for the Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings. OERR, September 1997.
SSL = EPA, 1996. Soil Screening Guidance: Technical Background Document. EPA/540/R-95.
Peterson = Peterson, D.S., 1987. Ground-Water Recharge Rates in Nassau and Suffolk Counties, New York, USGS, Water Resources Investigation 86-4181.

SPREADSHEET 1: PARTICULATES FROM WESTERN PARCEL SURFACE SOIL - May 2000

FATE AND TRANSPORT PARAMETERS

Parameter	Symbol	Units	Value Used
Function Dependent on U_m/U_t	F(x)	unitless	0.194
Inverse of the Mean Concentration at Source:	Q/C	$(g/m^2\text{-sec})/(kg/m^3)$	54.5
Equivalent Threshold Windspeed at 7 meters	U_t	m/sec	11.32
Mean Annual Windspeed	U_m	m/sec	4.69
Fraction of Vegetative Cover			
Trespassers	V	unitless	0
Commercial/Industrial Workers	V	unitless	0.5
Construction Workers	V	unitless	0
Recreational Users	V	unitless	0.5

SPREADSHEET 1: PARTICULATES FROM WESTERN PARCEL SURFACE SOIL - May 2000

PARTICULATE EMISSIONS AND AIR CONCENTRATIONS

Chemical	Soil Medium Exposure Concentration (mg/kg)	Particulates from Surface Soil	
		Particulate Emission Factor for Trespassers [m^3/kg]	Air Concentration for Trespassers [mg/m^3]
Aluminum	4.02E+04	3.95E+08	1.02E-04
Antimony	4.25E+01	3.95E+08	1.08E-07
Arsenic	1.73E+01	3.95E+08	4.38E-08
Cadmium	2.04E+02	3.95E+08	5.16E-07
Chromium III	1.61E+03	3.95E+08	4.07E-06
Chromium VI	5.36E+02	3.95E+08	1.36E-06
Copper	3.35E+03	3.95E+08	8.47E-06
Cyanide	2.43E+02	3.95E+08	6.15E-07
Lead	2.71E+02	3.95E+08	6.86E-07
Nickel	9.96E+01	3.95E+08	2.52E-07
Thallium	6.30E-01	3.95E+08	1.59E-09
Zinc	7.50E+03	3.95E+08	1.90E-05
Aroclor-1254	9.90E-01	3.95E+08	2.51E-09
Aroclor-1260	4.40E-01	3.95E+08	1.11E-09
Tetrachloroethene	1.54E-01	3.95E+08	3.90E-10

SPREADSHEET 2: PARTICULATES FROM WESTERN PARCEL SURFACE & SUBSURFACE SOIL - May 2000

FATE AND TRANSPORT PARAMETERS

Parameter	Symbol	Units	Value Used
Function Dependent on U_m/U_t	F(x)	unitless	0.194
Inverse of the Mean Concentration at Source:	Q/C	$(g/m^2\text{-sec})/(kg/m^3)$	54.5
Equivalent Threshold Windspeed at 7 meters	U_t	m/sec	11.32
Mean Annual Windspeed	U_m	m/sec	4.69
Fraction of Vegetative Cover			
Trespassers	V	unitless	0
Commercial/Industrial Workers	V	unitless	0.5
Construction Workers	V	unitless	0
Recreational Users	V	unitless	0.5

SPREADSHEET 2: PARTICULATES FROM WESTERN PARCEL SURFACE & SUBSURFACE SOIL - May 2000

PARTICULATE EMISSIONS AND AIR CONCENTRATIONS

Chemical	Soil Medium Exposure Concentration (mg/kg)	Particulates from Surface Soil					
		Particulate Emission Factor for Commercial Workers [m^3/kg]	Air Concentration for Commercial Workers [mg/m^3]	Particulate Emission Factor for Construction Workers [m^3/kg]	Air Concentration for Construction Workers [mg/m^3]	Particulate Emission Factor for Recreational Users [m^3/kg]	Air Concentration for Recreational Users [mg/m^3]
Aluminum	8.46E+03	7.90E+08	1.07E-05	3.95E+08	2.14E-05	7.90E+08	1.07E-05
Antimony	5.94E+00	7.90E+08	7.51E-09	3.95E+08	1.50E-08	7.90E+08	7.51E-09
Arsenic	5.06E+00	7.90E+08	6.41E-09	3.95E+08	1.28E-08	7.90E+08	6.41E-09
Cadmium	2.98E+01	7.90E+08	3.78E-08	3.95E+08	7.55E-08	7.90E+08	3.78E-08
Chromium III	5.40E+02	7.90E+08	6.84E-07	3.95E+08	1.37E-06	7.90E+08	6.84E-07
Chromium VI	1.56E+02	7.90E+08	1.97E-07	3.95E+08	3.95E-07	7.90E+08	1.97E-07
Copper	7.33E+02	7.90E+08	9.28E-07	3.95E+08	1.86E-06	7.90E+08	9.28E-07
Cyanide	7.77E+01	7.90E+08	9.83E-08	3.95E+08	1.97E-07	7.90E+08	9.83E-08
Lead	1.45E+02	7.90E+08	1.83E-07	3.95E+08	3.67E-07	7.90E+08	1.83E-07
Mercury	1.80E-01	7.90E+08	2.28E-10	3.95E+08	4.56E-10	7.90E+08	2.28E-10
Nickel	9.32E+01	7.90E+08	1.18E-07	3.95E+08	2.36E-07	7.90E+08	1.18E-07
Silver	1.43E+00	7.90E+08	1.81E-09	3.95E+08	3.62E-09	7.90E+08	1.81E-09
Zinc	1.47E+03	7.90E+08	1.86E-06	3.95E+08	3.72E-06	7.90E+08	1.86E-06
Aroclor-1248	1.91E-01	7.90E+08	2.41E-10	3.95E+08	4.83E-10	7.90E+08	2.41E-10
Aroclor-1254	2.02E+00	7.90E+08	2.55E-09	3.95E+08	5.11E-09	7.90E+08	2.55E-09
Aroclor-1260	5.36E-01	7.90E+08	6.78E-10	3.95E+08	1.36E-09	7.90E+08	6.78E-10
Benzo(a)pyrene	2.38E-01	7.90E+08	3.01E-10	3.95E+08	6.03E-10	7.90E+08	3.01E-10
Tetrachloroethene	1.97E-02	7.90E+08	2.50E-11	3.95E+08	5.00E-11	7.90E+08	2.50E-11

SPREADSHEET 3: PARTICULATES FROM EASTERN PARCEL SURFACE & SUBSURFACE SOIL - May 2000

FATE AND TRANSPORT PARAMETERS

Parameter	Symbol	Units	Value Used
Function Dependent on U_m/U_t	F(x)	unitless	0.194
Inverse of the Mean Concentration at Source:	Q/C	$(g/m^2\text{-sec})/(kg/m^3)$	54.5
Equivalent Threshold Windspeed at 7 meters	U_t	m/sec	11.32
Mean Annual Windspeed	U_m	m/sec	4.69
Fraction of Vegetative Cover			
Trespassers	V	unitless	0
Commercial/Industrial Workers	V	unitless	0.5
Construction Workers	V	unitless	0
Recreational Users	V	unitless	0.5

SPREADSHEET 3: PARTICULATES FROM EASTERN PARCEL SURFACE & SUBSURFACE SOIL - May 2000

PARTICULATE EMISSIONS AND AIR CONCENTRATIONS

Chemical	Soil Medium Exposure Concentration (mg/kg)	Particulates from Surface Soil			
		Particulate Emission Factor for Commercial Workers [m^3/kg]	Air Concentration for Commercial Workers [mg/m^3]	Particulate Emission Factor for Construction Workers [m^3/kg]	Air Concentration for Construction Workers [mg/m^3]
Antimony	3.03E+00	7.90E+08	3.84E-09	3.95E+08	7.67E-09
Arsenic	1.93E+00	7.90E+08	2.45E-09	3.95E+08	4.90E-09
Cadmium	1.34E+01	7.90E+08	1.70E-08	3.95E+08	3.39E-08
Chromium III	6.57E+01	7.90E+08	8.32E-08	3.95E+08	1.66E-07
Chromium VI	2.16E+01	7.90E+08	2.74E-08	3.95E+08	5.48E-08
Copper	6.03E+01	7.90E+08	7.63E-08	3.95E+08	1.53E-07
Cyanide	1.65E+01	7.90E+08	2.08E-08	3.95E+08	4.17E-08
Iron	0.00E+00	7.90E+08	0.00E+00	3.95E+08	0.00E+00
Lead	6.34E+01	7.90E+08	8.02E-08	3.95E+08	1.60E-07
Mercury	1.40E-01	7.90E+08	1.77E-10	3.95E+08	3.54E-10
Nickel	1.48E+01	7.90E+08	1.87E-08	3.95E+08	3.74E-08
Vanadium	8.73E+00	7.90E+08	1.11E-08	3.95E+08	2.21E-08
Zinc	1.12E+02	7.90E+08	1.42E-07	3.95E+08	2.85E-07
Benzo(a)pyrene	6.50E-01	7.90E+08	8.23E-10	3.95E+08	1.65E-09
Benzo(b)fluoranthene	7.10E-01	7.90E+08	8.99E-10	3.95E+08	1.80E-09
Dibenz(a,h)anthracene	1.00E-01	7.90E+08	1.27E-10	3.95E+08	2.53E-10
1,2-Dichloroethene (total)	2.26E-02	7.90E+08	2.86E-11	3.95E+08	5.72E-11
TICs (volatile)	0.00E+00	7.90E+08	0.00E+00	3.95E+08	0.00E+00
Trichloroethene	1.06E-01	7.90E+08	1.34E-10	3.95E+08	2.69E-10

SPREADSHEET 4: PARTICULATES FROM SOLID WASTE - May 2000

FATE AND TRANSPORT PARAMETERS

Parameter	Symbol	Units	Value Used
Function Dependent on U_m/U_t	F(x)	unitless	0.194
Inverse of the Mean Concentration at Source:	Q/C	$(g/m^2\text{-sec})/(kg/m^3)$	54.5
Equivalent Threshold Windspeed at 7 meters	U_t	m/sec	11.32
Mean Annual Windspeed	U_m	m/sec	4.69
Fraction of Vegetative Cover			
Trespassers	V	unitless	0
Commercial/Industrial Workers	V	unitless	0.5
Construction Workers	V	unitless	0
Recreational Users	V	unitless	0.5

SPREADSHEET 4: PARTICULATES FROM SOLID WASTE - May 2000

PARTICULATE EMISSIONS AND AIR CONCENTRATIONS

Chemical	Medium Exposure Concentration (mg/kg)	Particulates from Surface	
		Particulate Emission Factor for Construction Workers [m^3/kg]	Air Concentration for Construction Workers [mg/m^3]
Aluminum	1.14E+05	3.95E+08	2.89E-04
Antimony	1.53E+01	3.95E+08	3.88E-08
Arsenic	2.25E+01	3.95E+08	5.70E-08
Barium	4.88E+02	3.95E+08	1.23E-06
Cadmium	2.88E+01	3.95E+08	7.29E-08
Chromium III	8.46E+02	3.95E+08	2.14E-06
Chromium VI	8.46E+02	3.95E+08	2.14E-06
Copper	1.19E+04	3.95E+08	3.02E-05
Iron	0.00E+00	3.95E+08	0.00E+00
Lead	6.92E+02	3.95E+08	1.75E-06
Mercury	1.92E+00	3.95E+08	4.86E-09
Nickel	1.73E+02	3.95E+08	4.39E-07
Thallium	6.80E-01	3.95E+08	1.72E-09
Vanadium	1.31E+02	3.95E+08	3.33E-07
Zinc	3.83E+03	3.95E+08	9.69E-06
4,4'-DDD	1.93E+01	3.95E+08	4.90E-08
4,4'-DDE	4.17E+00	3.95E+08	1.06E-08
4,4'-DDT	5.00E+00	3.95E+08	1.27E-08
Aroclor-1248	2.17E-01	3.95E+08	5.49E-10
Aroclor-1254	1.03E+00	3.95E+08	2.60E-09
Aroclor-1260	1.02E+00	3.95E+08	2.57E-09

SPREADSHEET 4: PARTICULATES FROM SOLID WASTE - May 2000

PARTICULATE EMISSIONS AND AIR CONCENTRATIONS

Chemical	Medium Exposure Concentration (mg/kg)	Particulates from Surface	
		Particulate Emission Factor for Construction Workers [m^3/kg]	Air Concentration for Construction Workers [mg/m^3]
Dieldrin	3.46E-02	3.95E+08	8.75E-11
Benzo(a)anthracene	2.50E+02	3.95E+08	6.33E-07
Benzo(a)pyrene	1.60E+02	3.95E+08	4.05E-07
Benzo(b)fluoranthene	2.70E+02	3.95E+08	6.84E-07
Benzo(g,h,i)perylene	0.00E+00	3.95E+08	0.00E+00
Benzo(k)fluoranthene	1.00E+02	3.95E+08	2.53E-07
bis(2-Ethylhexyl)phthalate	1.79E+03	3.95E+08	4.52E-06
Carbazole	5.20E+01	3.95E+08	1.32E-07
Chrysene	2.50E+02	3.95E+08	6.33E-07
Di-n-octyl phthalate	4.43E+02	3.95E+08	1.12E-06
Dibenz(a,h)anthracene	2.60E+01	3.95E+08	6.58E-08
Fluoranthene	6.50E+02	3.95E+08	1.65E-06
Indeno(1,2,3-cd)pyrene	9.40E+01	3.95E+08	2.38E-07
Phenanthrene	4.90E+02	3.95E+08	1.24E-06
Pyrene	5.00E+02	3.95E+08	1.27E-06

SPREADSHEET 5: PARTICULATES FROM WESTERN PARCEL SURFACE & SUBSURFACE SOIL - May 2000

FATE AND TRANSPORT PARAMETERS

Parameter	Symbol	Units	Value Used
Function Dependent on U_m/U_t	F(x)	unitless	0.194
Inverse of the Mean Concentration at Source:	Q/C	$(g/m^2\text{-sec})/(kg/m^3)$	54.5
Equivalent Threshold Windspeed at 7 meters	U_t	m/sec	11.32
Mean Annual Windspeed	U_m	m/sec	4.69
Fraction of Vegetative Cover			
Trespassers	V	unitless	0
Commercial/Industrial Workers	V	unitless	0.5
Construction Workers	V	unitless	0
Recreational Users	V	unitless	0.5

SPREADSHEET 5: PARTICULATES FROM ELLSWORTH ALLEN PARK SUBSURFACE SOIL - May 2000

PARTICULATE EMISSIONS AND AIR CONCENTRATIONS

Chemical	Soil Medium Exposure Concentration (mg/kg)	Particulate Emission Factor for Recreational Users [m^3/kg]	Air Concentration for Recreational Users [mg/m^3]
Chromium IIII	2.04E+01	7.90E+08	2.59E-08
Chromium VI	6.81E+00	7.90E+08	8.62E-09
Iron	0.00E+00	7.90E+08	0.00E+00

SPREADSHEET 6: VOLATILIZATION FROM WESTERN PARCEL - May 2000

FATE AND TRANSPORT PARAMETERS

Parameter	Symbol	Units	Value Used
Dry Bulk Density	ρ_b	g/cm^3	1.5
Fraction Organic Carbon	f_{oc}	g-C/g-soil	0.0022
Total Soil Porosity	θ_T	cm^3/cm^3	0.43
Volumetric Air Content	θ_a	cm^3/cm^3	0.23
Volumetric Water Content	θ_ω	cm^3/cm^3	0.21
Inverse of Concentration at Center of Source	Q/C	g/m^2-s per kg/m^3	54.5
Emission Rate Averaging Time (Trespassers)	τ	years	9
Emission Rate Averaging Time (Workers)	τ	years	25
Emission Rate Averaging Time (Construction)	τ	years	1
Emission Rate Averaging Time (Recreational User)	τ	years	13
Average Depth to Bottom of Soil Contamination	d_s	cm	228

SPREADSHEET 6: VOLATILIZATION FROM WESTERN PARCEL - May 2000

ESTIMATED CHEMICAL PARAMETERS

Chemical	Henry's Dimensionless Constant	Soil Water Sorption Coefficient (K_d) [L/kg]	Effective Diffusion Coefficient in Soil (D_A) [cm^2/sec]
Tetrachloroethene	7.54E-01	3.41E-01	4.07E-04
TICs (volatile)	NA	NA	NA
Toluene	2.72E-01	4.00E-01	1.78E-04
Trichloroethene	4.22E-01	3.65E-01	2.50E-04

SPREADSHEET 6: VOLATILIZATION FROM WESTERN PARCEL - May 2000

SUBSURFACE SOIL VOLATILIZATION

Chemical	Soil Medium Exposure Concentration (mg/kg)	Ambient Vapor From Subsurface Soil							
		Volatilization Factor for Trespassers [m^3/kg]	Air Concentration for Trespassers [mg/m^3]	Volatilization Factor for Commercial Workers [m^3/kg]	Air Concentration for Commercial Workers [mg/m^3]	Volatilization Factor for Construction Workers [m^3/kg]	Air Concentration for Construction Workers [mg/m^3]	Volatilization Factor for Recreational Users [m^3/kg]	Air Concentration for Recreational Users [mg/m^3]
Tetrachloroethene	1.97E-02	4.79E-01	4.12E-02	7.98E-01	2.47E-02	1.60E-01	1.24E-01	5.76E-01	3.43E-02
Toluene	3.68E-02	7.25E-01	5.08E-02	1.21E+00	3.05E-02	2.42E-01	1.52E-01	8.71E-01	4.22E-02
Trichloroethene	3.19E-02	6.11E-01	5.22E-02	1.02E+00	3.13E-02	2.04E-01	1.57E-01	7.34E-01	4.34E-02

SPREADSHEET 6: VOLATILIZATION FROM W

SUBSURFACE SOIL VOLATILIZATION

Chemical	Soil Medium Exposure Concentration (mg/kg)	Mass-Limit for Ambient Vapor from Subsurface Soil							
		Volatilization Factor for Trespassers [m^3/kg]	Air Concentration for Trespassers [mg/m^3]	Volatilization Factor for Commercial Workers [m^3/kg]	Air Concentration for Commercial Workers [mg/m^3]	Volatilization Factor for Construction Workers [m^3/kg]	Air Concentration for Construction Workers [mg/m^3]	Volatilization Factor for Recreational Users [m^3/kg]	Air Concentration for Recreational Users [mg/m^3]
Tetrachloroethene	1.97E-02	4.52E+01	4.37E-04	1.25E+02	1.57E-04	5.02E+00	3.93E-03	6.53E+01	3.03E-04
Toluene	3.68E-02	4.52E+01	8.15E-04	1.25E+02	2.93E-04	5.02E+00	7.33E-03	6.53E+01	5.64E-04
Trichloroethene	3.19E-02	4.52E+01	7.06E-04	1.25E+02	2.54E-04	5.02E+00	6.35E-03	6.53E+01	4.89E-04

SPREADSHEET 7: VOLATILIZATION FROM EASTERN PARCEL - May 2000

FATE AND TRANSPORT PARAMETERS

Parameter	Symbol	Units	Value Used
Dry Bulk Density	ρ_b	g/cm^3	1.5
Fraction Organic Carbon	foc	g-C/g-soil	0.0022
Total Soil Porosity	θ_T	cm^3/cm^3	0.43
Volumetric Air Content	θ_a	cm^3/cm^3	0.23
Volumetric Water Content	$\theta\omega$	cm^3/cm^3	0.21
Inverse of Concentration at Center of Source	Q/C	g/m^2-s per kg/m^3	54.5
Emission Rate Averaging Time (Workers)	τ	years	25
Emission Rate Averaging Time (Construction)	τ	years	1
Average Depth to Bottom of Soil Contamination	d_s	cm	152

SPREADSHEET 7: VOLATILIZATION FROM EASTERN PARCEL - May 2000

ESTIMATED CHEMICAL PARAMETERS

Chemical	Henry's Dimensionless Constant	Soil Water Sorption Coefficient (K_d) [L/kg]	Effective Diffusion Coefficient in Soil (D_A) [cm^2/sec]
cis-1,2-Dichloroethene	1.67E-01	7.81E-02	9.30E-05
TICs (volatile)	NA	NA	NA
Trichloroethene	4.22E-01	3.65E-01	2.50E-04

SPREADSHEET 7: VOLATILIZATION FROM EASTERN PARCEL - May 2000

SUBSURFACE SOIL VOLATILIZATION

Chemical	Soil Medium Exposure Concentration (mg/kg)	Ambient Vapor From Subsurface Soil				Mass-Limit for Ambient Vapor from Subsurface Soil			
		Volatilization Factor for Commercial Workers [m^3/kg]	Air Concentration for Commercial Workers [mg/m^3]	Volatilization Factor for Construction Workers [m^3/kg]	Air Concentration for Construction Workers [mg/m^3]	Volatilization Factor for Commercial Workers [m^3/kg]	Air Concentration for Commercial Workers [mg/m^3]	Volatilization Factor for Construction Workers [m^3/kg]	Air Concentration for Construction Workers [mg/m^3]
cis-1,2-Dichloroethene	2.26E-02	1.67E+00	1.35E-02	3.34E-01	6.76E-02	1.88E+02	1.20E-04	7.53E+00	3.00E-03
Trichloroethene	1.06E-01	1.02E+00	1.04E-01	2.04E-01	5.21E-01	1.88E+02	5.64E-04	7.53E+00	1.41E-02

DATA ENTRY SHEET

SPREADSHEET 8: WESTERN PARCEL SOIL TO INDOOR AIR COMMERCIAL/INDUSTRIAL - May 2000

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
79016	3.19E+01	Trichloroethylene

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	15	15	228	15	0	0	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm³/cm³)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.24	0.03	0	0	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
7.88E+08	1	0.190	0.000	0.000	0.491	5.42E-08	0.493	2.67E-08	5,764	31.9	3.03E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.08E+06	2.78E-04	15	8,544	5.06E-03	2.17E-01	1.76E-04	1.70E-03	0.00E+00	0.00E+00	1.70E-03	1	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
4.98E+00	1.34E+03	0.10	3.86E+01	1.70E-03	5.76E+02	1.34E+257	NA	NA	9.23E+01	4.75E-05	8.91E+08	NO

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
8.10E-05	NA	8.17E-02	8.17E-02	1.7E-06	NA

DATA ENTRY SHEET

SPREADSHEET 9: WESTERN PARCEL SOIL TO INDOOR AIR COMMERCIAL/INDUSTRIAL - May 2000

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
127184	1.97E+01	Tetrachloroethylene

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	15	15	228	15	0	0	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.24	0.03	0	0	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
7.88E+08	1	0.190	0.000	0.000	0.491	5.42E-08	0.493	2.67E-08	5,764	19.7	3.03E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.08E+06	2.78E-04	15	9,543	8.32E-03	3.57E-01	1.76E-04	1.55E-03	0.00E+00	0.00E+00	1.55E-03	1	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
4.65E+00	1.45E+03	0.10	3.86E+01	1.55E-03	5.76E+02	1.80E+282	NA	NA	8.41E+01	7.57E-05	5.36E+08	YES

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(µg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	5.47E-02	NA	5.47E-02	5.7E-07	6.0E-01

DATA ENTRY SHEET

SPREADSHEET 10: WESTERN PARCEL SOIL TO INDOOR AIR COMMERCIAL/INDUSTRIAL - May 2000

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
108883	3.68E+01	Toluene

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_T (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	15	15	228	15	0	0	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.24	0.03	0	0	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
7.88E+08	1	0.190	0.000	0.000	0.491	5.42E-08	0.493	2.67E-08	5,764	36.8	3.03E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.08E+06	2.78E-04	15	9,144	3.10E-03	1.33E-01	1.76E-04	1.87E-03	0.00E+00	0.00E+00	1.87E-03	1	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe') (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
5.46E+00	8.68E+02	0.10	3.86E+01	1.87E-03	5.76E+02	2.37E+233	NA	NA	1.02E+02	2.94E-05	1.51E+09	NO

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
7.54E-05	NA	6.55E-02	6.55E-02	NA	4.0E-01

DATA ENTRY SHEET

SPREADSHEET 11: EASTERN PARCEL SOIL TO INDOOR AIR COMMERCIAL/INDUSTRIAL - May 2000

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
79016	1.06E+02	Trichloroethylene

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_T (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	15	15	152	15	0	0	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm³/cm³)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.24	0.03	0	0	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
7.88E+08	1	0.190	0.000	0.000	0.491	5.42E-08	0.493	2.67E-08	5,764	106	3.03E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.08E+06	2.78E-04	15	8,544	5.06E-03	2.17E-01	1.76E-04	1.70E-03	0.00E+00	0.00E+00	1.70E-03	1	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
4.98E+00	4.45E+03	0.10	3.86E+01	1.70E-03	5.76E+02	1.34E+257	NA	NA	9.23E+01	4.75E-05	4.64E+08	YES

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(µg/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	1.89E-01	NA	1.89E-01	1.7E-06	NA

DATA ENTRY SHEET

SPREADSHEET 12: EASTERN PARCEL SOIL TO INDOOR AIR COMMERCIAL/INDUSTRIAL - May 2000

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
156592	2.26E+01	cis-1,2-Dichloroethylene

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	15	15	152	15	0	0	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.24	0.03	0	0	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Initial soil concentration used, C_R (µg/kg)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
7.88E+08	1	0.190	0.000	0.000	0.491	5.42E-08	0.493	2.67E-08	5,764	22.6	3.03E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)	Convection path length, L_p (cm)
2.08E+06	2.78E-04	15	7,724	2.14E-03	9.18E-02	1.76E-04	1.58E-03	0.00E+00	0.00E+00	1.58E-03	1	15

Soil-water partition coefficient, K_d (cm^3/g)	Source vapor conc., C_{source} (µg/m^3)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ (µg/m^3)	Finite source β term (unitless)	Finite source ψ term $(sec)^{-1}$	Time for source depletion, τ_D (sec)	Exposure duration > time for source depletion (YES/NO)
1.07E+00	1.68E+03	0.10	3.86E+01	1.58E-03	5.76E+02	2.04E+275	NA	NA	8.62E+01	7.84E-05	2.70E+08	YES

Finite source indoor attenuation coefficient, $<\alpha>$ (unitless)	Mass limit bldg. conc., $C_{building}$ (µg/m^3)	Finite source bldg. conc., $C_{building}$ (µg/m^3)	Final finite source bldg. conc., $C_{building}$ (µg/m^3)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
NA	4.04E-02	NA	4.04E-02	NA	NA

DATA ENTRY SHEET

SPREADSHEET 13: ONSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL COMMERCIAL/INDUSTRIAL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
67641	1.65E+02	Acetone

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	15	548	30	518	0	B	S	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.24	1.5	0.43	0.21	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	533	0.190	0.220	0.000	0.491	5.42E-08	0.493	2.67E-08	17.05	0.43	0.136	0.294	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	2.08E+06	2.78E-04	15	7,547	2.07E-05	8.88E-04	1.76E-04	3.26E-03	4.72E-03	0.00E+00	2.05E-03	4.47E-03	533

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	1.47E+02	0.10	3.86E+01	3.26E-03	5.76E+02	7.08E+133	3.96E-05	5.81E-03	NA	NA

DATA ENTRY SHEET

SPREADSHEET 14: ONSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL COMMERCIAL/INDUSTRIAL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
67663	5.00E-01	Chloroform

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	15	548	30	518	0	B	S	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.24	1.5	0.43	0.21	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	533	0.190	0.220	0.000	0.491	5.42E-08	0.493	2.67E-08	17.05	0.43	0.136	0.294	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	2.08E+06	2.78E-04	15	7,544	1.95E-03	8.38E-02	1.76E-04	2.24E-03	3.64E-03	0.00E+00	7.38E-04	3.18E-03	533

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	4.19E+01	0.10	3.86E+01	2.24E-03	5.76E+02	1.14E+195	3.10E-05	1.30E-03	2.3E-05	3.0E-04

DATA ENTRY SHEET

SPREADSHEET 15: ONSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL COMMERCIAL/INDUSTRIAL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_w (µg/L)	Chemical
71556	1.00E+02	1,1,1-Trichloroethane

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)							
11	15	548	30	518	0	B	S	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.24	1.5	0.43	0.21	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm \cdot s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	533	0.190	0.220	0.000	0.491	5.42E-08	0.493	2.67E-08	17.05	0.43	0.136	0.294	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	2.08E+06	2.78E-04	15	7,874	8.94E-03	3.83E-01	1.76E-04	1.67E-03	2.73E-03	0.00E+00	5.47E-04	2.38E-03	533

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	3.83E+04	0.10	3.86E+01	1.67E-03	5.76E+02	3.61E+260	2.47E-05	9.46E-01	NA	1.0E+00

DATA ENTRY SHEET

SPREADSHEET 16: ONSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL COMMERCIAL/INDUSTRIAL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75343	2.27E+01	1,1-Dichloroethane

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	15	548	30	518	0	B	S	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.24	1.5	0.43	0.21	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	533	0.190	0.220	0.000	0.491	5.42E-08	0.493	2.67E-08	17.05	0.43	0.136	0.294	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	2.08E+06	2.78E-04	15	7,439	3.02E-03	1.30E-01	1.76E-04	1.59E-03	2.60E-03	0.00E+00	5.26E-04	2.27E-03	533

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	2.94E+03	0.10	3.86E+01	1.59E-03	5.76E+02	2.67E+273	2.37E-05	6.97E-02	NA	3.5E-01

DATA ENTRY SHEET

SPREADSHEET 17: ONSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL COMMERCIAL/INDUSTRIAL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	1.16E+03	Trichloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)							
11	15	548	30	518	0	B	S	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.24	1.5	0.43	0.21	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	533	0.190	0.220	0.000	0.491	5.42E-08	0.493	2.67E-08	17.05	0.43	0.136	0.294	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	2.08E+06	2.78E-04	15	8,544	5.06E-03	2.17E-01	1.76E-04	1.70E-03	2.76E-03	0.00E+00	5.56E-04	2.41E-03	533

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^I)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	2.52E+05	0.10	3.86E+01	1.70E-03	5.76E+02	1.34E+257	2.49E-05	6.28E+00	1.7E-06	NA

DATA ENTRY SHEET

SPREADSHEET 18: ONSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL COMMERCIAL/INDUSTRIAL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	1.90E+01	Tetrachloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)							
11	15	548	30	518	0	B	S	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.24	1.5	0.43	0.21	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	533	0.190	0.220	0.000	0.491	5.42E-08	0.493	2.67E-08	17.05	0.43	0.136	0.294	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	2.08E+06	2.78E-04	15	9,543	8.32E-03	3.57E-01	1.76E-04	1.55E-03	2.52E-03	0.00E+00	5.06E-04	2.20E-03	533

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	6.78E+03	0.10	3.86E+01	1.55E-03	5.76E+02	1.80E+282	2.31E-05	1.57E-01	5.7E-07	6.0E-01

DATA ENTRY SHEET

SPREADSHEET 19: ONSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL COMMERCIAL/INDUSTRIAL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	6.60E+02	cis-1,2-Dichloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)							
11	15	548	30	518	0	B	S	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.24	1.5	0.43	0.21	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	533	0.190	0.220	0.000	0.491	5.42E-08	0.493	2.67E-08	17.05	0.43	0.136	0.294	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	2.08E+06	2.78E-04	15	7,724	2.14E-03	9.18E-02	1.76E-04	1.58E-03	2.58E-03	0.00E+00	5.26E-04	2.25E-03	533

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	6.06E+04	0.10	3.86E+01	1.58E-03	5.76E+02	2.04E+275	2.36E-05	1.43E+00	NA	NA

DATA ENTRY SHEET

SPREADSHEET 20: ONSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL COMMERCIAL/INDUSTRIAL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156605	7.00E+00	trans-1,2-Dichloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)							
11	15	548	30	518	0	B	S	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.24	1.5	0.43	0.21	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+08	533	0.190	0.220	0.000	0.491	5.42E-08	0.493	2.67E-08	17.05	0.43	0.136	0.294	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	2.08E+06	2.78E-04	15	7,126	5.19E-03	2.23E-01	1.76E-04	1.52E-03	2.47E-03	0.00E+00	4.99E-04	2.16E-03	533

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	1.56E+03	0.10	3.86E+01	1.52E-03	5.76E+02	1.49E+287	2.28E-05	3.55E-02	NA	NA

DATA ENTRY SHEET

SPREADSHEET 21: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL RESIDENTIAL- May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
71556	8.30E+00	1,1,1-Trichloroethane

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.23	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	488	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	350	30	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1.10E+10	105	0.200	0.000	0.000	0.464	5.42E-08	0.527	2.85E-08	18.75	0.43	0.134	0.296	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
5.63E+04	1.69E+06	2.27E-04	200	7,874	8.94E-03	3.83E-01	1.76E-04	1.99E-03	0.00E+00	0.00E+00	5.21E-04	1.32E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	3.18E+03	0.10	1.89E+01	1.99E-03	3.84E+02	3.12E+161	1.78E-04	5.66E-01	NA	1.0E+00

DATA ENTRY SHEET

SPREADSHEET 22: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL RESIDENTIAL- May 2000

VERSION 1.2
September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_w (µg/L)	Chemical
75014	4.23E+01	Vinyl chloride (chloroethene)

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)							
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.23	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	488	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	350	30	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1.10E+10	105	0.200	0.000	0.000	0.464	5.42E-08	0.527	2.85E-08	18.75	0.43	0.134	0.296	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
5.63E+04	1.69E+06	2.27E-04	200	4,989	1.79E-02	7.68E-01	1.76E-04	2.70E-03	0.00E+00	0.00E+00	7.06E-04	1.79E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	3.25E+04	0.10	1.89E+01	2.70E-03	3.84E+02	7.73E+118	2.03E-04	6.59E+00	8.7E-06	1.0E-01

DATA ENTRY SHEET

SPREADSHEET 23: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL RESIDENTIAL- May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75343	8.00E+00	1,1-Dichloroethane

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)							
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.23	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	488	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	350	30	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1.10E+10	105	0.200	0.000	0.000	0.464	5.42E-08	0.527	2.85E-08	18.75	0.43	0.134	0.296	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
5.63E+04	1.69E+06	2.27E-04	200	7,439	3.02E-03	1.30E-01	1.76E-04	1.89E-03	0.00E+00	0.00E+00	5.02E-04	1.27E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.04E+03	0.10	1.89E+01	1.89E-03	3.84E+02	3.54E+169	1.74E-04	1.81E-01	NA	3.5E-01

DATA ENTRY SHEET

SPREADSHEET 25: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL RESIDENTIAL- May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	2.97E+01	Trichloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)							
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.23	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	488	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	350	30	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1.10E+10	105	0.200	0.000	0.000	0.464	5.42E-08	0.527	2.85E-08	18.75	0.43	0.134	0.296	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
5.63E+04	1.69E+06	2.27E-04	200	8,544	5.06E-03	2.17E-01	1.76E-04	2.01E-03	0.00E+00	0.00E+00	5.30E-04	1.34E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	6.45E+03	0.10	1.89E+01	2.01E-03	3.84E+02	2.45E+159	1.79E-04	1.15E+00	1.7E-06	NA

DATA ENTRY SHEET

SPREADSHEET 26: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL RESIDENTIAL- May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
108907	1.40E+01	Chlorobenzene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.23	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	488	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	350	30	1.0E-06	1

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1.10E+10	105	0.200	0.000	0.000	0.464	5.42E-08	0.527	2.85E-08	18.75	0.43	0.134	0.296	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
5.63E+04	1.69E+06	2.27E-04	200	9,793	1.64E-03	7.05E-02	1.76E-04	1.86E-03	0.00E+00	0.00E+00	4.98E-04	1.25E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	9.87E+02	0.10	1.89E+01	1.86E-03	3.84E+02	1.49E+172	1.73E-04	1.71E-01	NA	6.0E-02

DATA ENTRY SHEET

SPREADSHEET 27: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL RESIDENTIAL- May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	5.18E+00	Tetrachloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.23	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	488	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	350	30	1.0E-06	1

Used to calculate risk-based groundwater concentration.

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1.10E+10	105	0.200	0.000	0.000	0.464	5.42E-08	0.527	2.85E-08	18.75	0.43	0.134	0.296	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
5.63E+04	1.69E+06	2.27E-04	200	9,543	8.32E-03	3.57E-01	1.76E-04	1.83E-03	0.00E+00	0.00E+00	4.82E-04	1.22E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.85E+03	0.10	1.89E+01	1.83E-03	3.84E+02	8.81E+174	1.71E-04	3.16E-01	5.7E-07	6.0E-01

DATA ENTRY SHEET

SPREADSHEET 28: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL RESIDENTIAL- May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	2.50E+01	cis-1,2-Dichloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)							
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.23	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	961	961	488	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	350	30	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
1.10E+10	105	0.200	0.000	0.000	0.464	5.42E-08	0.527	2.85E-08	18.75	0.43	0.134	0.296	3,844

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
5.63E+04	1.69E+06	2.27E-04	200	7,724	2.14E-03	9.18E-02	1.76E-04	1.88E-03	0.00E+00	0.00E+00	5.02E-04	1.26E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	2.30E+03	0.10	1.89E+01	1.88E-03	3.84E+02	5.94E+170	1.74E-04	3.99E-01	NA	NA

DATA ENTRY SHEET

SPREADSHEET 29: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL SCHOOL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
71556	8.30E+00	1,1,1-Trichloroethane

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.21	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	250	25	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+09	105	0.220	0.000	0.000	0.410	5.42E-08	0.594	3.22E-08	18.75	0.43	0.134	0.296	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	3.23E+06	1.78E-04	200	7,874	8.94E-03	3.83E-01	1.76E-04	2.73E-03	0.00E+00	0.00E+00	5.21E-04	1.55E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	3.18E+03	0.10	3.20E+01	2.73E-03	5.76E+02	4.54E+132	6.32E-05	2.01E-01	NA	1.0E+00

DATA ENTRY SHEET

SPREADSHEET 30: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL SCHOOL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75014	4.23E+01	Vinyl chloride (chloroethene)

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.21	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	250	25	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+09	105	0.220	0.000	0.000	0.410	5.42E-08	0.594	3.22E-08	18.75	0.43	0.134	0.296	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	3.23E+06	1.78E-04	200	4,989	1.79E-02	7.68E-01	1.76E-04	3.70E-03	0.00E+00	0.00E+00	7.06E-04	2.11E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	3.25E+04	0.10	3.20E+01	3.70E-03	5.76E+02	4.35E+97	7.07E-05	2.29E+00	8.7E-06	1.0E-01

DATA ENTRY SHEET

SPREADSHEET 31: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL SCHOOL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75343	8.00E+00	1,1-Dichloroethane

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.21	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm \cdot s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	250	25	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+09	105	0.220	0.000	0.000	0.410	5.42E-08	0.594	3.22E-08	18.75	0.43	0.134	0.296	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	3.23E+06	1.78E-04	200	7,439	3.02E-03	1.30E-01	1.76E-04	2.60E-03	0.00E+00	0.00E+00	5.02E-04	1.49E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.04E+03	0.10	3.20E+01	2.60E-03	5.76E+02	2.27E+139	6.21E-05	6.44E-02	NA	3.5E-01

DATA ENTRY SHEET

SPREADSHEET 32: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL SCHOOL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
75354	4.67E+00	1,1-Dichloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.21	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	250	25	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+09	105	0.220	0.000	0.000	0.410	5.42E-08	0.594	3.22E-08	18.75	0.43	0.134	0.296	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	3.23E+06	1.78E-04	200	6,386	1.53E-02	6.58E-01	1.76E-04	3.15E-03	0.00E+00	0.00E+00	6.01E-04	1.79E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe') (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	3.07E+03	0.10	3.20E+01	3.15E-03	5.76E+02	9.58E+114	6.68E-05	2.05E-01	5.0E-05	NA

DATA ENTRY SHEET

SPREADSHEET 33: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL SCHOOL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
79016	2.97E+01	Trichloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.21	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	250	25	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+09	105	0.220	0.000	0.000	0.410	5.42E-08	0.594	3.22E-08	18.75	0.43	0.134	0.296	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	3.23E+06	1.78E-04	200	8,544	5.06E-03	2.17E-01	1.76E-04	2.76E-03	0.00E+00	0.00E+00	5.30E-04	1.58E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	6.45E+03	0.10	3.20E+01	2.76E-03	5.76E+02	8.94E+130	6.36E-05	4.10E-01	1.7E-06	NA

DATA ENTRY SHEET

SPREADSHEET 34: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL SCHOOL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
108907	1.40E+01	Chlorobenzene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.21	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	250	25	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+09	105	0.220	0.000	0.000	0.410	5.42E-08	0.594	3.22E-08	18.75	0.43	0.134	0.296	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	3.23E+06	1.78E-04	200	9,793	1.64E-03	7.05E-02	1.76E-04	2.55E-03	0.00E+00	0.00E+00	4.98E-04	1.47E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	9.87E+02	0.10	3.20E+01	2.55E-03	5.76E+02	3.75E+141	6.18E-05	6.10E-02	NA	6.0E-02

DATA ENTRY SHEET

SPREADSHEET 35: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL SCHOOL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
127184	5.18E+00	Tetrachloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.21	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	250	25	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+09	105	0.220	0.000	0.000	0.410	5.42E-08	0.594	3.22E-08	18.75	0.43	0.134	0.296	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	3.23E+06	1.78E-04	200	9,543	8.32E-03	3.57E-01	1.76E-04	2.52E-03	0.00E+00	0.00E+00	4.82E-04	1.43E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^I) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	1.85E+03	0.10	3.20E+01	2.52E-03	5.76E+02	5.12E+143	6.12E-05	1.13E-01	5.7E-07	6.0E-01

DATA ENTRY SHEET

SPREADSHEET 36: OFFSITE GROUNDWATER TO INDOOR AIR UPPER GLACIAL SCHOOL - May 2000

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

VERSION 1.2
September, 1998

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
156592	2.50E+01	cis-1,2-Dichloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
11	200	305	305	0	0	A	LS	LS		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.21	0	0	0	0	0	0

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
15	40	1441	1441	633	0.1	0.83

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	25	250	25	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Thickness of capillary zone, L_{cz} (cm)	Total porosity in capillary zone, n_{cz} (cm^3/cm^3)	Air-filled porosity in capillary zone, $\theta_{a,cz}$ (cm^3/cm^3)	Water-filled porosity in capillary zone, $\theta_{w,cz}$ (cm^3/cm^3)	Floor-wall seam perimeter, X_{crack} (cm)
7.88E+09	105	0.220	0.000	0.000	0.410	5.42E-08	0.594	3.22E-08	18.75	0.43	0.134	0.296	5,764

Bldg. ventilation rate, $Q_{building}$ (cm^3/s)	Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. groundwater temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. groundwater temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. groundwater temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Capillary zone effective diffusion coefficient, D^{eff}_{cz} (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
3.03E+05	3.23E+06	1.78E-04	200	7,724	2.14E-03	9.18E-02	1.76E-04	2.58E-03	0.00E+00	0.00E+00	5.02E-04	1.48E-03	105

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, exp(Pe^f) (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF ($\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
200	2.30E+03	0.10	3.20E+01	2.58E-03	5.76E+02	2.64E+140	6.20E-05	1.42E-01	NA	NA

SPREADSHEET 37: VOLATILIZATION FROM ONSITE GROUNDWATER TO AMBIENT AIR - May 2000

FATE AND TRANSPORT PARAMETERS

Soil Parameters	Symbol	Value Used	Units
Total Soil Porosity	θ_T	0.43	cm^3/cm^3
Volumetric Air Content	θ_a	0.23	cm^3/cm^3
Volumetric Water Content	$\theta\omega$	0.21	cm^3/cm^3
Volumetric Air Content in Capillary Zone	θ_{acap}	0.043	cm^3/cm^3
Volumetric Water Content in Capillary Zone	θ_{wcap}	0.387	cm^3/cm^3
Wind Speed	U_{air}	225	cm/sec
Mixing Height	δ_{air}	200	cm
Thickness of Vadose Zone	h_v	543	cm
Thickness of Capillary Fringe	h_{cap}	5	cm
Average Depth to Groundwater	L_{gw}	548	cm
Width of Plume Parallel to Flow	W	12192	cm

SPREADSHEET 37: VOLATILIZATION FROM ONSITE GROUNDWATER TO AMBIENT AIR - May 2000

ESTIMATED CHEMICAL PARAMETERS

Chemical	Air Diffusivity D^{air} (cm^2/sec)	Water Diffusivity D^{wat} (cm^2/sec)	Henry's Constant H ($cm^3/cm^{3)}$	D_s^{eff} (cm^2/sec)	D_{cap}^{eff} (cm^2/sec)	D_{ws}^{eff} (cm^2/sec)
1,1,1-Trichloroethane	7.80E-02	8.80E-06	7.05E-01	3.16E-03	1.47E-05	1.07E-03
1,1-Dichloroethane	7.42E-02	1.05E-05	2.30E-01	3.01E-03	2.18E-05	1.34E-03
Acetone	1.24E-01	1.14E-05	1.59E-03	5.24E-03	1.66E-03	5.14E-03
Chloroform	1.04E-01	1.00E-05	1.50E-01	4.22E-03	3.11E-05	1.89E-03
cis-1,2-Dichloroethene	7.36E-02	1.13E-05	1.67E-01	2.98E-03	2.67E-05	1.48E-03
Tetrachloroethene	7.20E-02	8.20E-06	7.54E-01	2.92E-03	1.35E-05	9.82E-04
trans-1,2-Dichloroethene	7.07E-02	1.19E-05	3.85E-01	2.87E-03	1.78E-05	1.17E-03
Trichloroethene	7.90E-02	9.10E-06	4.22E-01	3.20E-03	1.70E-05	1.18E-03

SPREADSHEET 37: VOLATILIZATION FROM ONSITE GROUNDWATER TO AMBIENT AIR - May 2000

GROUNDWATER VOLATILIZATION

Chemical	Medium Exposure Concentration (ug/L)	Groundwater Vapors into Ambient Air	
		Volatilization Factor [L/m^3]	Air Concentration [mg/m^3]
1,1,1-Trichloroethane	1.00E+02	3.74E-04	3.74E-05
1,1-Dichloroethane	2.27E+01	1.52E-04	3.44E-06
2-Hexanone	0.00E+00	NA	0.00E+00
Acetone	1.65E+02	4.04E-06	6.66E-07
Chloroform	5.00E-01	1.40E-04	7.02E-08
cis-1,2-Dichloroethene	6.60E+02	1.23E-04	8.09E-05
Tetrachloroethene	1.12E+01	3.66E-04	4.11E-06
TICs (volatile)	0.00E+00	NA	0.00E+00
trans-1,2-Dichloroethene	7.00E+00	2.22E-04	1.55E-06
Trichloroethene	1.16E+03	2.46E-04	2.86E-04

SPREADSHEET 38: VOLATILIZATION FROM OFFSITE GROUNDWATER TO AMBIENT AIR - May 2000

FATE AND TRANSPORT PARAMETERS

Soil Parameters	Symbol	Value Used	Units
Total Soil Porosity	θ_T	0.43	cm^3/cm^3
Volumetric Air Content	θ_a	0.23	cm^3/cm^3
Volumetric Water Content	$\theta\omega$	0.21	cm^3/cm^3
Volumetric Air Content in Capillary Zone	θ_{acap}	0.043	cm^3/cm^3
Volumetric Water Content in Capillary Zone	θ_{wcap}	0.387	cm^3/cm^3
Wind Speed	U_{air}	225	cm/sec
Mixing Height	δ_{air}	200	cm
Thickness of Vadose Zone	h_v	300	cm
Thickness of Capillary Fringe	h_{cap}	5	cm
Average Depth to Groundwater	L_{gw}	305	cm
Width of Plume Parallel to Flow	W	12192	cm

SPREADSHEET 38: VOLATILIZATION FROM OFFSITE GROUNDWATER TO AMBIENT AIR - May 2000

ESTIMATED CHEMICAL PARAMETERS

Chemical	Air Diffusivity D^{air} (cm^2/sec)	Water Diffusivity D^{wat} (cm^2/sec)	Henry's Constant H ($cm^3/cm^{3)}$	D_s^{eff} (cm^2/sec)	D_{cap}^{eff} (cm^2/sec)	D_{ws}^{eff} (cm^2/sec)
1,1,1-Trichloroethane	7.80E-02	8.80E-06	7.05E-01	3.16E-03	1.47E-05	7.02E-04
1,1-Dichloroethane	7.42E-02	1.05E-05	2.30E-01	3.01E-03	2.18E-05	9.25E-04
1,1-Dichloroethene	9.00E-02	1.04E-05	1.07E+00	3.65E-03	1.59E-05	7.70E-04
Chlorobenzene	7.30E-02	8.70E-06	1.52E-01	2.96E-03	2.42E-05	9.91E-04
cis-1,2-Dichloroethene	7.36E-02	1.13E-05	1.67E-01	2.98E-03	2.67E-05	1.06E-03
Tetrachloroethene	7.20E-02	8.20E-06	7.54E-01	2.92E-03	1.35E-05	6.43E-04
Trichloroethene	7.90E-02	9.10E-06	4.22E-01	3.20E-03	1.70E-05	7.85E-04
Vinyl Chloride	1.06E-01	1.23E-06	1.11E+00	4.29E-03	1.64E-05	8.14E-04

SPREADSHEET 38: VOLATILIZATION FROM OFFSITE GROUNDWATER TO AMBIENT AIR - May 2000

GROUNDWATER VOLATILIZATION

Chemical	Medium Exposure Concentration (ug/L)	Groundwater Vapors into Ambient Air	
		Volatilization Factor [L/m^3]	Air Concentration [mg/m^3]
1,1,1-Trichloroethane	8.30E+00	4.40E-04	3.65E-06
1,1-Dichloroethane	8.00E+00	1.89E-04	1.51E-06
1,1-Dichloroethene	4.67E+00	7.32E-04	3.41E-06
Chlorobenzene	1.40E+01	1.34E-04	1.87E-06
cis-1,2-Dichloroethene	2.50E+01	1.57E-04	3.93E-06
Tetrachloroethene	5.18E+00	4.31E-04	2.23E-06
Trichloroethene	2.97E+01	2.94E-04	8.73E-06
Vinyl Chloride	4.23E+01	8.02E-04	3.39E-05

SPREADSHEET 39: VOLATILIZATION FROM SOLID WASTE TO AMBIENT AIR - May 2000

FATE AND TRANSPORT PARAMETERS

Soil Parameters	Symbol	Value Used	Units
Soil Bulk Density	ρ_b	1.5	g/cm^3
Wind Speed	U_{air}	225	cm/sec
Width of Subsurface Soil Source	W	60	cm
Mixing Height	δ_{air}	200	cm
Lower Depth of Source	d	60	cm
Emission Rate Averaging Time (Trespassers)	τ	2.84E+08	sec
Emission Rate Averaging Time (Workers)	τ	7.88E+08	sec
Emission Rate Averaging Time (Construction)	τ	3.15E+07	sec

SPREADSHEET 39: VOLATILIZATION FROM SOLID WASTE TO AMBIENT AIR - May 2000

SURFACE VOLATILIZATION

Chemical		Trespassers		Commercial/Industrial Workers		Construction Workers	
	Medium Exposure Concentration (mg/kg)	Volatilization Factor for Trespassers (kg/m^3)	Air Concentra-tion for Trespassers (mg/m^3)	Volatilization Factor for Commercial Workers (kg/m^3)	Air Concentra-tion for Commercial Workers (mg/m^3)	Volatilization Factor for Construction Workers (kg/m^3)	Air Concentra-tion for Construction Workers (mg/m^3)
2-Methylnaphthalene	2.90E+01	4.23E-07	1.23E-05	1.52E-07	4.41E-06	3.81E-06	1.10E-04
Anthracene	6.70E+01	4.23E-07	2.83E-05	1.52E-07	1.02E-05	3.81E-06	2.55E-04
Phenanthrene	4.90E+02	4.23E-07	2.07E-04	1.52E-07	7.46E-05	3.81E-06	1.86E-03

SPREADSHEET 40: VOLATILIZATION FROM SOLID WASTE TO CURRENT INDOOR AIR - May 2000

FATE AND TRANSPORT PARAMETERS

Soil Parameters	Symbol	Value Used	Units
Soil Bulk Density	ρ_b	1.5	g/cm^3
Width of Source	W	60	cm
Length of Source	L	30	cm
Air Exchange	ER	0.00023	sec^{-1}
Mixing Height (building height)	H_B	610	cm
Width of Building	W_B	3658	cm
Length of Building	L_B	15240	cm
Lower Depth of Source	d	60	cm
Emission Rate Averaging Time (Workers)	τ	7.88E+08	sec

SPREADSHEET 40: VOLATILIZATION FROM SOLID WASTE TO CURRENT INDOOR AIR - May 2000

SURFACE VOLATILIZATION

Chemical	Medium Exposure Concentration (mg/kg)	Mass Limit - Surface Vapors into Indoor Air		
		Volatilization Factor for Commercial Workers (kg/m^3)	Air Concentration for Commercial Workers (mg/m^3)	Air Concentration for 4 Sources in Building C_a (mg/m3)
2-Methylnaphthalene	5.50E+00	2.63E-08	1.44E-07	5.78E-07
Anthracene	6.70E+01	2.63E-08	1.76E-06	7.04E-06
Phenanthrene	4.90E+02	2.63E-08	1.29E-05	5.15E-05

SPREADSHEET 41: VOLATILIZATION FROM SOLID WASTE TO FUTURE INDOOR AIR - May 2000

FATE AND TRANSPORT PARAMETERS

Soil Parameters	Symbol	Value Used	Units
Soil Bulk Density	ρ_b	1.5	g/cm^3
Width of Source	W	60	cm
Length of Source	L	30	cm
Air Exchange	ER	0.00023	sec^{-1}
Mixing Height (building height)	H_B	633	cm
Width of Building	W_B	1441	cm
Length of Building	L_B	1441	cm
Lower Depth of Source	d	60	cm
Emission Rate Averaging Time (Workers)	τ	7.88E+08	sec

SPREADSHEET 41: VOLATILIZATION FROM SOLID WASTE TO FUTURE INDOOR AIR - May 2000

SURFACE VOLATILIZATION

Chemical	Medium Exposure Concentration (mg/kg)	Mass Limit - Surface Vapors into Indoor Air		
		Volatilization Factor for Commercial Workers (kg/m^3)	Air Concentration for Commercial Workers (mg/m^3)	Air Concentration for up to 100 Sources in a Building C_a (mg/m3)
2-Methylnaphthalene	2.90E+01	6.80E-07	1.97E-05	1.97E-03
Anthracene	6.70E+01	6.80E-07	4.55E-05	4.55E-03
Phenanthrene	4.90E+02	6.80E-07	3.33E-04	3.33E-02

SPREASHEET 42: VOLATILIZATION FROM LIQUID WASTES TO AMBIENT AIR MASS TRANSFER - May 2000

FATE AND TRANSPORT PARAMETERS

Soil Parameters	Symbol	Value Used	Units
Conversion Factor	CF	1.00E-03	L/cm^3
Width of Source	W	60	cm
Wind Speed	U_{air}	225	cm/sec
Mixing Height	δ_{air}	200	cm
Lower Depth of Source	d	60	cm
Emission Rate Averaging Time (Trespassers)	τ	2.84E+08	sec
Emission Rate Averaging Time (Workers)	τ	7.88E+08	sec
Emission Rate Averaging Time (Construction)	τ	3.15E+07	sec

SURFACE VOLATILIZATION

Chemical	Medium Exposure Concentration (ug/L)	Trespassers		Commercial/Industrial Workers		Construction Workers	
		Volatilization Factor for Trespassers (kg/m^3)	Air Concentration for Trespassers (mg/m^3)	Volatilization Factor for Commercial Workers (kg/m^3)	Air Concentration for Commercial Workers (mg/m^3)	Volatilization Factor for Construction Workers (kg/m^3)	Air Concentration for Construction Workers (mg/m^3)
1,4-Dichlorobenzene	2.00E+00	2.82E-13	5.64E-16	1.01E-13	2.03E-16	2.54E-12	5.07E-15
Dibenzofuran	4.00E+00	2.82E-13	1.13E-15	1.01E-13	4.06E-16	2.54E-12	1.01E-14
Naphthalene	6.00E+00	2.82E-13	1.69E-15	1.01E-13	6.09E-16	2.54E-12	1.52E-14
Phenanthrene	4.22E+01	2.82E-13	1.19E-14	1.01E-13	4.28E-15	2.54E-12	1.07E-13
Acetone	3.18E+01	2.82E-13	8.96E-15	1.01E-13	3.22E-15	2.54E-12	8.06E-14
Benzene	1.06E+01	2.82E-13	3.00E-15	1.01E-13	1.08E-15	2.54E-12	2.70E-14
Chloroethane	1.55E+01	2.82E-13	4.36E-15	1.01E-13	1.57E-15	2.54E-12	3.93E-14
Ethylbenzene	2.35E+01	2.82E-13	6.61E-15	1.01E-13	2.38E-15	2.54E-12	5.95E-14
Methylene Chloride	7.65E+00	2.82E-13	2.16E-15	1.01E-13	7.76E-16	2.54E-12	1.94E-14
Toluene	4.15E+01	2.82E-13	1.17E-14	1.01E-13	4.21E-15	2.54E-12	1.05E-13
Trichloroethene	2.00E+00	2.82E-13	5.64E-16	1.01E-13	2.03E-16	2.54E-12	5.07E-15
Vinyl Chloride	8.00E-01	2.82E-13	2.25E-16	1.01E-13	8.12E-17	2.54E-12	2.03E-15
Xylenes (total)	8.71E+01	2.82E-13	2.45E-14	1.01E-13	8.84E-15	2.54E-12	2.21E-13

SPREADSHEET 43: VOLATILIZATION FROM LIQUID WASTE TO FUTURE INDOOR AIR MASS TRANSFER - May 2000

FATE AND TRANSPORT PARAMETERS

Soil Parameters	Symbol	Value Used	Units
Conversion Factor	CF	1.00E-03	L/cm^3
Width of Source	W	60	cm
Length of Source	L	30	cm
Air Exchange	ER	0.00023	sec^{-1}
Mixing Height (building height)	H_B	633	cm
Width of Building	W_B	1441	cm
Length of Building	LB	1441	cm
Lower Depth of Source	d	60	cm
Emission Rate Averaging Time (Workers)	τ	7.88E+08	sec

SURFACE VOLATILIZATION

Chemical	Medium Exposure Concentration (ug/L)	Mass Limit - Surface Vapors into Indoor Air		
		Volatilization Factor for Commercial Workers (kg/m^3)	Air Concentration for Commercial Workers (mg/m^3)	Air Concentration for up to 100 Sources in a Building C_a (mg/m^3)
1,4-Dichlorobenzene	2.00E+00	4.53E-13	9.06E-16	9.06E-14
Dibenzofuran	4.00E+00	4.53E-13	1.81E-15	1.81E-13
Naphthalene	6.00E+00	4.53E-13	2.72E-15	2.72E-13
Phenanthrene	4.22E+01	4.53E-13	1.91E-14	1.91E-12
Acetone	3.18E+01	4.53E-13	1.44E-14	1.44E-12
Benzene	1.06E+01	4.53E-13	4.82E-15	4.82E-13
Chloroethane	1.55E+01	4.53E-13	7.01E-15	7.01E-13
Ethylbenzene	2.35E+01	4.53E-13	1.06E-14	1.06E-12
Methylene Chloride	7.65E+00	4.53E-13	3.47E-15	3.47E-13
Toluene	4.15E+01	4.53E-13	1.88E-14	1.88E-12
Trichloroethene	2.00E+00	4.53E-13	9.06E-16	9.06E-14
Viny Chloride	8.00E-01	4.53E-13	3.62E-16	3.62E-14
Xylenes (total)	8.71E+01	4.53E-13	3.95E-14	3.95E-12

SPREADSHEET 44: VOLATILIZATION FROM TAP WATER DURING BATHING (Magothy Aquifer) - May 2000

TAP WATER VOLATILIZATION

Chemical	Medium Exposure Concentration (ug/L)	Volatilization Factor K (unitless)	Conversion Factor 1 (L/m^3)	Conversion Factor 2 (ug/mg)	Air Concentration (mg/m^3)
1,1-Dichloroethane	1.21E+01	0.0005	1000	0.001	6.07E-03
1,1-Dichloroethene	1.11E+01	0.0005	1000	0.001	5.56E-03
1,2-Dichloroethane	8.62E+00	0.0005	1000	0.001	4.31E-03
Benzene	7.97E+00	0.0005	1000	0.001	3.98E-03
Carbon Tetrachloride	1.00E+00	0.0005	1000	0.001	5.00E-04
cis-1,2-Dichloroethene	2.30E+01	0.0005	1000	0.001	1.15E-02
Tetrachloroethene	1.09E+01	0.0005	1000	0.001	5.45E-03
TICs (volatile)	0.00E+00	0.0005	1000	0.001	0.00E+00
Toluene	1.50E+01	0.0005	1000	0.001	7.50E-03
trans-1,2-Dichloroethene	2.85E+01	0.0005	1000	0.001	1.43E-02
Trichloroethene	7.40E+02	0.0005	1000	0.001	3.70E-01

SPREADSHEET 45: VOLATILIZATION FROM TAP WATER DURING BATHING (Upper Glacial Aquifer) - May 2000

TAP WATER VOLATILIZATION

Chemical	Medium Exposure Concentration (ug/L)	Volatilization Factor K (unitless)	Conversion Factor 1 (L/m^3)	Conversion Factor 2 (ug/mg)	Air Concentration (mg/m^3)
1,1,1-Trichloroethane	8.30E+00	0.0005	1000	0.001	4.15E-03
1,1-Dichloroethane	8.00E+00	0.0005	1000	0.001	4.00E-03
1,1-Dichloroethene	4.67E+00	0.0005	1000	0.001	2.33E-03
Chlorobenzene	1.40E+01	0.0005	1000	0.001	7.00E-03
cis-1,2-Dichloroethene	2.50E+01	0.0005	1000	0.001	1.25E-02
Tetrachloroethene	5.18E+00	0.0005	1000	0.001	2.59E-03
TICs (volatile)	0.00E+00	0.0005	1000	0.001	0.00E+00
Trichloroethene	2.97E+01	0.0005	1000	0.001	1.48E-02
Vinyl Chloride	4.23E+01	0.0005	1000	0.001	2.11E-02

APPENDIX E

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TOXICOLOGICAL PROFILES OF CONSTITUENTS OF POTENTIAL CONCERN

(Electronic copy available on Final BHHRA CD-ROM submittal and upon request)

APPENDIX E
TOXICOLOGICAL PROFILES FOR CONSTITUENTS OF POTENTIAL CONCERN
LIBERTY INDUSTRIAL FINISHING SITE

CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
		Metals		
Aluminum	Soluble forms of aluminum are potentially toxic; the insoluble forms have no measurable acute response. Acute aluminum toxicity is unlikely. The vast majority of cases of aluminum toxicity in humans fall into one of two categories: 1) patients with chronic renal failure; 2) people exposed to aluminum in the workplace. Aluminum dust may cause eye irritation.	Some aluminum workers are at risk for developing respiratory manifestations of aluminum toxicity, mainly asthma, chronic obstructive lung disease, and pulmonary fibrosis. Pulmonary fibrosis, asthma, COPD, chronic interstitial. Serum phosphorus was reduced and urinary phosphorus and calcium were increased with chronic exposure to aluminum aerosol. Delayed hypersensitivity, telangiectases, and granulomas may occur from chronic aluminum skin contact.		Aluminum compounds have been evaluated as non-mutagenic by most standard methods of mutagenic assays.
Antimony	Many antimony compounds irritate the gastrointestinal tract; antimony tartar has been used as an emetic; intoxication results in severe vomiting and diarrhea. With occupational inhalation exposure, rhinitis and acute pulmonary edema may occur.	Inhalation of some antimony compounds can produce rhinitis, pharyngitis, tracheitis, bronchitis, and pneumoconiosis with obstructive lung disease and emphysema. Transient spots on the skin have been reported in workers. Antimony may form stibine gas, which causes hemolysis.	Cancer potential is not indicated. In mutation tests, some antimony compounds were positive in human lymphocytes and hamster embryo cells.	Antimony can exist as trivalent or pentavalent compounds. Trivalent antimony compounds have been used for treatment of parasites.
Arsenic	Acute oral exposure can cause muscular cramps, facial swelling, cardiovascular reactions, severe gastrointestinal damage, and vascular collapse leading to death. Sensory loss and hematopoietic symptoms delayed after exposure to high concentrations are usually reversible. Inhalation exposure can cause severe irritation of nasal lining, larynx, and bronchi.	Chronic oral or inhalation exposure can produce: changes in skin, including hyperpigmentation and hyperkeratosis; peripheral neuropathy; liver injury; cardiovascular disorders; peripheral vascular disease associated with oral exposures; and blackfoot disease. High doses of some inorganic arsenic compounds to pregnant laboratory animals produced malformations in offspring.	Excess skin cancers have been observed in individuals drinking water with elevated levels of arsenic from natural sources. Excess lung cancers have been observed in workers exposed to elevated concentrations of arsenic in air.	Toxicity varies for different compounds; inorganic trivalent arsenic compounds are usually more toxic than pentavalent compounds.

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Barium	Ingestion of barium salts can cause prolonged muscular stimulation, gastroenteritis, hypokalemia, and cardiovascular effects such as ventricular fibrillation and extra systoles.	Prolonged occupational inhalation has resulted in baritosis--a benign, reversible pneumoconiosis.	Cancer potential is not indicated.	The toxicity of barium compounds depends on their solubility.

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Beryllium	Acute lung disease (chemical pneumonitis) has been observed immediately after inhalation of aerosols of soluble and insoluble beryllium compounds in broken fluorescent light tubes. Several months after exposure the entire respiratory tract may become inflamed with fulminating pneumonitis in severe reactions. Recoveries usually occur within weeks, but fatalities have occurred. In studies with monkeys, high concentrations of aerosols of beryllium fluoride or beryllium phosphate produced severe lung reactions in all animals and damaged the liver and kidney as well as affecting adrenals, pancreas, thyroid, and spleen; many lesions were similar to those inpatients who died of pneumonitis. Conjunctivitis and contact dermatitis may follow exposure to beryllium, with skin lesions or ulcerations. Beryllium compounds may produce hypersensitivity with delayed allergic reactions.	The lung is a major target organ for toxic effects of beryllium. Berylliosis, a chronic granulomatous lung disease that is frequently fatal, has been described for over 40 years among workers exposed to insoluble beryllium compounds; symptoms may include shortness of breath, cyanosis, clubbed fingers, and lesions that progress to fibrotic tissue and nodules with respiratory dysfunction.	Beryllium compounds or alloys have produced cancer in rats, rabbits, and monkeys. Lung tumors have been reported in rats and monkeys exposed by inhalation, intratracheally, or intrabronchial implantation, and bone tumors have been produced in rabbits after intravenous or intraosseus administration. Excess lung cancer has been observed in some studies of workers occupationally exposed to beryllium, but data on exposure and confounding factors were lacking. Beryllium and its compounds have been classified by IARC as having sufficient evidence of being carcinogenic in animals and limited evidence in humans, and by EPA as a probable human carcinogen. Some beryllium compounds are mutagenic in vitro.	Wide variations in individual sensitivity have been reported, perhaps because of an immune reaction; individuals exposed to low doses may exhibit severe effects. Beryllium is stored in the body for many years with detectable amounts in lung reported as long as 23 years after exposure.

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Cadmium	For acute exposure by ingestion, symptoms of cadmium toxicity included nausea, vomiting, diarrhea, muscular cramps, salivation, spasms, drop in blood pressure, vertigo, loss of consciousness, and collapse. Acute renal failure, liver damage, and death may occur. Exposure by inhalation can cause irritation, coughing, labored respiration, vomiting, acute chemical pneumonitis, and pulmonary edema.	Respiratory and renal toxicity are major effects in workers. Chronic oral exposures can produce kidney damage. Cadmium accumulates in kidney, and nephropathy results after critical concentration in kidney is reached, probably about 200 g/g. Inhalation can cause chronic obstructive pulmonary disease, including bronchitis, progressive fibrosis, and emphysema. Chronic exposure affects calcium metabolism and can cause loss of calcium from bone, bone pain, osteomalacia, and osteoporosis. Chronic exposure may be associated with hypertension. Cadmium can produce testicular atrophy, sterility, and teratogenic effects in experimental animals.	Increased risk of prostate cancer and perhaps respiratory tract cancer have been seen in workers exposed by inhalation. No evidence of carcinogenicity from chronic oral exposure exists.	
Chromium	The major acute effect from oral exposure is renal tubular necrosis. Inhalation of chromate salts results in irritation and inflammation of nasal mucosa, ulceration, and perforation of nasal septum.	Chronic exposure to hexavalent chromium has resulted in kidney damage in animals and humans. Inhalation exposures to chromates in industrial settings have resulted in nasal membrane inflammation, chronic rhinitis, laryngitis, and pharyngitis. Exposures to skin can result in allergic skin reactions in sensitive individuals. Overall, hexavalent forms are usually more toxic than trivalent forms.	Hexavalent chromium is considered a known human carcinogen. Excess lung cancer has been associated with workers in the chromate-producing industry. Chromate salts have been shown to be carcinogenic in rats exposed by inhalation in some studies.	Trivalent chromium is an essential element in human nutrition. Chromium toxicity is related to valence state.

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Copper	Inhalation of copper dusts results in symptoms similar to metal fume fever. Exposure to metal fumes results in upper respiratory tract irritation, metallic or sweet taste, metal fume fever, and skin and hair discoloration. Exposure to dusts and mists of copper salts result in congestion of nasal mucous membranes, sometimes of the pharynx, and occasional ulceration and perforation of nasal septum. Acute copper sulfate poisoning in humans (oral) is sometimes fatal; symptoms include vomiting, diarrhea, hypotension, coma, and jaundice.	Hemolytic anemia occurs after chronic exposure in some dialysis patients. Sensitive to individuals with metabolism disorders (Wilson's disease and Menke's disease).	Copper is not known to be carcinogenic in humans or laboratory animals.	Copper is an essential nutrient in human nutrition. The organoleptic threshold in water is 1 to 5 mg/l.

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Cyanide	The acute effects in humans following exposure include headaches, throat irritation, weakness, abdominal pain, vomiting, changes in taste and smell, incoordination, gasping, collapse, cardiac irregularities, and convulsions. Death can be caused by cardiac and/or respiratory failure secondary to CNS effects. Acute effects have been reported after inhalation exposure to as low as 6.4-10.4 ppm of hydrogen cyanide in air. A total absorbed dose of 0.7 mg/kg hydrogen cyanide has been fatal. Parkinsonism has been reported in individuals surviving the acute phase.	Adverse effects on the CNS occur with prolonged chronic exposure, causing symptoms of fatigue, dizziness, headache, paresthesia, and behavioral changes in humans. Symptoms of effects have been observed in workers chronically exposed to 0.19 ppm hydrogen cyanide in air. Respiratory effects including respiratory discomfort and dyspnea have been observed in workers at 6.4 ppm hydrogen cyanide in air. Cardiac effects (chest pain, palpitations) and weight loss have been observed at 15 ppm hydrogen cyanide in air. Thyroid effects have been observed in animals and humans after chronic inhalation and oral exposures.	There is no currently available evidence of a carcinogenic potential for cyanide; however, few studies have been conducted. Cyanide tested negative in *in vitro* and *in vivo* genotoxicity studies.	Oral exposures in rats and hamsters to cyanogens in cassava caused teratogenic and fetotoxic effects. Hydrogen cyanide is highly toxic to aquatic species.

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Lead	Acute inorganic lead intoxication in humans is characterized by encephalopathy, abdominal pain, hemolysis, liver damage, renal tubular necrosis, seizures, coma, and respiratory arrest.	Chronic low levels of exposure to lead can affect the hematopoietic system, the nervous system, and the cardiovascular system. Lead inhibits several key enzymes involved in heme biosyntheses. One characteristic effect of chronic lead intoxication is anemia, by reduction of both hemoglobin production and shortened erythrocyte survival. In humans, lead exposure has resulted in nervous system injury including reduced hand-eye coordination, reaction time, visual motor performance, and nerve conduction velocity. Developing children appear especially sensitive to lead-induced nervous system injury. Lead can also affect the immune system and produce gingival lead lines. Epidemiological studies have indicated that chronic lead exposure may be associated with increased blood pressure in humans. Exposure to lead is associated with sterility, abortion, neonatal mortality, and morbidity. Organolead compounds are neurotoxic.	Lead salts have shown some evidence of carcinogenicity in animals at very high exposure levels.	Children are especially sensitive to low-level exposures to lead.
Manganese	Toxicity following acute ingestion of inorganic manganese salts is unlikely since they are poorly absorbed from the gastrointestinal tract. If dust or fume is inhaled in sufficient quantity, may produce "metal fume fever".	Systemic toxicity is most common following chronic inhalation or ingestion. Two clinical patterns are common: one involving the degeneration of the CNS resulting in manganese psychosis; and the other involving acute pneumonitis.	Existing studies are inadequate to assess the carcinogenicity of manganese.	Manganese is an element considered essential to human health. High levels may interfere with iron absorption. Divalent mangangese (2+) is about 2 to 3 times more toxic than is manganese(3+).

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Mercury	Inhalation of mercury vapor can cause bronchitis and nervous system effects. Oral exposure can result in abdominal cramps, gastrointestinal effects, ulceration, shock, circulatory collapse, and renal failure.	Occupational exposure to inorganic mercury can produce effects on nervous system, including tremors, erethism, muscular weakness, personality changes, gingivitis, and colored eye reflex. In children, pink disease has been reported after ingestion of mercurous compounds. Exposure to organic mercury can cause sensory and visual disturbances, tingling, paresthesia, numbness, tunnel vision leading to blindness, visual and peripheral neuropathy, weakness in extremities and progressive ataxia, tremor, cerebral atrophy, degeneration of nerves, and death.	Mercury is not known to be carcinogenic in humans or laboratory animals.	Mercury is transferred transplacentally. Toxicity depends on chemical form. Metallic, organic, and inorganic compounds can be biotransformed.
Nickel	Signs of acute nickel toxicity may include headaches, nausea, vomiting, chest pain, cough, hyperpnea, cyanosis, gastrointestinal and CNS effects, weakness, fever, pneumonia, respiratory failure, cerebral edema, and death. Acute exposures to nickel-containing dust may result in chemical pneumonitis.	Rhinitis, nasal sinusitis, and nasal mucosal injury are among the effects reported among workers chronically exposed to various nickel compounds. Allergic contact dermatitis and other dermatological effects are the most frequent effects of dermal exposure to nickel and nickel-containing compounds.	There is extensive epidemiological evidence indicating excess cancer of the lung and nasal cavity for workers exposed to certain nickel compounds. Nickel compounds implicated as having carcinogenic potential include insoluble dusts of nickel subsulfide and nickel oxides, vapor of nickel carbonyl and soluble sulfate, nickel carbonyl.	Nickel may be an essential element.
Silver	Argyria (local or generalized impregnation of tissue causing discoloration of skin and eye) may effect eyes and respiratory tract. Gastrointestinal irritation may occur with oral exposure.	Kidney and lung damage and possibly arteriosclerosis have been reported for industrial or medial exposures.	Silver is not known to be carcinogenic in humans or laboratory animals.	

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Thallium	Thallium is absorbed by the intact skin, by inhalation, and by the gastrointestinal route. Absorption via these routes is demonstrated to be very rapid in animals. Thallium is a potent neurotoxin and can induce nausea, vomiting, GI pain, constipation, bloating, and GI bleeding, coma, delirium, hallucinations, and seizures. Paresthesias, neuritis alopecia, ataxia, tremors, and psychologic and emotional changes may occur later. Tachycardia, paralytic ileus, and slight hypertension may also result. Death may occur due to cardiac dysrhythmias, shock, coma, and renal failure. Dermal effects include erythema, anhidrosis, sebaceous gland injury, and scaliness.	Recovery from thallotoxicosis may be lengthy, and can include residual neuropathy. Chronic exposure is rare; symptoms include weakness in the legs, hair loss, painful legs, psychologic disturbances, and alopecia.	Thallium is not classifiable as to its carcinogenicity, based on lack of data in both animals and humans.	
Vanadium	Signs and symptoms of exposure to vanadium pentoxide include irritation of mouth and stomach, vomiting, abdominal spasms, and tongue discoloration. Inhalation of dust irritates the nose and throat and can result in pulmonary edema. Contact with eyes and skin causes irritation and redness.	Chronic inhalation exposure to vanadium pentoxide may cause bronchitis, emphysema, and bronchial pneumonia.	The cancer potential of vanadium is not indicated.	The toxicity of vanadium increases with its valence. Vanadium is not readily absorbed through the skin or gastrointestinal tract; most adverse health effects occur from inhalation.

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Zinc	Acute adverse effects of zinc include: metal fume fever by inhalation of fumes; and fever, nausea, vomiting, stomach cramps, and diarrhea from ingestion.	Prolonged ingestion of zinc can result in irritability, muscular stiffness and pain, loss of appetite, and nausea. High levels of zinc in diet may retard growth and produce defective mineralization of bone.	Zinc is not known to be carcinogenic in humans or laboratory animals.	Zinc is an essential nutrient in human nutrition. The taste threshold is 15 ppm in water; 40 ppm soluble zinc salts in water imparts a metallic taste.
Polychlorinated Biphenyls				
PCBs	Acute exposure of rats to technical mixtures at high doses causes diarrhea, loss of appetite, and liver necrosis.	Cumulative toxic effects may follow continuous exposure at low levels. In animals, the most notable effects are alterations to the liver, including liver enlargement, fatty infiltration, centrilobular neurosis, induction of metabolizing enzymes, and changes in porphyrin metabolism. Effects on liver enzymes may alter the toxicity of other chemicals. Adverse reproductive effects and fetotoxicity have been observed in animals. Immunosuppressive effects have also been reported.	Rats fed Aroclor 1260 exhibit an increased incidence of neoplastic nodules and hepatocellular carcinomas (liver tumors), as well as proliferative lesions in the liver.	

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Polycyclic Aromatic Hydrocarbons				
Anthracene	Anthracene is a photosensitizer in hairless mice.	Anthracene has caused an increased incidence of melanosis of the colon and rectum in humans. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Evidence of carcinogenicity is lacking. Anthracene was negative as a complete carcinogen following chronic dermal exposure. Anthracene is also inactive as an initiating agent.	
Benzo(a)anthracene	No information is available on short-term dermal or inhalation effects.	No information is available on systemic effects. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Evidence exists that benzo(a)anthracene is carcinogenic to laboratory animals through dermal and ingestion exposure routes. May cause skin and lung cancer. Benzo(a)anthracene has been shown to be mutagenic in laboratory experiments.	Benzo(a)anthracene may be metabolized into reactive derivatives.
Benzo(a)pyrene	Acute toxicity appears low when administered by oral or dermal routes to laboratory animals.	Prolonged exposure may produce chronic dermatitis and reproductive changes. Repeated oral doses to mice have caused hypoplastic anemia. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Benzo(a)pyrene is a constituent of coal tar, which is classified as a known carcinogen by IARC and a probable carcinogen by the EPA. Ingestion may produce stomach tumors, and inhalation may produce lung cancer. Prolonged skin exposure has been linked to an increase in skin cancer among workers. Benzo(a)pyrene is considered to be the most potently carcinogenic PAH. Benzo(a)pyrene is a mutagen.	
Benzo(b)fluoranthene	No information is available.	Systemic effects specific to benzo(b)fluoranthene have not been reported. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Experimental evidence exists of lung and skin cancer in laboratory animals induced by dermal absorption and intratracheal distillation.	
Benzo(k)fluoranthene	Little information is available.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Benzo(k)fluoranthene is a probable human carcinogen.	

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Benzo(g,h,i)perylene	Limited information is available.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Benzo(g,h,i)perylene is a liver and skin carcinogen in laboratory animals. It has been reported to produce cocarcinogenic effects when applied to mouse skin along with benzo(a)pyrene.	
Carbazole	No information is available.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects.	No data are available in humans. Limited evidence of carcinogenicity in animals. Not classifiable as to its carcinogenicity to humans. Carbazole was not mutagenic to Salmonella typhimurium.	
Chrysene	Chrysene is absorbed orally and dermally.	Chrysene accumulates in adipose and mammary tissues. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Chrysene is carcinogenic in laboratory animals exposed to prolonged dermal doses. There is limited evidence that chrysene is mutagenic. Epidemiological reports indicate the incidence of skin cancer due to exposure to PAH mixtures which included chrysene.	
Dibenzo(a,h)anthracene	Orally absorbed. Dermal absorption is slow. High doses in laboratory animals have produced fetal death.	PAHs as a group may cause skin disorders and have immunosuppressive effects.	There is sufficient evidence that dibenzo(a,h)anthracene is carcinogenic in laboratory animals. Oral doses have caused tumors in mice. Lung tumors in rats resulted from intratracheal distillation, and skin cancer resulted following dermal application.	
Dibenzofuran	May cause irritation.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects.	No animal or human studies available.	
Fluoranthene	Fluoranthene is toxic by oral and dermal absorption. It is a defatting agent that may affect the skin, and can cross epithelial membranes.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects.	There is no evidence that fluoranthene is carcinogenic. Cocarcinogenic effects have occurred following simultaneous dermal exposures with other PAHs.	
Indeno(1,2,3-c,d)pyrene	Little information is available.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects.	This compound is a probable human carcinogen.	

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Naphthalene	Inhalation of vapor may cause eye irritation, headache, and confusion. Ingestion may cause abdominal pain, nausea, and vomiting. Skin or eye contact may lead to systemic effects such as bladder irritation, kidney effects, and hemolytic effects. In animal studies, bronchial necrosis was observed in rats.	Occurrence of cataracts upon exposure to naphthalene vapor and dust has been observed in humans. Subchronic animal studies have shown that oral doses produced cataracts and degeneration of the retina. Dermatitis has been reported with repeated skin exposure. Two studies have reported hemolytic anemia in infants born to women exposed during pregnancy. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Studies have not shown that naphthalene is carcinogenic. Naphthalene is commonly found in coal tar and epidemiological studies have shown coal tar to be carcinogenic. The role of naphthalene alone could not be determined.	Hemolytic effects from acute exposure are more pronounced in individuals with a hereditary deficiency of glucose-6-phosphate dehydrogenase.
Phenanthrene	Phenanthrene is an irritant through inhalation and ingestion exposure, and may also be dermally absorbed. Phenanthrene can cause photosensitization of the skin.	Phenanthrene may be an allergen. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Cancer potential is not indicated.	
Pyrene	Limited information is available.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects. Evidence suggests that pyrene is cocarcinogenic in laboratory animal experiments.		
Pesticides				
DDD (dichlorodiphenyl-dichloroethane)	Little information is available. Guinea pigs exposed intraperitoneally to DDD exhibited tremors.	Primary effects observed in animals are to the liver, nervous system, developing fetus, and adrenal gland.	DDD is considered to be a probable human carcinogen, based on increased incidence of lung and liver tumors in mice and thyroid tumors in rats.	DDD was used to kill pests and to treat cancer of the adrenal gland. It is also a contaminant of technical DDT.

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DDE (dichlorodiphenyl-ichloroethylene)	CNS disruption occurs, resulting in excitation, seizures, convulsions, tremor, ataxia, agitation, nervousness, amnesia and respiratory depression. Aspiration may result in pneumonitis. Nausea, vomiting, and diarrhea may also follow from ingestion. Extensive contact results in dermal irritation. It may prove fatal by any route of exposure.	DDE causes liver and kidney damage.	DDE is considered to be a probable human carcinogen, based on increased incidence of liver tumors in mice and hamsters and thyroid tumors in rats by diet.	DDE is environmentally persistent and is a ubiquitous water contaminated. It is a dehydrochlorination reaction product of DDT, and is much less toxic to insects and higher organisms and less degradable than DDT. The degradation pathway of DDE is not well-known.
DDT (dichlorodiphenyl-trichloroethane)	CNS disruption occurs, resulting in excitation, seizures, convulsions, tremor, ataxia, agitation, nervousness, amnesia and respiratory depression. Aspiration may result in pneumonitis. Nausea, vomiting, and diarrhea may follow ingestion. Extensive contact results in dermal irritation. Its acute toxicity is considered to be moderate. It may, however, prove fatal by any route of exposure.	DDT causes the loss of egg-shell integrity in some birds. It also causes liver and kidney damage.	DDT is considered to be a probable human carcinogen, based on tumors in rats and mice (generally of the liver) and on its structural similarity to DDE and DDD, two probable human carcinogens. DDT tested positive for tumor induction in one or more species of test animals.	DDT and its breakdown products are persistent and readily biomagnified.
Dieldrin	Major toxicity involves the nervous system; exposure can produce tremors, giddiness, hyperexcitability, seizures and coma. It has also produces headache, dizziness, ataxia, and muscle twitching. CNS effects can be irreversible.	Memory impairment and emotional disturbances may result from exposure. Dieldrin has produced reproductive effects in animals.	Dieldrin is considered to be a probable human carcinogen based on tests on seven mouse strains and its structural similarity to other animal carcinogens. Excess cancer has been noted in workers and in animals.	Dieldrin is a pesticide that can also be formed from the conversion of aldrin in the environment. Dieldrin is absorbed through all routes of exposure, and is very persistent.
Endrin Aldehyde	No acute toxicity information is available.	No chronic toxicity information is available.	Cancer potential is not indicated.	Endrin Aldehyde is chemically similar to the agricultural pesticide dieldrin. Dieldrin produces liver cancer in some mammals and suppresses the immune system.

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Heptachlor epoxide	Little information is available.	Long-term exposure to heptachlor epoxide has caused liver and kidney damage, increased RBC count, and tremors and convulsions. It may be associated with infertility and improper development.	Heptachlor epoxide is a probable human carcinogen.	This compound is an oxidation product of heptachlor. It remains in soil for long periods of time.
Volatile and Semivolatile Compounds				
Acetone	Systemic and central nervous system (CNS) depression are likely to occur due to inhalation, ingestion, or dermal absorption of acetone. CNS toxicity ranges from ataxia and sedation to varying degrees of coma. Respiratory depression, cough, and bronchial irritation may occur if inhaled. Vomiting (including hematemesis) may be noted after ingestion. Renal tubular necrosis may occur following exposure, but is rare. Hyperglycemia and ketonemia mimicking acute diabetic coma are commonly reported as a result of acetone metabolism. Occupational exposure for 15 minutes to concentrations of 1,660 ppm causes irritation to the eyes and nose.	Liver and kidney weight, and tubular degeneration of the kidneys increased significantly in orally dosed rats. There have been no reports that prolonged exposure to low vapor concentrations results in any serious chronic effects in humans.	Not classifiable as to human carcinogenicity. Acetone was found to be non-mutagenic in the Ames assay. Furthermore, acetone gave negative result in assays for teratogenicity, chromosomal aberrations, and DNA binding studies.	Because of its high water solubility, acetone is rapidly absorbed, transported, and excreted from the body. Ingestion of 10 to 20 ml generally does not result in toxicity. Ingestion of 200 ml produced severe coma and hyperglycemia in adults. The toxic dose for children is considered to be 2 to 3 ml.

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Benzene	Signs and symptoms from mild exposure include dizziness, weakness, euphoria, headache, ataxia and tightness in the chest. A burning sensation of the oral mucous membranes, esophagus, and stomach as well as nausea, vomiting, and abdominal pain may occur after ingestion. Inhalation results in bronchial irritation, cough, and hoarseness; pulmonary edema may be noted. Inhalation exposure to high levels of benzene may lead to depression of the central nervous system and induce blurred vision, tremors, shallow and rapid respiration, ventricular irregularities (including fatal cardiac arrhythmias), paralysis, unconsciousness, and death.	Fatigue, headache, anorexia and dizziness may be noted following chronic exposure to benzene.	Benzene is listed as a known human carcinogen. Benzene exposure has been associated with the development of leukemia in humans. Lifetime exposure to 100 ppm is associated with 140 excess deaths from leukemia/1,000 individuals; 10 ppm is associated with 14 excess deaths from leukemia/1,000 individuals. The major toxic effect is hematopoietic toxicity (affecting blood formation); chronic exposure of workers to low levels has been associated with blood disorders, such as leukemia and aplastic anemia (depression of all three types of blood cells in the absence of functioning marrow). Benzene is weakly mutagenic in human lymphocytes. Both gavage and inhalation exposure to rodents have resulted in development of neoplasia.	Chromosomal aberrations in bone marrow and blood have been reported in experimental animals and some workers. 100 ml is the estimated lethal dose.
Bis(2-ethylhexyl) phthalate	This compound is not considered to be acutely or chronically toxic.		This compound is classified as a probable human carcinogen, based on significant dose-related increases in liver tumor responses in rats and mice of both sexes.	

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Carbon tetrachloride	Acute toxicity signs and symptoms include dyspnea, cyanosis, proteinuria, hematuria, jaundice, hepatomegaly, optic neuritis, ventricular fibrillation, eye-nose-throat irritation, headache, dizziness, nausea, vomiting, abdominal cramps, and diarrhea. CNS depression with deepening coma and death from respiratory arrest or circulatory collapse may result. In massive exposures, general kidney and liver damage may occur. In general, the main target organ is the liver.	Chronic exposure usually results in nausea, vomiting, headache, drowsiness, and fatigue. Hepatic cirrhosis and necrosis, renal damage, and serum changes may result. Carbon tetrachloride has reduced fetal weights after maternally toxic inhalation exposures. Fetal effects have been noted in several studies.	Carbon tetrachloride is classified as a probable human carcinogen based on inadequate human data and sufficient evidence of hepatocellular carcinoma in rats, mice, and hamsters. All mutagenicity studies have been negative; this may be due to inadequate activation in the test systems.	Carbon tetrachloride is metabolized to a reactive radical intermediate, which is believed to induce lipid peroxidation and subsequent hepatotoxicity. There may be an age difference in susceptibility to carbon tetrachloride-induced hepatotoxicity. It is rapidly absorbed and distributed in the body, and is excreted primarily via the lung.
Chlordane, alpha Chlordane, gamma	Large amounts of chlordane taken orally primarily affects the nervous and digestive systems and the liver. Convulsions and death may occur. Dermal exposure has also resulted in convulsions. Exposure can cause headaches, irritability, confusion, weakness, vision problems, nausea, vomiting, stomach cramps and diarrhea.	Long term exposure in food caused liver and nervous system effects in rats and death in mice.	Chlordane is considered to be a probable human carcinogen, based on the incidence of liver tumors in rats and mice.	

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Chlorobenzene	CNS depression and irritation of the eye and respiratory tract have been reported in humans exposed to chlorobenzene. Workers exposed to chlorobenzene exhibited blood dyscrasia. Cardiac effects and toxemia of pregnancy were noted in workers exposed to chlorobenzene and other chemicals. Liver necrosis and interference with porphyrin metabolism occurred in rats dosed orally with chlorobenzene. Kidneys of rabbits were swollen after injection with chlorobenzene.	In dogs exposed to chlorobenzene via inhalation increased adrenal gland weights, increased liver-to-body weight ratios, and emesis were documented. In rats dosed orally, increased liver and kidney weights and histopathological changes in the liver were observed. Histopathological changes in lymphoid, liver, and kidney tissues and depressed body weight gain were also found in another study with mice and rats receiving chlorobenzene by gavage. In a NTP chronic study of rats and mice receiving chlorobenzene by gavage, liver necrosis occurred in rats and decreased survival was found in low-dose male mice but not high-dose male mice. No teratogenic effects were seen in two-phase inhalation study of rats and rabbits.	Findings regarding human carcinogenicity are inconclusive. Increased incidence of neoplastic nodules was observed in the livers of male rats receiving chlorobenzene in corn oil by gavage, but judged to be of borderline significance because of carcinomas in vehicle controls. Mutagenicity test results are mixed.	Chlorobenzene is lipophilic.
Chloroethane	A high dose exposure may produce dizziness, incoordination, inebriation, abdominal cramps, potentiation of epinephrine with possible cardiac arrhythmias, and liver or kidney damage. Vapors are mildly irritating to eyes, mucous membranes, and respiratory tract. Liquid is harmful to the eyes, and may cause frostbite if spilled on the skin. Lung damage has not been reported in humans, but occurred with high concentrations in animals.	Chloroethane may cause fatty changes in the liver, kidney, and heart. Some workers occupationally exposed exhibited pathological changes in the sympathetic nervous system, decreased phagocyte activity of leukocytes, and lowered hippuric acid formation in the liver. Histopathological changes in the lung, brain, and CNS system have also been observed.	According to IARC, chloroethane is a Group 3 chemical (not classifiable as to its carcinogenicity). There is limited evidence for carcinogenicity in experimental animals. In laboratory studies, there was an increased incidence of alveolar/bronchiolar neoplasms of the lung and carcinomas of the uterus, with a marginally increased incidence of hepatocellular neoplasms. There was also equivocal evidence of carcinogenic activity as indicated by benign and malignant epithelial neoplasms of the skin in male mice and malignant astrocytomas of the brain in female mice.	Chloroethane is fetotoxic. It caused foramina of the skull bones in the fetuses of exposed laboratory animals, as well as rib malformations. In addition, chloroethane may disrupt the estrus cycle of laboratory animals. Chloroethane was mutagenic with and without exogenous metabolic activation in several Salmonella typhimurium strains, and showed no evidence of mutagenicity in other strains.

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Chloroform	Chloroform is a CNS and cardiac depressant; signs and symptoms include inebriation, dizziness, excitation, unconsciousness, nausea, and vomiting. Extreme exposure may cause cardiac irregularities, liver and kidney injury, death from cardiac arrest, and delayed liver and kidney damage. Delayed renal and hepatic toxicity as well as nausea, vomiting, and gastrointestinal irritation may also occur after ingestion. Respiratory depression, chemical pneumonitis, and pulmonary edema may occur following inhalation. Conjunctivitis and blepharospasm may occur from exposure to vapors of chloroform. Liquid chloroform in the eyes causes immediate burning pain, tearing, and reddening of conjunctiva. The corneal epithelium is usually injured and may temporarily be partially lost.	Repeated exposure results in liver injury and possible kidney injury. Chloroform with metabolic activation failed to induce chromosome breakage or sister-chromatid exchanges in human lymphocytes. Chloroform is fetotoxic in rats. Chloroform may be embryotoxic.	Listed as a probable human carcinogen, based on inadequate evidence in humans and sufficient evidence in animals. A statistically significant increased incidence of hepatocellular carcinoma was found in mice, due to oral ingestion of chloroform. Oral ingestion also induced kidney epithelial tumors in male rats. It is proven to be non-mutagenic in the Ames assay with and without metabolic activators.	Chloroform is rapidly and extensively absorbed through both respiratory and gastrointestinal tracts. Signs of chloroform poisoning in humans include a characteristic sweetish odor on the breath, dilated pupils, cold and clammy skin, initial excitation alternating with apathy, loss of sensation, abolition of motor functions, prostration, unconsciousness and eventual death. Toxic blood level: 70.0 to 250 mg/l; Lethal blood level: 390.0 mg/l. Fatal dose by ingestion or inhalation is reported to be 10 ml.
Dibromochloro-methane	Oral administration of less than the LD_{50} produced sedation and anesthesia, and effects on the liver, kidneys and adrenals.	No chronic information is available.	This compound is classified as a possible human carcinogen, based on inadequate human data and limited evidence in animals (positive carcinogenicity in mice, positive mutagenicity, and structural similarity to other carcinogens).	Dibromochloromethane is formed during chlorination in the presence of humic material.

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1,4-Dichlorobenzene (p-dichlorobenzene)	There is no evidence of severe toxicity in humans. Isolated cases of pulmonary granulomatosis, hemolytic anemia, and allergic purpura have been reported. Tingling of hands, vertigo, and weight loss occurred in a worker exposed to a mixture containing 1,4-dichlorobenzene.	Hepatic effects have been observed in rats and mice administered 1,4-dichlorobenzene by gavage; these effects included cloudiness, swelling, necrosis, porphyria, and increased liver weight. Renal lesions have also been reported in rats and mice receiving 1,4-dichlorobenzene by gavage; in some studies, multi-focal degeneration and necrosis occurred. Effects on bone marrow, nasal turbinates, small intestine, spleen, and thymus have also been described in rodents. Changes in weight of spleen, liver, heart, kidney, and lungs were noted in rats exposed by inhalation, as well as liver and kidney lesions, pulmonary edema and congestion, and reversible changes in the eye. Abnormal mitotic division has been induced in higher plants.	The carcinogenic classification of this compound has not been determined. In rats administered 1,4-dichlorobenzene by gavage renal and liver adenocarcinomas developed in males. Liver adenomas and carcinomas appeared in male and female mice. In one study, no fetotoxicity or teratogenicity occurred in rabbits.	
1,1-Dichloroethane (1,1-DCA)	This compound can cause salivation, sneezing, and coughing. Anesthetic effects have been observed, with associated dizziness, nausea and vomiting. In severe and fatal cases, hepatic and renal injury have been observed.	1,1-DCA has little capacity to cause liver or kidney injury on repeated exposure; however, repeated or prolonged dermal exposure can cause skin burns, scaliness, and rash.	This is a possible human carcinogen based on limited animal data and structural similarity to 1,2-DCA, a probable human carcinogen. Limited evidence exists of the occurrence of mammary and benign uterine polyps in female rats and mice respectively, and of liver carcinomas in male mice. This chemical is mutagenic in Salmonella strains TA 98, 100, 1537 and negative in strain TA 1535. Additionally, it is classified as a weak initiator due to its ability to covalently bind to DNA. Specifically, it is able to bind to mouse and rat RNA and DNA in liver, lung, and stomach tissue.	1,1-Dichloroethane caused delayed ossification of sternebrae in developing rat fetuses.

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1,2-Dichloroethane (1,2-DCA)	This is a CNS depressant that produces signs and symptoms ranging from nausea, vomiting, headache, lightheadedness, weakness, stupor, and disequilibrium, to coma and respiratory arrest. Ingestion of large amounts has also produced widespread organ damage (especially in kidneys, liver, and adrenal glands) as well as gastrointestinal bleeding.	Weight loss, low blood pressure, jaundice, oliguria, or anemia may occur after repeated minimal exposure via inhalation or skin absorption. Skin tissue defatting occurs. Pathological evidence exists of damage to the liver, kidneys, and adrenal glands in humans and several animal species exists. It is not considered to be a teratogen in laboratory animals.	This compound is a probable human carcinogen and is suspected of producing excess occupational mortality from tumors and diseases of the circulatory system. 1,2-DCA has been shown to be a carcinogen in laboratory animals. Tumors produced include increased incidence of mammary and uterine adenocarcinomas, endometrial stromal neoplasms of the uterus, and squamous-cell carcinomas of the forestomach in females; lung adenomas and malignant histiocytic lymphomas in males and females; and hepatocellular carcinomas in male mice. Single-stranded breaks in DNA of hamster cells and chromosomal aberrations in barley kernels have been produced. 1,2-DCA has a weak direct mutagenic effect in Salmonella typhimurium strain TA-1535, and is considered to be a probable mutagen.	The primary target appears to be the CNS. Ingestion of 400 to 1,000 mg/kg body weight is fatal in humans. Death is thought to be caused by circulatory or respiratory failure. Autopsies have revealed liver necrosis and focal adrenal degeneration and necrosis.
1,1-Dichloroethylene (Vinylidene chloride; 1,1-DCE)	Contact may irritate or burn the skin. It is irritating to the eyes and may cause conjunctivitis and transient corneal injury. Inhalation of high concentrations produces CNS depression resulting in poor coordination, stupor, drunkenness, and unconsciousness. Narcosis has been noted at concentrations exceeding 4,000 ppm.	Inhalation may produce hepatic and renal dysfunction. Low-level oral or inhalation exposure produces symptoms similar to acute exposure. It was shown to be mutagenic in several bacterial test strains. It was also shown to be non-mutagenic in chinese hamster cells. Rats exposed by inhalation for six hours daily, five days per week, for 18 months at 25 or 75 ppm showed a target organ effect on the liver. The liver lesions, however, were reversible, as they disappeared during the last six months of the study after exposures had been discontinued.	1,1-DCE is classified as a possible human carcinogen, based on tumors observed in one mouse strain after inhalation exposure. It is mutagenic for Salmonella typhimurium in multiple assays. 1,1-DCE is structurally related to vinyl chloride, a known human carcinogen.	No toxic levels have been reported. A human study of 138 employees exposed to 5 to 20 ppm showed no changes in mortality or health parameters.

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cis-1,2-Dichloroethylene (cis-1,2-DCE)	This chemical is toxic via all exposure routes. It is an irritant of the skin and mucous membranes. Inhalation causes nausea, vomiting, weakness, tremor, epigastric cramps, and CNS depression. Ingestion also causes CNS depression. In general, the liver is the primary target organ.	Repeated exposure of cats & rabbits to vapor concentrations of 0.16-0.19% in air resulted in loss of appetite, decrease in body weight, & pathological changes in the lung, liver, & kidneys.	This chemical is not known to be carcinogenic in humans or laboratory animals. This isomer was not mutagenic in the Salmonella/microsome preincubation assay using five different strains, in both the presence and absence of rat and hamster liver. In a host-mediated assay using Saccharomyces cerevisiae, the cis-isomer showed evidence of mutagenic activity. The cis-isomer also induced unscheduled DNA synthesis in isolated hepatocytes.	Haziness has been observed in the corneas of dogs exposed to the vapor.
trans-1,2-Dichloroethylene (trans-1,2-DCE)	Inhalation causes nausea, vomiting, weakness, tremor, epigastric cramps, and CNS depression. Contact with liquid causes irritation of eyes and (on prolonged contact) skin. Ingestion causes CNS depression.	Cats and rabbits repeatedly exposed to the trans-isomer at concentrations of 0.16% to 0.19% in air showed loss of appetite and some respiratory irritation but no histopathological changes in organs.	Cancer effects have not been studied in humans or animals. The trans-isomer was not mutagenic to Escherichia coli strain k-12 in culture medium containing mouse liver microsomes. Additionally, it was not mutagenic in tests using Salmonella typhimurium strains in vitro without metabolic activation, nor in vivo with metabolic activation (host-mediated assay), nor in a cytogenetic analysis of bone marrow cells from female mice after single and repeated injections.	Human and animal studies are limited. Human studies have been limited to the neurological effects from inhalation exposure. Dichloroethylene is largely excreted through the lungs.
Di-N-Octyl phthalate	Little information is available. This compound is mildly toxic by ingestion, and is a severe skin and eye irritant.	Di-N-octyl phthalate exposure has resulted in teratogenic and reproductive effects in animals.	The carcinogenicity of this compound is not indicated.	

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Ethylbenzene	Acute toxicity is low. Low-level ingestion or inhalation exposure causes irritation of the eyes, nose, throat, skin, and mucous membranes. At high levels of exposure the irritating effects are more pronounced and the exposed subject may feel week, dizzy, and drowsy.	Histopathologic changes in the liver and kidneys, narcotic effects, and adverse reproductive effects were noted in oral and inhalation animal studies. Inhalation exposure to concentrations of up to 1,000 ppm did not induce embryotoxicity, phytotoxicity, or teratogenicity in rats or rabbits. No adverse health effects were noted in human volunteers inhaling vapors at 100 ppm for eight hours.	Cancer potential is not indicated. Mutagenicity has not been demonstrated in this chemical.	Inhalation is the primary route of exposure.
2-Hexanone	Eye exposure may result in pain and corneal damage. Tachycardia may be noted. Respiratory depression and CNS depression may follow inhalation; headache, dizziness, tremor, fainting, coma and death may occur. Nausea, vomiting and hypothermia may be noted. Skin exposure may result in dermatitis and paresthesias of affected areas. Oral ingestion or skin exposure may result in burns.	Polyneuropathy has been reported in humans and laboratory animals after chronic exposure. Pregnant rats exposed throughout gestation experienced a decrease in weight gain and litter size; pups experienced lower birth weights and decreased postnatal growth.	The carcinogenicity of 2-hexanone is not determined.	

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Methylene chloride	At high levels, it is a CNS depressant producing behavioral and performance deficits, depression, and coma, as well as toxicity to the liver, kidneys, and cardiovascular system. The CNS and liver are the primary target organs.	Oral exposure to drinking water resulted in changes in the blood and liver of rats. The potential for teratogenicity is low.	Methylene chloride is a probable human carcinogen based on evidence of carcinogenicity from inhalation bioassays using rats and mice, and lack of evidence in humans. Rats developed benign mammary gland neoplasms, and mice alveolar/bronchiolar and hepatocellular neoplasms. No conclusive association between exposure and incidence of liver or lung tumors found from human epidemiological studies. It is judged to be weakly mutagenic.	Methylene chloride is lethal to humans if swallowed or inhaled. It is absorbed through and is distributed rapidly from lung and gut, and is highly lipid-soluble.
2-Methylnaphthalene	2-Methylnaphthalene is toxic by all routes (ingestion, inhalation, and dermal). Effects from exposure may include facial flushing, fever, headache, skin irritation, corneal damage, nausea, anorexia, heptatocellular injury, convulsions, and coma.	No chronic toxicity information is available.	Cancer potential is not indicated.	
4-Methylphenol (P-Cresol)	Methylphenols, including 4-methylphenol (p-cresol) and 2-methylphenol (o-cresol), are rated as very toxic compounds. Methylphenols are strong skin irritants and frequently cause rashes. Serious or even fatal poisoning may result if large areas of the skin are exposed to these compounds. Ingestion of relatively small amounts can cause paralysis and coma.	As with phenol, chronic exposures to methylphenols have been reported to result in a broad spectrum of toxic effects in laboratory animals.	The cancer potential of methylphenols is not indicated.	

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Pentachlorophenol	Can cause high body temperature and profuse sweating. Rapid pulse, coma, heart failure, and death can occur within 30 hours of initial symptoms. Nonfatal poisoning can cause weakness, gastrointestinal upset, headache, dizziness, and seizures. Potent skin, eye, and upper respiratory tract irritant.	Long-term exposure to low levels such as those that occur in the workplace can cause damage to the liver, kidneys, blood, and nervous system. Chronic exposure in humans can cause hemolytic and aplastic anemia and weight loss.	An increased risk of cancer has been shown in some laboratory animals given large amounts of pentachlorophenol, but there is no good evidence that pentachlorophenol causes cancer in humans. IARC has determined that pentachlorophenol is possibly carcinogenic to humans.	Fetotoxic in animal studies. Chronic occupational exposure has caused cloracne, which may be related to contamination with dioxins and furans.
Phenol	Phenol is caustic, and acute oral exposure produces severe irritation to the gastrointestinal tract, irregularities in heart function, and liver and kidney damage. Skin contact with liquid phenol can result in severe injury.	Chronic exposure to phenol has been associated with sores in the mouth and gastrointestinal effects such as diarrhea in humans. These effects were associated with approximately 5 to 126 ppm phenol in drinking water. Elevated exposure to phenols have been shown to cause damage to the liver, kidneys, cardiovascular, and nervous systems. Severe dermatitis has been reported following prolonged dermal contact to relatively low concentrations of phenol.	The cancer potential of phenol is not indicated.	

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Tetrachloroethylene (Perchloroethylene, PCE)	PCE is a central and peripheral nervous system depressant producing dizziness, confusion, headache, and nausea. It is also an irritant of eyes and mucous tissue. Overexposure can cause malaise, dizziness, fatigue, headache, lightheadedness, sweating, staggering, inebriation, and mental dullness which most often clear rapidly when the victim is moved to fresh air. Transient liver and kidney damage in humans has been associated with high dose exposures. Workers rendered unconscious for hours have survived without sequelae.	Dermal blistering and dermatitis may occur with repeated direct skin contact. Chronic inhalation exposure has been associated with the development of peripheral neuropathies. Occupational exposure has resulted in hepatitis, confusion, disorientation, muscle cramps, fatigue, and agitation. Chromosome abnormalities were seen in lymphocytes from exposed workers. In one study, no fetal toxicity or teratogenicity was detected from pregnant rats and mice exposed to 300 ppm PCE. However, fetotoxicity and developmental abnormalities have been described in other experimental animals. PCE is a proven hepatotoxin in mice.	PCE is carcinogenic in experimental animals, but epidemiologic evidence from studies of laundry and dry cleaning workers has been judged to be inadequate in the assessment of its potential for human carcinogenicity. It was not mutagenic in two strains of Salmonella typhimurium, but was mutagenic in a test using L5178Y mouse lymphoma cells, and is considered to be a weak mutagen.	PCE is readily absorbed and eliminated from the body via the lung. Metabolism of PCE is relatively slow, with only a few percent of the total dose being excreted as metabolites. An autopsy after a fatal PCE exposure revealed an eight-fold greater concentration in the brain than in the blood.

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LIBERTY INDUSTRIAL FINISHING SITE

CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Toluene	Toluene appears to produce reversible effects upon liver, renal, and nervous systems. Lower-level acute exposures in humans produce dizziness, exhilaration and confusion. High-level toluene exposure (or exposure in confined areas) has produced incoordination, ataxia, unconsciousness and eventually, death. Ingestion of toluene probably causes transient CNS depression. Ingestion may also result in a burning sensation of the oropharynx and stomach followed by nausea, vomiting (including hematemesis), and abdominal pain. Inhalation may result in bronchial and laryngeal irritation, upper bronchial lacrimation, and respiratory failure. However, concentrations in air of up to 800 ppm have caused only slight irritation to the human eye.	Profound muscle weakness secondary to hypokalemia may be noted following chronic inhalation. Hallucinations may be noted, especially following repeated inhalation. Rats exposed to 1,500 mg/cu m of air showed no signs of teratogenic effects.	No skin tumors developed in several strains of mice painted with toluene. A chronic bioassay of toluene in rats of both sexes reported no carcinogenic effects. Toluene did not change the number of sister-chromatid exchanges or chromosomal aberrations in human lymphocytes in vitro. It is non mutagenic in Salmonella typhimurium strains TA1535, TA1537, TA1538, TA98 and TA100 in the Ames assay, both with and without metabolic activation, and has been provisionally classified as non-mutagenic.	The nervous system appears to be highly sensitive to the effects of toluene. Lethal levels in human blood are reported to be 10.0 g/ml. Human death has resulted from exposure to toluene at 10,000 ppm.

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TOXICOLOGICAL PROFILES FOR CONSTITUENTS OF POTENTIAL CONCERN
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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
1,1,1-Trichloroethane (1,1,1-TCA) ,	1,1,1-trichloroethane is a CNS and respiratory depressant, and a skin and mucous membrane irritant. Contact with eyes will result in chemosis and hyperemia. Following extreme acute exposure, hypotension and cardiac arrhythmia due to myocardial sensitization have occurred. Trichloroethane has a rapid anesthetic action. Acute overdoses may cause dizziness, unconsciousness and coma. Cerebral hypoxia has been reported. Human males exposed to 1,1,1-TCA at concentrations of up to 1,000 ppm experienced transient mild irritation and minimal impairment of coordination. However, at concentrations below 1,000 ppm, perceptual speed and manual dexterity were impaired. Nausea, vomiting, diarrhea, and burns of the esophagus have been noted after large ingestion exposures. May cause transient increases in liver enzyme levels and renal impairment. Extreme exposure may have adverse effects on the cardiac system.	Prolonged dermal exposure has caused transient mild to severe dermatitis in humans. Significant changes in liver cells were noted in a high-level inhalation study of male mice. Chick embryo malformations were noted from air space injections of 1,1,1-TCA. It tested negative for teratogenicity and mutagenicity in a two-generation reproductive study performed on ICR Swiss mice and has proven to be non-fetotoxic in mice and rats.	Three out of 49 male rats ingesting high doses of 1,1,1-TCA developed liver-cell adenomas, and one rat developed hepatocellular carcinomas. It is not classifiable as to human carcinogenicity. 1,1,1-TCA showed mutagenic activity when tested by the Salmonella/microsome test, the basic test on Drosophila, and the micronucleus test on mouse bone marrow.	1,1,1-TCA levels in human blood above 1.0 to 1.5 mg/100 ml can result in death. From the available data, it can be estimated that a single exposure to concentrations of 1,1,1-TCA less than 5,000 ppm is probably not life- threatening to humans. Inhalation and lung absorption is the most important and rapid route of intake into the body. Unlike other chlorinated hydrocarbons, it has not been associated with evidence of liver or kidney damage.

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Trichloroethylene (TCE)	TCE is toxic by ingestion, inhalation or dermal exposure. Optic neuritis and blindness have been reported following ingestion. Eye exposure to 160 ppm causes pain and irritation, but permanent injury is unlikely. Respiratory depression and cyanosis, and pulmonary hemorrhage and edema have been reported following ingestion and inhalation, respectively. TCE is a CNS depressant, producing headaches, dizziness, tremors, nausea and vomiting, fatigue and incoordination (full narcosis was noted at exposure concentrations of 2,500-6,000 ppm). Cases of severe liver necrosis have been reported as a result of anesthetic use of TCE. Renal failure may occur following oral or inhalation exposure to TCE. TCE is mildly irritating to the skin.	Prolonged exposures produce irritation of mucous membranes, and have been associated with impairment of peripheral nervous system function, persistent neuritis and temporary loss of tactile sense and paralysis of the fingers after direct contact with the solvent. Chronic exposure may produce varying degrees of dermatitis. Trigeminal nerve impairment has been noted in individuals chronically exposed to TCE. Female rats exposed to vapors of 1,800 ppm for two weeks showed no effects indicative of treatment-related maternal toxicity, embryotoxicity, severe teratogenicity or behavioral defects. It was neither embryotoxic nor teratogenic in Sprague-Dawley rats and Swiss Webster mice by inhalation but was embryotoxic in rats at 131 ppb concentration in water.	TCE is a probable human carcinogen based on hepatocellular tumors observed in mice. Epidemiological studies in the late 1970s and early 1980s indicated that there were no increased cancer incidence associated with human occupational exposure to TCE. These studies were considered by EPA to be inadequate. In the largest study to date, an epidemiological study of 6,929 workers exposed to TCE at an aircraft maintenance facility did not show any significant or persuasive association between TCE exposure and excess of cancer. Women employed in areas in which fabric cleaning and parachute repair were performed had more deaths than expected from multiple myeloma and non-Hodgkin's lymphoma, but this could not be positively linked with TCE exposure. TCE has been shown to be mutagenic in vivo and in vitro.	The lowest concentration that produces unconsciousness in adult humans is 16 mg/l; the equivalent oral dose is 40-150 ml. Lethal blood levels range from 3 to 110 g/ml in human blood, with an estimated fatal oral dose of 3 to 5 ml/kg.

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CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Vinyl chloride	This compound may cause CNS depression, fatigue, headache, vertigo, ataxia, euphoria, visual disturbances, numbness and tingling in the extremities, narcosis, loss of consciousness, and death from respiratory failure. Additionally, various pulmonary abnormalities have occurred including dyspnea, asthma, and pneumonoconiosis. Nausea, vomiting, diarrhea, and severe epigastric pain can result from ingestion of the liquid. Angiosarcoma, hepatomegaly, and splenomegaly have been reported as toxic effects of this agent.	Fetotoxicity and congenital malformations have been seen in animals.	Vinyl chloride is a human carcinogen. Vinyl chloride can induce angiosarcoma, a rare form of liver cancer. Cancers of the brain, lung, and blood and digestive systems, and melanoma have also been documented. Human birth defects have not been substantiated. Vinyl chloride has induced DNA damage, unscheduled DNA synthesis, DNA inhibition, mutations, chromosome aberrations, sister chromatid exchanges, micronuclei, and oncogenic transformation in a variety of in vivo or in vitro assays.	There may be a long latency period between initial exposure and the onset of symptoms.
Xylenes (*o*-Xylene, *m*-Xylene, and *p*-Xylene)	Industrial exposure to vapors in confined areas has resulted in collapse, coma, and death. Acute ingestion of xylene solvents probably causes transient CNS depression. Inhalation may result in bronchial and laryngeal irritation and lacrimation; respiratory failure and cardiac arrhythmia may also occur. Ingestion may result in a burning sensation of the oropharynx and stomach, nausea, vomiting (including hematemesis), and abdominal pain. Transient liver injury may be noted.	Animal studies have shown xylene to be both fetotoxic and teratogenic in several mice species at high doses. An increase in tumor incidence or response was not found in rats or mice ingesting technical grade xylene mixtures. Myoglobinemia, proteinuria, oliguria, rhabdomyolysis, and acute renal failure may be noted especially following repeated inhalation or accidental ingestion.	Xylenes are not classifiable as to human carcinogenicity. Bioassays for mutagenicity have shown both positive and negative results.	Blood concentrations of 3 to 40 μg/ml are likely to cause death in humans. Xylenes are absorbed readily through the skin, mucous membranes, and pulmonary system, where they are translocated through the vascular system, and have been reported to cross the human placenta.

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APPENDIX F

APPENDIX F

RME RAGS D FORMAT TABLE 7s AND 8s

(Electronic copy available on Final BHHRA CD-ROM submittal and upon request)

TABLE F7.1.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	4.02E+04	mg/kg	4.02E+04	mg/kg	R	1.35E-02	mg/kg-day	1.00E+00	mg/kg-day			1.3E-02
	Antimony	4.25E+01	mg/kg	4.25E+01	mg/kg	R	1.43E-05	mg/kg-day	4.00E-04	mg/kg-day			3.6E-02
	Arsenic	1.73E+01	mg/kg	1.73E+01	mg/kg	R	5.80E-06	mg/kg-day	3.00E-04	mg/kg-day			1.9E-02
	Cadmium	2.04E+02	mg/kg	2.04E+02	mg/kg	R	6.83E-05	mg/kg-day	5.00E-04	mg/kg-day			1.4E-01
	Chromium III	1.61E+03	mg/kg	1.61E+03	mg/kg	R	5.39E-04	mg/kg-day	1.50E+00	mg/kg-day			3.6E-04
	Chromium VI	5.36E+02	mg/kg	5.36E+02	mg/kg	R	1.80E-04	mg/kg-day	3.00E-03	mg/kg-day			6.0E-02
	Copper	3.35E+03	mg/kg	3.35E+03	mg/kg	R	1.12E-03	mg/kg-day	4.00E-02	mg/kg-day			2.8E-02
	Cyanide	2.43E+02	mg/kg	2.43E+02	mg/kg	R	8.15E-05	mg/kg-day	2.00E-02	mg/kg-day			4.1E-03
	Lead	2.71E+02	mg/kg	2.71E+02	mg/kg	R	9.09E-05	mg/kg-day	NA	mg/kg-day			NA
	Nickel	9.96E+01	mg/kg	9.96E+01	mg/kg	R	3.34E-05	mg/kg-day	2.00E-02	mg/kg-day			1.7E-03
	Thallium	8.30E-01	mg/kg	6.30E-01	mg/kg	R	2.11E-07	mg/kg-day	8.00E-05	mg/kg-day			2.6E-03
	Zinc	7.50E+03	mg/kg	7.50E+03	mg/kg	R	2.52E-03	mg/kg-day	3.00E-01	mg/kg-day			8.4E-03
	Aroclor-1254	9.90E-01	mg/kg	9.90E-01	mg/kg	R	3.32E-07	mg/kg-day	5.00E-05	mg/kg-day			6.6E-03
	Aroclor-1260	4.40E-01	mg/kg	4.40E-01	mg/kg	R	1.48E-07	mg/kg-day	5.00E-05	mg/kg-day			3.0E-03
	Tetrachloroethene	1.54E-01	mg/kg	1.54E-01	mg/kg	R	5.17E-08	mg/kg-day	1.00E-02	mg/kg-day			5.2E-06
												Total Hazard Index	3.2E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.2.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	4.02E+04	mg/kg	4.02E+04	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Antimony	4.25E+01	mg/kg	4.25E+01	mg/kg	R	NA	mg/kg-day	6.00E-05	mg/kg-day			NA
	Arsenic	1.73E+01	mg/kg	1.73E+01	mg/kg	R	2.28E-06	mg/kg-day	3.00E-04	mg/kg-day			7.6E-03
	Cadmium	2.04E+02	mg/kg	2.04E+02	mg/kg	R	8.93E-07	mg/kg-day	1.25E-05	mg/kg-day			7.1E-02
	Chromium III	1.61E+03	mg/kg	1.61E+03	mg/kg	R	NA	mg/kg-day	1.95E-02	mg/kg-day			NA
	Chromium VI	5.36E+02	mg/kg	5.36E+02	mg/kg	R	NA	mg/kg-day	7.50E-05	mg/kg-day			NA
	Copper	3.35E+03	mg/kg	3.35E+03	mg/kg	R	NA	mg/kg-day	4.00E-02	mg/kg-day			NA
	Cyanide	2.43E+02	mg/kg	2.43E+02	mg/kg	R	NA	mg/kg-day	2.00E-02	mg/kg-day			NA
	Nickel	9.96E+01	mg/kg	9.96E+01	mg/kg	R	NA	mg/kg-day	8.00E-04	mg/kg-day			NA
	Thallium	6.30E-01	mg/kg	6.30E-01	mg/kg	R	NA	mg/kg-day	8.00E-05	mg/kg-day			NA
	Zinc	7.50E+03	mg/kg	7.50E+03	mg/kg	R	NA	mg/kg-day	3.00E-01	mg/kg-day			NA
	Aroclor-1254	9.90E-01	mg/kg	9.90E-01	mg/kg	R	6.08E-07	mg/kg-day	5.00E-05	mg/kg-day			1.2E-02
	Aroclor-1260	4.40E-01	mg/kg	4.40E-01	mg/kg	R	2.70E-07	mg/kg-day	5.00E-05	mg/kg-day			5.4E-03
	Tetrachloroethene	1.54E-01	mg/kg	1.54E-01	mg/kg	R	NA	mg/kg-day	1.00E-02	mg/kg-day			NA
												Total Hazard Index	9.7E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.3.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Aluminum	4.02E+04	mg/kg	1.02E-04	mg/m^3	R	2.59E-06	mg/kg-day	1.40E-02	mg/kg-day			1.9E-04
	Antimony	4.25E+01	mg/kg	1.08E-07	mg/m^3	R	2.74E-09	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	1.73E+01	mg/kg	4.38E-08	mg/m^3	R	1.12E-09	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.04E+02	mg/kg	5.16E-07	mg/m^3	R	1.31E-08	mg/kg-day	2.00E-04	mg/kg-day			6.6E-05
	Chromium III	1.61E+03	mg/kg	4.07E-06	mg/m^3	R	1.04E-07	mg/kg-day	NA	mg/kg-day			NA
	Chromium VI	5.36E+02	mg/kg	1.36E-06	mg/m^3	R	3.46E-08	mg/kg-day	3.00E-05	mg/kg-day			1.2E-03
	Copper	3.35E+03	mg/kg	8.47E-06	mg/m^3	R	2.16E-07	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	2.43E+02	mg/kg	6.15E-07	mg/m^3	R	1.57E-08	mg/kg-day	NA	mg/kg-day			NA
	Nickel	9.96E+01	mg/kg	2.52E-07	mg/m^3	R	6.42E-09	mg/kg-day	NA	mg/kg-day			NA
	Thallium	6.30E-01	mg/kg	1.59E-09	mg/m^3	R	4.07E-11	mg/kg-day	NA	mg/kg-day			NA
	Zinc	7.50E+03	mg/kg	1.90E-05	mg/m^3	R	4.84E-07	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1254	9.90E-01	mg/kg	2.51E-09	mg/m^3	R	6.39E-11	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1260	4.40E-01	mg/kg	1.11E-09	mg/m^3	R	2.84E-11	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.54E-01	mg/kg	3.90E-10	mg/m^3	R	9.94E-12	mg/kg-day	1.40E-01	mg/kg-day			7.1E-11
												Total Hazard Index	1.4E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.4.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	4.37E-04	mg/m^3	R	4.35E-06	mg/kg-day	1.40E-01	mg/kg-day			3.1E-05
	Toluene	3.68E-02	mg/kg	8.15E-04	mg/m^3	R	8.10E-06	mg/kg-day	1.14E-01	mg/kg-day			7.1E-05
	Trichloroethene	3.19E-02	mg/kg	7.06E-04	mg/m^3	R	7.02E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.0E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.5.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	9.52E-07	mg/kg-day	1.40E+00	mg/kg-day			6.8E-07
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	8.77E-08	mg/kg-day	1.40E-01	mg/kg-day			6.3E-07
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	1.70E-08	mg/kg-day	NA	mg/kg-day			NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	1.79E-09	mg/kg-day	8.60E-05	mg/kg-day			2.1E-05
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	2.06E-06	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	1.05E-07	mg/kg-day	1.40E-01	mg/kg-day			7.5E-07
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	3.96E-08	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	7.28E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.3E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.6.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	4.14E-03	mg/kg-day	1.00E+00	mg/kg-day			4.1E-03
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	2.90E-06	mg/kg-day	4.00E-04	mg/kg-day			7.3E-03
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	2.48E-06	mg/kg-day	3.00E-04	mg/kg-day			8.3E-03
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.46E-05	mg/kg-day	5.00E-04	mg/kg-day			2.9E-02
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	2.64E-04	mg/kg-day	1.50E+00	mg/kg-day			1.8E-04
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	7.63E-05	mg/kg-day	3.00E-03	mg/kg-day			2.5E-02
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	3.59E-04	mg/kg-day	4.00E-02	mg/kg-day			9.0E-03
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	3.80E-05	mg/kg-day	2.00E-02	mg/kg-day			1.9E-03
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	8.81E-08	mg/kg-day	3.00E-04	mg/kg-day			2.9E-04
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	4.56E-05	mg/kg-day	2.00E-02	mg/kg-day			2.3E-03
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	7.00E-07	mg/kg-day	5.00E-03	mg/kg-day			1.4E-04
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	7.20E-04	mg/kg-day	3.00E-01	mg/kg-day			2.4E-03
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	9.33E-08	mg/kg-day	5.00E-05	mg/kg-day			1.9E-03
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	9.87E-07	mg/kg-day	5.00E-05	mg/kg-day			2.0E-02
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	2.62E-07	mg/kg-day	5.00E-05	mg/kg-day			5.2E-03
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	1.16E-07	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	9.66E-09	mg/kg-day	1.00E-02	mg/kg-day			9.7E-07
												Total Hazard Index	1.2E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.7.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	6.00E-05	mg/kg-day			NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	9.80E-07	mg/kg-day	3.00E-04	mg/kg-day			3.3E-03
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.93E-07	mg/kg-day	1.25E-05	mg/kg-day			1.5E-02
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	1.95E-02	mg/kg-day			NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	7.50E-05	mg/kg-day			NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	4.00E-02	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	2.00E-02	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	2.10E-05	mg/kg-day			NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	8.00E-04	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	2.00E-04	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	3.00E-01	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	1.72E-07	mg/kg-day	5.00E-05	mg/kg-day			3.4E-03
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	1.82E-06	mg/kg-day	5.00E-05	mg/kg-day			3.6E-02
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	4.84E-07	mg/kg-day	5.00E-05	mg/kg-day			9.7E-03
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	2.00E-07	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	1.00E-02	mg/kg-day			NA
												Total Hazard Index	6.8E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.8.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	1.07E-05	mg/m^3	R	2.10E-06	mg/kg-day	1.40E-02	mg/kg-day			1.5E-04
	Antimony	5.94E+00	mg/kg	7.51E-09	mg/m^3	R	1.47E-09	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	5.06E+00	mg/kg	6.41E-09	mg/m^3	R	1.25E-09	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.98E+01	mg/kg	3.78E-08	mg/m^3	R	7.39E-09	mg/kg-day	2.00E-04	mg/kg-day			3.7E-05
	Chromium III	5.40E+02	mg/kg	6.84E-07	mg/m^3	R	1.34E-07	mg/kg-day	NA	mg/kg-day			NA
	Chromium VI	1.56E+02	mg/kg	1.97E-07	mg/m^3	R	3.86E-08	mg/kg-day	3.00E-05	mg/kg-day			1.3E-03
	Copper	7.33E+02	mg/kg	9.28E-07	mg/m^3	R	1.82E-07	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	9.83E-08	mg/m^3	R	1.92E-08	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	2.28E-10	mg/m^3	R	4.46E-11	mg/kg-day	8.60E-05	mg/kg-day			5.2E-07
	Nickel	9.32E+01	mg/kg	1.18E-07	mg/m^3	R	2.31E-08	mg/kg-day	NA	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	1.81E-09	mg/m^3	R	3.54E-10	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	1.86E-06	mg/m^3	R	3.64E-07	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	2.41E-10	mg/m^3	R	4.72E-11	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1254	2.02E+00	mg/kg	2.55E-09	mg/m^3	R	5.00E-10	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1260	5.36E-01	mg/kg	6.78E-10	mg/m^3	R	1.33E-10	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	2.38E-01	mg/kg	3.01E-10	mg/m^3	R	5.90E-11	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	2.50E-11	mg/m^3	R	4.89E-12	mg/kg-day	1.40E-01	mg/kg-day			3.5E-11
												Total Hazard Index	1.5E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.9.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	5.47E-05	mg/m^3	R	1.07E-05	mg/kg-day	1.40E-01	mg/kg-day			7.6E-05
	Toluene	3.68E-02	mg/kg	6.55E-05	mg/m^3	R	1.28E-05	mg/kg-day	1.14E-01	mg/kg-day			1.1E-04
	Trichloroethene	3.19E-02	mg/kg	8.17E-05	mg/m^3	R	1.60E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.9E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.10.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	1.57E-04	mg/m^3	R	3.08E-05	mg/kg-day	1.40E-01	mg/kg-day			2.2E-04
	Toluene	3.68E-02	mg/kg	2.93E-04	mg/m^3	R	5.74E-05	mg/kg-day	1.14E-01	mg/kg-day			5.0E-04
	Trichloroethene	3.19E-02	mg/kg	2.54E-04	mg/m^3	R	4.97E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	7.2E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.11.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	1.99E-02	mg/kg-day	NA	mg/kg-day			NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	1.39E-05	mg/kg-day	4.00E-04	mg/kg-day			3.5E-02
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	1.19E-05	mg/kg-day	3.00E-04	mg/kg-day			4.0E-02
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	7.00E-05	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	1.27E-03	mg/kg-day	1.00E+00	mg/kg-day			1.3E-03
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	3.66E-04	mg/kg-day	2.00E-02	mg/kg-day			1.8E-02
	Copper	7.77E+01	mg/kg	7.33E+02	mg/kg	R	1.72E-03	mg/kg-day	4.00E-02	mg/kg-day			4.3E-02
	Cyanide	7.33E+02	mg/kg	7.77E+01	mg/kg	R	1.82E-04	mg/kg-day	2.00E-02	mg/kg-day			9.1E-03
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	4.23E-07	mg/kg-day	3.00E-04	mg/kg-day			1.4E-03
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	2.19E-04	mg/kg-day	2.00E-02	mg/kg-day			1.1E-02
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	3.36E-06	mg/kg-day	5.00E-03	mg/kg-day			6.7E-04
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	3.46E-03	mg/kg-day	3.00E-01	mg/kg-day			1.2E-02
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	4.48E-07	mg/kg-day	5.00E-05	mg/kg-day			9.0E-03
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	4.74E-06	mg/kg-day	5.00E-05	mg/kg-day			9.5E-02
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	1.26E-06	mg/kg-day	5.00E-05	mg/kg-day			2.5E-02
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	5.59E-07	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	4.64E-08	mg/kg-day	1.00E-01	mg/kg-day			4.6E-07
												Total Hazard Index	3.0E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.12.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	6.00E-05	mg/kg-day			NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	4.90E-07	mg/kg-day	3.00E-04	mg/kg-day			1.6E-03
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	9.63E-08	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	1.30E-02	mg/kg-day			NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	5.00E-04	mg/kg-day			NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	4.00E-02	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	2.00E-02	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	2.10E-05	mg/kg-day			NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	8.00E-04	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	2.00E-04	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	3.00E-01	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	8.62E-08	mg/kg-day	5.00E-05	mg/kg-day			1.7E-03
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	9.12E-07	mg/kg-day	5.00E-05	mg/kg-day			1.8E-02
	Aroclor-1260	5.36E-01	mg/kg	5.38E-01	mg/kg	R	2.42E-07	mg/kg-day	5.00E-05	mg/kg-day			4.8E-03
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	9.99E-08	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	1.00E-01	mg/kg-day			NA
												Total Hazard Index	2.6E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.13.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	2.14E-05	mg/m^3	R	2.10E-06	mg/kg-day	NA	mg/kg-day			NA
	Antimony	5.94E+00	mg/kg	1.50E-08	mg/m^3	R	1.47E-09	mg/kg-day	1.10E-04	mg/kg-day			1.3E-05
	Arsenic	5.06E+00	mg/kg	1.28E-08	mg/m^3	R	1.25E-09	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.98E+01	mg/kg	7.55E-08	mg/m^3	R	7.39E-09	mg/kg-day	2.60E-04	mg/kg-day			2.8E-05
	Chromium III	5.40E+02	mg/kg	1.37E-06	mg/m^3	R	1.34E-07	mg/kg-day	1.10E-06	mg/kg-day			1.2E-01
	Chromium VI	1.56E+02	mg/kg	3.95E-07	mg/m^3	R	3.86E-08	mg/kg-day	1.10E-06	mg/kg-day			3.5E-02
	Copper	7.33E+02	mg/kg	1.86E-06	mg/m^3	R	1.82E-07	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	1.97E-07	mg/m^3	R	1.92E-08	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	4.56E-10	mg/m^3	R	4.46E-11	mg/kg-day	8.60E-04	mg/kg-day			5.2E-08
	Nickel	9.32E+01	mg/kg	2.36E-07	mg/m^3	R	2.31E-08	mg/kg-day	NA	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	3.62E-09	mg/m^3	R	3.54E-10	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	3.72E-06	mg/m^3	R	3.64E-07	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	4.83E-10	mg/m^3	R	4.72E-11	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1254	2.02E+00	mg/kg	5.11E-09	mg/m^3	R	5.00E-10	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1260	5.36E-01	mg/kg	1.36E-09	mg/m^3	R	1.33E-10	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	2.38E-01	mg/kg	6.03E-10	mg/m^3	R	5.90E-11	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	5.00E-11	mg/m^3	R	4.89E-12	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.6E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.14.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	3.93E-03	mg/m^3	R	3.85E-04	mg/kg-day	NA	mg/kg-day			NA
	Toluene	3.68E-02	mg/kg	7.33E-03	mg/m^3	R	7.17E-04	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	3.19E-02	mg/kg	6.35E-03	mg/m^3	R	6.22E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.15.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	3.35E-03	mg/kg-day	1.00E+00	mg/kg-day			3.3E-03
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	2.35E-06	mg/kg-day	4.00E-04	mg/kg-day			5.9E-03
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	2.00E-06	mg/kg-day	3.00E-04	mg/kg-day			6.7E-03
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.18E-05	mg/kg-day	5.00E-04	mg/kg-day			2.4E-02
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	2.14E-04	mg/kg-day	1.50E+00	mg/kg-day			1.4E-04
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	6.17E-05	mg/kg-day	3.00E-03	mg/kg-day			2.1E-02
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	2.90E-04	mg/kg-day	4.00E-02	mg/kg-day			7.3E-03
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	3.07E-05	mg/kg-day	2.00E-02	mg/kg-day			1.5E-03
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	7.12E-08	mg/kg-day	3.00E-04	mg/kg-day			2.4E-04
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	3.69E-05	mg/kg-day	2.00E-02	mg/kg-day			1.8E-03
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	5.66E-07	mg/kg-day	5.00E-03	mg/kg-day			1.1E-04
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	5.82E-04	mg/kg-day	3.00E-01	mg/kg-day			1.9E-03
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	7.54E-08	mg/kg-day	5.00E-05	mg/kg-day			1.5E-03
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	7.98E-07	mg/kg-day	5.00E-05	mg/kg-day			1.6E-02
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	2.12E-07	mg/kg-day	5.00E-05	mg/kg-day			4.2E-03
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	9.42E-08	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	7.81E-09	mg/kg-day	1.00E-02	mg/kg-day			7.8E-07
												Total Hazard Index	9.5E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.16.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	6.0E-05	mg/kg-day			NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	3.33E-07	mg/kg-day	3.0E-04	mg/kg-day			1.1E-03
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	6.54E-08	mg/kg-day	1.3E-05	mg/kg-day			5.2E-03
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	2.0E-02	mg/kg-day			NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	7.5E-05	mg/kg-day			NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	4.0E-02	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	2.0E-02	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	2.1E-05	mg/kg-day			NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	8.0E-04	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	2.0E-04	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	3.0E-01	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	5.85E-08	mg/kg-day	5.0E-05	mg/kg-day			1.2E-03
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	6.19E-07	mg/kg-day	5.0E-05	mg/kg-day			1.2E-02
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	1.64E-07	mg/kg-day	5.0E-05	mg/kg-day			3.3E-03
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	6.78E-08	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	1.0E-02	mg/kg-day			NA
												Total Hazard Index	2.3E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.17.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	1.07E-05	mg/m^3	R	1.98E-07	mg/kg-day	1.4E-02	mg/kg-day			1.4E-05
	Antimony	5.94E+00	mg/kg	7.51E-09	mg/m^3	R	1.39E-10	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	5.06E+00	mg/kg	6.41E-09	mg/m^3	R	1.19E-10	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.98E+01	mg/kg	3.78E-08	mg/m^3	R	6.99E-10	mg/kg-day	2.0E-04	mg/kg-day			3.5E-06
	Chromium III	5.40E+02	mg/kg	6.84E-07	mg/m^3	R	1.27E-08	mg/kg-day	NA	mg/kg-day			NA
	Chromium VI	1.56E+02	mg/kg	1.97E-07	mg/m^3	R	3.66E-09	mg/kg-day	3.0E-05	mg/kg-day			1.2E-04
	Copper	7.33E+02	mg/kg	9.28E-07	mg/m^3	R	1.72E-08	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	9.83E-08	mg/m^3	R	1.82E-09	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	2.28E-10	mg/m^3	R	4.22E-12	mg/kg-day	8.6E-05	mg/kg-day			4.9E-08
	Nickel	9.32E+01	mg/kg	1.18E-07	mg/m^3	R	2.18E-09	mg/kg-day	NA	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	1.81E-09	mg/m^3	R	3.35E-11	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	1.86E-06	mg/m^3	R	3.45E-08	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	2.41E-10	mg/m^3	R	4.47E-12	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1254	2.02E+00	mg/kg	2.55E-09	mg/m^3	R	4.73E-11	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1260	5.36E-01	mg/kg	6.78E-10	mg/m^3	R	1.25E-11	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	2.38E-01	mg/kg	3.01E-10	mg/m^3	R	5.58E-12	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	2.50E-11	mg/m^3	R	4.62E-13	mg/kg-day	1.4E-01	mg/kg-day			3.3E-12
												Total Hazard Index	1.4E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.18.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	3.03E-04	mg/m^3	R	5.62E-06	mg/kg-day	1.40E-01	mg/kg-day			4.0E-05
	Toluene	3.68E-02	mg/kg	5.64E-04	mg/m^3	R	1.05E-05	mg/kg-day	1.14E-01	mg/kg-day			9.2E-05
	Trichloroethene	3.19E-02	mg/kg	4.89E-04	mg/m^3	R	9.08E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.3E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.19.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	9.46E-04	mg/m^3	R	1.85E-04	mg/kg-day	1.40E+00	mg/kg-day			1.3E-04
	1,1-Dichloroethane	2.27E+01	ug/l	6.97E-05	mg/m^3	R	1.36E-05	mg/kg-day	1.40E-01	mg/kg-day			9.7E-05
	Acetone	1.85E+02	ug/l	5.81E-06	mg/m^3	R	1.14E-06	mg/kg-day	NA	mg/kg-day			NA
	Chloroform	5.00E-01	ug/l	1.30E-06	mg/m^3	R	2.54E-07	mg/kg-day	8.60E-05	mg/kg-day			3.0E-03
	cis-1,2-Dichloroethene	6.60E+02	ug/l	1.43E-03	mg/m^3	R	2.80E-04	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.12E+01	ug/l	9.24E-05	mg/m^3	R	1.81E-05	mg/kg-day	1.40E-01	mg/kg-day			1.3E-04
	trans-1,2-Dichloroethene	7.00E+00	ug/l	3.55E-05	mg/m^3	R	6.96E-06	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.16E+03	ug/l	6.28E-03	mg/m^3	R	1.23E-03	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.3E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.20.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	7.31E-06	mg/kg-day	1.4E+00	mg/kg-day			5.2E-06
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	6.74E-07	mg/kg-day	1.4E-01	mg/kg-day			4.8E-06
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	1.30E-07	mg/kg-day	NA	mg/kg-day			NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	1.37E-08	mg/kg-day	8.6E-05	mg/kg-day			1.6E-04
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	1.58E-05	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	8.05E-07	mg/kg-day	1.4E-01	mg/kg-day			5.7E-06
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	3.04E-07	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	5.59E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.8E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.21.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	3.66E-06	mg/kg-day	1.4E+01	mg/kg-day			2.6E-07
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	3.37E-07	mg/kg-day	1.0E+00	mg/kg-day			3.4E-07
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	6.52E-08	mg/kg-day	NA	mg/kg-day			NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	6.87E-09	mg/kg-day	8.6E-04	mg/kg-day			8.0E-06
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	7.91E-06	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	4.02E-07	mg/kg-day	NA	mg/kg-day			NA
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	1.52E-07	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	2.80E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	8.6E-06

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.22.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	6.92E-07	mg/kg-day	1.40E+00	mg/kg-day			4.9E-07
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	6.37E-08	mg/kg-day	1.40E-01	mg/kg-day			4.6E-07
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	1.23E-08	mg/kg-day	NA	mg/kg-day			NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	1.30E-09	mg/kg-day	8.60E-05	mg/kg-day			1.5E-05
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	1.50E-06	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	7.61E-08	mg/kg-day	1.40E-01	mg/kg-day			5.4E-07
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	2.88E-08	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	5.29E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.7E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.23.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.23E-05	mg/m^3	R	3.13E-07	mg/kg-day	8.57E-04	mg/kg-day			3.6E-04
	Anthracene	6.70E+01	mg/kg	2.83E-05	mg/m^3	R	7.22E-07	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	2.07E-04	mg/m^3	R	5.28E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.6E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.24.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	2-Methylnaphthalene	5.50E+00	mg/kg	5.78E-07	mg/m^3	R	1.13E-07	mg/kg-day	8.57E-04	mg/kg-day			1.3E-04
	Anthracene	6.70E+01	mg/kg	7.04E-06	mg/m^3	R	1.38E-06	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	5.15E-05	mg/m^3	R	1.01E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.3E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.25.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	5.64E-16	mg/m^3	R	8.84E-18	mg/kg-day	2.29E-01	mg/kg-day			3.9E-17
	Dibenzofuran	4.00E+00	ug/l	1.13E-15	mg/m^3	R	1.77E-17	mg/kg-day	NA	mg/kg-day			NA
	Naphthalene	6.00E+00	ug/l	1.69E-15	mg/m^3	R	2.65E-17	mg/kg-day	8.57E-04	mg/kg-day			3.1E-14
	Phenanthrene	4.22E+01	ug/l	1.19E-14	mg/m^3	R	1.86E-16	mg/kg-day	NA	mg/kg-day			NA
	Acetone	3.18E+01	ug/l	8.96E-15	mg/m^3	R	1.41E-16	mg/kg-day	NA	mg/kg-day			NA
	Benzene	1.06E+01	ug/l	3.00E-15	mg/m^3	R	4.70E-17	mg/kg-day	1.70E-03	mg/kg-day			2.8E-14
	Chloroethane	1.55E+01	ug/l	4.36E-15	mg/m^3	R	6.84E-17	mg/kg-day	2.90E+00	mg/kg-day			2.4E-17
	Ethylbenzene	2.35E+01	ug/l	6.61E-15	mg/m^3	R	1.04E-16	mg/kg-day	2.90E-01	mg/kg-day			3.6E-16
	Methylene chloride	7.65E+00	ug/l	2.16E-15	mg/m^3	R	3.38E-17	mg/kg-day	8.60E-01	mg/kg-day			3.9E-17
	Toluene	4.15E+01	ug/l	1.17E-14	mg/m^3	R	1.83E-16	mg/kg-day	1.14E-01	mg/kg-day			1.6E-15
	Trichloroethene	2.00E+00	ug/l	5.64E-16	mg/m^3	R	8.84E-18	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	8.00E-01	ug/l	2.25E-16	mg/m^3	R	3.54E-18	mg/kg-day	NA	mg/kg-day			NA
	Xylenes (total)	8.71E+01	ug/l	2.45E-14	mg/m^3	R	3.85E-16	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	6.1E-14

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.26.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	1.48E-06	mg/kg-day	4.00E-04	mg/kg-day			3.7E-03
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	9.46E-07	mg/kg-day	3.00E-04	mg/kg-day			3.2E-03
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	6.56E-06	mg/kg-day	5.00E-04	mg/kg-day			1.3E-02
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	3.22E-05	mg/kg-day	1.50E+00	mg/kg-day			2.1E-05
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	1.06E-05	mg/kg-day	3.00E-03	mg/kg-day			3.5E-03
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	2.95E-05	mg/kg-day	4.00E-02	mg/kg-day			7.4E-04
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	8.06E-06	mg/kg-day	2.00E-02	mg/kg-day			4.0E-04
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	6.65E-08	mg/kg-day	3.00E-04	mg/kg-day			2.3E-04
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	7.22E-06	mg/kg-day	2.00E-02	mg/kg-day			3.6E-04
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	4.27E-06	mg/kg-day	7.00E-03	mg/kg-day			6.1E-04
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	5.50E-05	mg/kg-day	3.00E-01	mg/kg-day			1.8E-04
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	3.18E-07	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	3.47E-07	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	4.89E-08	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	1.10E-08	mg/kg-day	9.00E-03	mg/kg-day			1.2E-06
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	5.19E-06	mg/kg-day	5.70E-02	mg/kg-day			9.1E-07
												Total Hazard Index	2.6E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.27.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	NA	mg/kg-day	8.00E-05	mg/kg-day			NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	3.75E-07	mg/kg-day	3.00E-04	mg/kg-day			1.2E-03
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	8.65E-08	mg/kg-day	1.25E-05	mg/kg-day			6.9E-03
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	NA	mg/kg-day	1.95E-02	mg/kg-day			NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	NA	mg/kg-day	7.50E-05	mg/kg-day			NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	NA	mg/kg-day	4.00E-02	mg/kg-day			NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	NA	mg/kg-day	2.00E-02	mg/kg-day			NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	NA	mg/kg-day	2.10E-05	mg/kg-day			NA
	Nickel	1.46E+01	mg/kg	1.46E+01	mg/kg	R	NA	mg/kg-day	8.00E-04	mg/kg-day			NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	NA	mg/kg-day	1.82E-04	mg/kg-day			NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	NA	mg/kg-day	3.00E-01	mg/kg-day			NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	5.46E-07	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	5.96E-07	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	8.40E-08	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	NA	mg/kg-day	9.00E-03	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	NA	mg/kg-day	5.70E-02	mg/kg-day			NA
												Total Hazard Index	8.2E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.28.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Antimony	3.03E+00	mg/kg	3.84E-09	mg/m^3	R	7.51E-10	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	1.93E+00	mg/kg	2.45E-09	mg/m^3	R	4.79E-10	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	1.34E+01	mg/kg	1.70E-08	mg/m^3	R	3.32E-09	mg/kg-day	2.00E-04	mg/kg-day			1.7E-05
	Chromium III	6.57E+01	mg/kg	8.32E-08	mg/m^3	R	1.63E-08	mg/kg-day	NA	mg/kg-day			NA
	Chromium VI	2.16E+01	mg/kg	2.74E-08	mg/m^3	R	5.36E-09	mg/kg-day	3.00E-05	mg/kg-day			1.8E-04
	Copper	6.03E+01	mg/kg	7.63E-08	mg/m^3	R	1.49E-08	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	1.65E+01	mg/kg	2.08E-08	mg/m^3	R	4.08E-09	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.40E-01	mg/kg	1.77E-10	mg/m^3	R	3.66E-09	mg/kg-day	8.60E-05	mg/kg-day			4.0E-07
	Nickel	1.48E+01	mg/kg	1.87E-08	mg/m^3	R	1.72E-08	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	8.73E+00	mg/kg	1.11E-08	mg/m^3	R	1.82E-09	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.12E+02	mg/kg	1.42E-07	mg/m^3	R	0.00E+00	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.23E-10	mg/m^3	R	3.39E-09	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	8.99E-10	mg/m^3	R	4.22E-12	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.27E-10	mg/m^3	R	2.18E-09	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.86E-11	mg/m^3	R	3.35E-11	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	1.34E-10	mg/m^3	R	4.47E-12	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.0E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.29.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	4.04E-05	mg/m^3	R	7.90E-06	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	1.89E-04	mg/m^3	R	3.70E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.30.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point:Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	1.20E-04	mg/m^3	R	5.87E-06	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	5.64E-04	mg/m^3	R	2.76E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.31.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	7.12E-06	mg/kg-day	4.00E-04	mg/kg-day			1.8E-02
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	4.54E-06	mg/kg-day	3.00E-04	mg/kg-day			1.5E-02
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	3.15E-05	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	1.54E-04	mg/kg-day	1.00E+00	mg/kg-day			1.5E-04
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	5.08E-05	mg/kg-day	2.00E-02	mg/kg-day			2.5E-03
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	1.42E-04	mg/kg-day	4.00E-02	mg/kg-day			3.5E-03
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	3.87E-05	mg/kg-day	2.00E-02	mg/kg-day			1.9E-03
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	3.29E-07	mg/kg-day	3.00E-04	mg/kg-day			1.1E-03
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	3.47E-05	mg/kg-day	2.00E-02	mg/kg-day			1.7E-03
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	2.05E-05	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	2.64E-04	mg/kg-day	3.00E-01	mg/kg-day			8.8E-04
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	1.53E-06	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	1.67E-06	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	2.35E-07	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	5.30E-08	mg/kg-day	9.00E-03	mg/kg-day			5.9E-06
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	2.49E-07	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	4.5E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.32.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	NA	mg/kg-day	6.00E-05	mg/kg-day			NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	1.87E-07	mg/kg-day	3.00E-04	mg/kg-day			6.2E-04
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	4.33E-08	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	NA	mg/kg-day	1.30E-02	mg/kg-day			NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	NA	mg/kg-day	5.00E-04	mg/kg-day			NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	NA	mg/kg-day	4.00E-02	mg/kg-day			NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	NA	mg/kg-day	2.00E-02	mg/kg-day			NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	NA	mg/kg-day	2.10E-05	mg/kg-day			NA
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	NA	mg/kg-day	8.00E-04	mg/kg-day			NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	NA	mg/kg-day	3.00E-01	mg/kg-day			NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	2.73E-07	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	2.98E-07	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	4.20E-08	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (tot	2.26E-02	mg/kg	2.26E-02	mg/kg	R	NA	mg/kg-day	9.00E-03	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	6.2E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.33.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Antimony	3.03E+00	mg/kg	7.67E-09	mg/m^3	R	7.51E-10	mg/kg-day	1.10E-04	mg/kg-day			6.8E-06
	Arsenic	1.93E+00	mg/kg	4.90E-09	mg/m^3	R	4.79E-10	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	1.34E+01	mg/kg	3.39E-08	mg/m^3	R	3.32E-09	mg/kg-day	2.60E-04	mg/kg-day			1.3E-05
	Chromium III	6.57E+01	mg/kg	1.66E-07	mg/m^3	R	1.63E-08	mg/kg-day	1.10E-06	mg/kg-day			1.5E-02
	Chromium VI	2.16E+01	mg/kg	5.48E-08	mg/m^3	R	5.36E-09	mg/kg-day	1.10E-06	mg/kg-day			4.9E-03
	Copper	6.03E+01	mg/kg	1.53E-07	mg/m^3	R	1.49E-08	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	1.65E+01	mg/kg	4.17E-08	mg/m^3	R	4.08E-09	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.40E-01	mg/kg	3.54E-10	mg/m^3	R	3.47E-11	mg/kg-day	8.60E-04	mg/kg-day			4.0E-08
	Nickel	1.48E+01	mg/kg	3.74E-08	mg/m^3	R	3.66E-09	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	8.73E+00	mg/kg	2.21E-08	mg/m^3	R	2.16E-09	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.12E+02	mg/kg	2.85E-07	mg/m^3	R	2.78E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	6.50E-01	mg/kg	1.65E-09	mg/m^3	R	1.61E-10	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	1.80E-09	mg/m^3	R	1.76E-10	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	2.53E-10	mg/m^3	R	2.48E-11	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	5.72E-11	mg/m^3	R	5.59E-12	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	2.69E-10	mg/m^3	R	2.63E-11	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.0E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.34.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Madium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	3.00E-03	mg/m^3	R	2.93E-04	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	1.41E-02	mg/m^3	R	1.38E-03	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.35.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.97E-03	mg/m^3	R	3.86E-04	mg/kg-day	8.57E-04	mg/kg-day			4.5E-01
	Anthracene	6.70E+01	mg/kg	4.55E-03	mg/m^3	R	8.91E-04	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	3.33E-02	mg/m^3	R	6.52E-03	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	4.5E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.36.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	4.41E-06	mg/m^3	R	2.16E-07	mg/kg-day	8.57E-04	mg/kg-day			2.5E-04
	Anthracene	6.70E+01	mg/kg	1.02E-05	mg/m^3	R	4.99E-07	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	7.46E-05	mg/m^3	R	3.65E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.5E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.37.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	1.14E+05	mg/kg	1.14E+05	mg/kg	R	2.68E-01	mg/kg-day	NA	mg/kg-day			NA
	Antimony	1.53E+01	mg/kg	1.53E+01	mg/kg	R	3.60E-05	mg/kg-day	4.0E-04	mg/kg-day			9.0E-02
	Arsenic	2.25E+01	mg/kg	2.25E+01	mg/kg	R	5.28E-05	mg/kg-day	3.0E-04	mg/kg-day			1.8E-01
	Barium	4.88E+02	mg/kg	4.88E+02	mg/kg	R	1.15E-03	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.88E+01	mg/kg	2.88E+01	mg/kg	R	6.77E-05	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	8.46E+02	mg/kg	8.46E+02	mg/kg	R	1.99E-03	mg/kg-day	1.0E+00	mg/kg-day			2.0E-03
	Chromium VI	8.46E+02	mg/kg	8.46E+02	mg/kg	R	1.99E-03	mg/kg-day	2.0E-02	mg/kg-day			9.9E-02
	Copper	1.19E+04	mg/kg	1.19E+04	mg/kg	R	2.80E-02	mg/kg-day	4.0E-02	mg/kg-day			7.0E-01
	Mercury	1.92E+00	mg/kg	1.92E+00	mg/kg	R	4.51E-06	mg/kg-day	3.0E-04	mg/kg-day			1.5E-02
	Nickel	1.73E+02	mg/kg	1.73E+02	mg/kg	R	4.07E-04	mg/kg-day	2.0E-02	mg/kg-day			2.0E-02
	Thallium	6.80E-01	mg/kg	6.80E-01	mg/kg	R	1.60E-06	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	1.31E+02	mg/kg	1.31E+02	mg/kg	R	3.08E-04	mg/kg-day	NA	mg/kg-day			NA
	Zinc	3.83E+03	mg/kg	3.83E+03	mg/kg	R	8.99E-03	mg/kg-day	3.0E-01	mg/kg-day			3.0E-02
	4,4'-DDD	1.93E+01	mg/kg	1.93E+01	mg/kg	R	4.54E-05	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDE	4.17E+00	mg/kg	4.17E+00	mg/kg	R	9.79E-06	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDT	5.00E+00	mg/kg	5.00E+00	mg/kg	R	1.17E-05	mg/kg-day	5.0E-04	mg/kg-day			2.3E-02
	Aroclor-1248	2.17E-01	mg/kg	2.17E-01	mg/kg	R	5.09E-07	mg/kg-day	5.0E-05	mg/kg-day			1.0E-02
	Aroclor-1254	1.03E+00	mg/kg	1.03E+00	mg/kg	R	2.41E-06	mg/kg-day	5.0E-05	mg/kg-day			4.8E-02
	Aroclor-1260	1.02E+00	mg/kg	1.02E+00	mg/kg	R	2.39E-06	mg/kg-day	5.0E-05	mg/kg-day			4.8E-02
	Dieldrin	3.46E-02	mg/kg	3.46E-02	mg/kg	R	8.12E-08	mg/kg-day	5.0E-05	mg/kg-day			1.6E-03
	Benz(a)anthracene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	5.87E-04	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	1.60E+02	mg/kg	1.60E+02	mg/kg	R	3.76E-04	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	2.70E+02	mg/kg	2.70E+02	mg/kg	R	6.34E-04	mg/kg-day	NA	mg/kg-day			NA
	Benzo(k)fluoranthene	1.00E+02	mg/kg	1.00E+02	mg/kg	R	2.35E-04	mg/kg-day	NA	mg/kg-day			NA
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	1.79E+03	mg/kg	R	4.20E-03	mg/kg-day	NA	mg/kg-day			NA
	Carbazole	5.20E+01	mg/kg	5.20E+01	mg/kg	R	1.22E-04	mg/kg-day	NA	mg/kg-day			NA
	Chrysene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	5.87E-04	mg/kg-day	NA	mg/kg-day			NA
	Di-n-octyl phthalate	4.43E+02	mg/kg	4.43E+02	mg/kg	R	1.04E-03	mg/kg-day	2.0E-02	mg/kg-day			5.2E-02
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	2.60E+01	mg/kg	R	6.11E-05	mg/kg-day	NA	mg/kg-day			NA
	Fluoranthene	6.50E+02	mg/kg	6.50E+02	mg/kg	R	1.53E-03	mg/kg-day	4.0E-01	mg/kg-day			3.8E-03
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	9.40E+01	mg/kg	R	2.21E-04	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	4.90E+02	mg/kg	R	1.15E-03	mg/kg-day	NA	mg/kg-day			NA
	Pyrene	5.00E+02	mg/kg	5.00E+02	mg/kg	R	1.17E-03	mg/kg-day	3.0E-01	mg/kg-day			3.9E-03
												Total Hazard Index	1.3E+00

R = Route EPC

* Total hazard index is broken down by target organ in other tables.

TABLE F7.38.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	1.14E+05	mg/kg	1.14E+05	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Antimony	1.53E+01	mg/kg	1.53E+01	mg/kg	R	NA	mg/kg-day	6.0E-05	mg/kg-day			NA
	Arsenic	2.25E+01	mg/kg	2.25E+01	mg/kg	R	2.18E-06	mg/kg-day	3.0E-04	mg/kg-day			7.3E-03
	Barium	4.88E+02	mg/kg	4.88E+02	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.88E+01	mg/kg	2.88E+01	mg/kg	R	9.30E-08	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	8.48E+02	mg/kg	8.46E+02	mg/kg	R	NA	mg/kg-day	1.3E-02	mg/kg-day			NA
	Chromium VI	8.48E+02	mg/kg	6.46E+02	mg/kg	R	NA	mg/kg-day	5.0E-04	mg/kg-day			NA
	Copper	1.19E+04	mg/kg	1.19E+04	mg/kg	R	NA	mg/kg-day	4.0E-02	mg/kg-day			NA
	Mercury	1.92E+00	mg/kg	1.92E+00	mg/kg	R	NA	mg/kg-day	2.1E-05	mg/kg-day			NA
	Nickel	1.73E+02	mg/kg	1.73E+02	mg/kg	R	NA	mg/kg-day	8.0E-04	mg/kg-day			NA
	Thallium	6.80E-01	mg/kg	6.80E-01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	1.31E+02	mg/kg	1.31E+02	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Zinc	3.83E+03	mg/kg	3.83E+03	mg/kg	R	NA	mg/kg-day	3.0E-01	mg/kg-day			NA
	4,4'-DDD	1.93E+01	mg/kg	1.93E+01	mg/kg	R	1.87E-06	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDE	4.17E+00	mg/kg	4.17E+00	mg/kg	R	4.04E-07	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDT	5.00E+00	mg/kg	5.00E+00	mg/kg	R	4.84E-07	mg/kg-day	5.0E-04	mg/kg-day			9.7E-04
	Aroclor-1248	2.17E-01	mg/kg	2.17E-01	mg/kg	R	9.81E-08	mg/kg-day	5.0E-05	mg/kg-day			2.0E-03
	Aroclor-1254	1.03E+00	mg/kg	1.03E+00	mg/kg	R	4.64E-07	mg/kg-day	5.0E-05	mg/kg-day			9.3E-03
	Aroclor-1260	1.02E+00	mg/kg	1.02E+00	mg/kg	R	4.60E-07	mg/kg-day	5.0E-05	mg/kg-day			9.2E-03
	Dieldrin	3.48E-02	mg/kg	3.46E-02	mg/kg	R	1.12E-08	mg/kg-day	5.0E-05	mg/kg-day			2.2E-04
	Benz(a)anthracene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.05E-04	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	1.60E+02	mg/kg	1.60E+02	mg/kg	R	6.72E-05	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	2.70E+02	mg/kg	2.70E+02	mg/kg	R	1.13E-04	mg/kg-day	NA	mg/kg-day			NA
	Benzo(k)fluoranthene	1.00E+02	mg/kg	1.00E+02	mg/kg	R	4.20E-05	mg/kg-day	NA	mg/kg-day			NA
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	1.79E+03	mg/kg	R	5.77E-04	mg/kg-day	NA	mg/kg-day			NA
	Carbazole	5.20E+01	mg/kg	5.20E+01	mg/kg	R	1.68E-05	mg/kg-day	NA	mg/kg-day			NA
	Chrysene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.05E-04	mg/kg-day	NA	mg/kg-day			NA
	Di-n-octyl phthalate	4.43E+02	mg/kg	4.43E+02	mg/kg	R	1.43E-04	mg/kg-day	2.0E-02	mg/kg-day			7.2E-03
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	2.60E+01	mg/kg	R	1.09E-05	mg/kg-day	NA	mg/kg-day			NA
	Fluoranthene	6.50E+02	mg/kg	6.50E+02	mg/kg	R	2.73E-04	mg/kg-day	4.0E-01	mg/kg-day			6.8E-04
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	9.40E+01	mg/kg	R	3.95E-05	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	4.90E+02	mg/kg	R	2.06E-04	mg/kg-day	NA	mg/kg-day			NA
	Pyrene	5.00E+02	mg/kg	5.00E+02	mg/kg	R	2.10E-04	mg/kg-day	3.0E-01	mg/kg-day			7.0E-04
												Total Hazard Index	3.7E-02

R = Route EPC

* Total hazard index is broken down by target organ in other tables.

TABLE F7.39.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Aluminum	1.14E+05	mg/kg	2.89E-04	mg/m^3	R	2.83E-05	mg/kg-day	NA	mg/kg-day			NA
	Antimony	1.53E+01	mg/kg	3.88E-08	mg/m^3	R	3.80E-09	mg/kg-day	1.10E-04	mg/kg-day			3.5E-05
	Arsenic	2.25E+01	mg/kg	5.70E-08	mg/m^3	R	5.57E-09	mg/kg-day	NA	mg/kg-day			NA
	Barium	4.88E+02	mg/kg	1.23E-06	mg/m^3	R	1.21E-07	mg/kg-day	1.43E-03	mg/kg-day			8.5E-05
	Cadmium	2.88E+01	mg/kg	7.29E-08	mg/m^3	R	7.14E-09	mg/kg-day	2.60E-04	mg/kg-day			2.7E-05
	Chromium III	8.46E+02	mg/kg	2.14E-06	mg/m^3	R	2.10E-07	mg/kg-day	1.10E-06	mg/kg-day			1.9E-01
	Chromium VI	8.46E+02	mg/kg	2.14E-06	mg/m^3	R	2.10E-07	mg/kg-day	1.10E-06	mg/kg-day			1.9E-01
	Copper	1.19E+04	mg/kg	3.02E-05	mg/m^3	R	2.96E-08	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.92E+00	mg/kg	4.86E-09	mg/m^3	R	4.76E-10	mg/kg-day	8.60E-04	mg/kg-day			5.5E-07
	Nickel	1.73E+02	mg/kg	4.39E-07	mg/m^3	R	4.30E-08	mg/kg-day	NA	mg/kg-day			NA
	Thallium	6.80E-01	mg/kg	1.72E-09	mg/m^3	R	1.68E-10	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	1.31E+02	mg/kg	3.33E-07	mg/m^3	R	3.25E-08	mg/kg-day	NA	mg/kg-day			NA
	Zinc	3.83E+03	mg/kg	9.69E-06	mg/m^3	R	9.48E-07	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDD	1.93E+01	mg/kg	4.90E-08	mg/m^3	R	4.79E-09	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDE	4.17E+00	mg/kg	1.06E-08	mg/m^3	R	1.03E-09	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDT	5.00E+00	mg/kg	1.27E-08	mg/m^3	R	1.24E-09	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1248	2.17E-01	mg/kg	5.49E-10	mg/m^3	R	5.37E-11	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1254	1.03E+00	mg/kg	2.60E-09	mg/m^3	R	2.54E-10	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1260	1.02E+00	mg/kg	2.57E-09	mg/m^3	R	2.52E-10	mg/kg-day	NA	mg/kg-day			NA
	Dieldrin	3.48E-02	mg/kg	8.75E-11	mg/m^3	R	8.56E-12	mg/kg-day	NA	mg/kg-day			NA
	Benz(a)anthracene	2.50E+02	mg/kg	6.33E-07	mg/m^3	R	6.19E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	1.60E+02	mg/kg	4.05E-07	mg/m^3	R	3.96E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	2.70E+02	mg/kg	6.84E-07	mg/m^3	R	6.69E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(k)fluoranthene	1.00E+02	mg/kg	2.53E-07	mg/m^3	R	2.48E-08	mg/kg-day	NA	mg/kg-day			NA
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	4.52E-06	mg/m^3	R	4.43E-07	mg/kg-day	NA	mg/kg-day			NA
	Carbazole	5.20E+01	mg/kg	1.32E-07	mg/m^3	R	1.29E-08	mg/kg-day	NA	mg/kg-day			NA
	Chrysene	2.50E+02	mg/kg	6.33E-07	mg/m^3	R	6.19E-08	mg/kg-day	NA	mg/kg-day			NA
	Di-n-octyl phthalate	4.43E+02	mg/kg	1.12E-06	mg/m^3	R	1.10E-07	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	6.58E-08	mg/m^3	R	6.44E-09	mg/kg-day	NA	mg/kg-day			NA
	Fluoranthene	6.50E+02	mg/kg	1.65E-06	mg/m^3	R	1.61E-07	mg/kg-day	NA	mg/kg-day			NA
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	2.38E-07	mg/m^3	R	2.33E-08	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	1.24E-06	mg/m^3	R	1.21E-07	mg/kg-day	NA	mg/kg-day			NA
	Pyrene	5.00E+02	mg/kg	1.27E-06	mg/m^3	R	1.24E-07	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.8E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.40.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.10E-04	mg/m^3	R	1.08E-05	mg/kg-day	NA	mg/kg-day			NA
	Anthracene	6.70E+01	mg/kg	2.55E-04	mg/m^3	R	2.49E-05	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	1.86E-03	mg/m^3	R	1.82E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.41.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	9.06E-14	mg/m^3	R	1.77E-14	mg/kg-day	2.29E-01	mg/kg-day			7.7E-14
	Dibenzofuran	4.00E+00	ug/l	1.81E-13	mg/m^3	R	3.55E-14	mg/kg-day	NA	mg/kg-day			NA
	Naphthalene	6.00E+00	ug/l	2.72E-13	mg/m^3	R	5.32E-14	mg/kg-day	8.57E-04	mg/kg-day			6.2E-11
	Phenanthrene	4.22E+01	ug/l	1.91E-12	mg/m^3	R	3.74E-13	mg/kg-day	NA	mg/kg-day			NA
	Acetone	3.18E+01	ug/l	1.44E-12	mg/m^3	R	2.82E-13	mg/kg-day	NA	mg/kg-day			NA
	Benzene	1.06E+01	ug/l	4.82E-13	mg/m^3	R	9.43E-14	mg/kg-day	1.70E-03	mg/kg-day			5.5E-11
	Chloroethane	1.55E+01	ug/l	7.01E-13	mg/m^3	R	1.37E-13	mg/kg-day	2.90E+00	mg/kg-day			4.7E-14
	Ethylbenzene	2.35E+01	ug/l	1.06E-12	mg/m^3	R	2.08E-13	mg/kg-day	2.90E-01	mg/kg-day			7.2E-13
	Methylene chloride	7.65E+00	ug/l	3.47E-13	mg/m^3	R	6.78E-14	mg/kg-day	8.60E-01	mg/kg-day			7.9E-14
	Toluene	4.15E+01	ug/l	1.88E-12	mg/m^3	R	3.68E-13	mg/kg-day	1.14E-01	mg/kg-day			3.2E-12
	Trichloroethene	2.00E+00	ug/l	9.06E-14	mg/m^3	R	1.77E-14	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	8.00E-01	ug/l	3.62E-14	mg/m^3	R	7.09E-15	mg/kg-day	NA	mg/kg-day			NA
	Xylenes (total)	8.71E+01	ug/l	3.95E-12	mg/m^3	R	7.72E-13	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.2E-10

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.42.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,4-Dichlorobenzene	2.0E+00	ug/l	2.0E-16	mg/m^3	R	9.9E-18	mg/kg-day	2.3E-01	mg/kg-day			4.3E-17
	Dibenzofuran	4.0E+00	ug/l	4.1E-16	mg/m^3	R	2.0E-17	mg/kg-day	NA	mg/kg-day			NA
	Naphthalene	6.0E+00	ug/l	6.1E-16	mg/m^3	R	3.0E-17	mg/kg-day	8.6E-04	mg/kg-day			3.5E-14
	Phenanthrene	4.2E+01	ug/l	4.3E-15	mg/m^3	R	2.1E-16	mg/kg-day	NA	mg/kg-day			NA
	Acetone	3.2E+01	ug/l	3.2E-15	mg/m^3	R	1.6E-16	mg/kg-day	NA	mg/kg-day			NA
	Benzene	1.1E+01	ug/l	1.1E-15	mg/m^3	R	5.3E-17	mg/kg-day	1.7E-03	mg/kg-day			3.1E-14
	Chloroethane	1.5E+01	ug/l	1.6E-15	mg/m^3	R	7.7E-17	mg/kg-day	2.9E+00	mg/kg-day			2.6E-17
	Ethylbenzene	2.3E+01	ug/l	2.4E-15	mg/m^3	R	1.2E-16	mg/kg-day	2.9E-01	mg/kg-day			4.0E-16
	Methylene chloride	7.7E+00	ug/l	7.8E-16	mg/m^3	R	3.8E-17	mg/kg-day	8.6E-01	mg/kg-day			4.4E-17
	Toluene	4.1E+01	ug/l	4.2E-15	mg/m^3	R	2.1E-16	mg/kg-day	1.1E-01	mg/kg-day			1.8E-15
	Trichloroethene	2.0E+00	ug/l	2.0E-16	mg/m^3	R	9.9E-18	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	8.0E-01	ug/l	8.1E-17	mg/m^3	R	4.0E-18	mg/kg-day	NA	mg/kg-day			NA
	Xylenes (total)	8.7E+01	ug/l	8.8E-15	mg/m^3	R	4.3E-16	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	6.8E-14

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.43.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Liquid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	2.8E+04	mg/kg	2.8E+04	mg/kg	R	9.0E-04	mg/kg-day	NA	mg/kg-day			NA
	Antimony	4.7E+01	mg/kg	4.7E+01	mg/kg	R	1.5E-06	mg/kg-day	6.0E-05	mg/kg-day			2.5E-02
	Arsenic	1.6E+01	mg/kg	1.6E+01	mg/kg	R	5.3E-07	mg/kg-day	3.0E-04	mg/kg-day			1.8E-03
	Barium	8.2E+02	mg/kg	8.2E+02	mg/kg	R	2.7E-05	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	1.4E+02	mg/kg	1.4E+02	mg/kg	R	4.4E-06	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	1.1E+04	mg/kg	1.1E+04	mg/kg	R	3.7E-04	mg/kg-day	1.3E-02	mg/kg-day			2.8E-02
	Copper	4.5E+03	mg/kg	4.5E+03	mg/kg	R	1.4E-04	mg/kg-day	4.0E-02	mg/kg-day			3.6E-03
	Manganese	4.5E+02	mg/kg	4.5E+02	mg/kg	R	1.5E-05	mg/kg-day	NA	mg/kg-day			NA
	Mercury	7.8E-01	mg/kg	7.8E-01	mg/kg	R	2.5E-08	mg/kg-day	2.1E-05	mg/kg-day			1.2E-03
	Nickel	1.2E+02	mg/kg	1.2E+02	mg/kg	R	3.9E-07	mg/kg-day	8.0E-04	mg/kg-day			4.8E-04
	Thallium	2.7E+00	mg/kg	2.7E+00	mg/kg	R	8.6E-08	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	5.1E+02	mg/kg	5.1E+02	mg/kg	R	1.6E-05	mg/kg-day	NA	mg/kg-day			NA
	Zinc	5.5E+03	mg/kg	5.5E+03	mg/kg	R	1.1E-04	mg/kg-day	3.0E-01	mg/kg-day			3.6E-04
	4,4'-DDE	3.0E+00	mg/kg	3.0E+00	mg/kg	R	1.1E-04	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDT	3.4E+00	mg/kg	3.4E+00	mg/kg	R	2.9E-04	mg/kg-day	5.0E-04	mg/kg-day			5.9E-01
	Aroclor-1260	9.5E+00	mg/kg	9.5E+00	mg/kg	R	1.5E-03	mg/kg-day	5.0E-05	mg/kg-day			3.0E+01
	Endrin aldehyde	6.9E-01	mg/kg	6.9E-01	mg/kg	R	2.6E-06	mg/kg-day	NA	mg/kg-day			NA
	Heptachlor epoxide	3.4E-02	mg/kg	3.4E-02	mg/kg	R	9.5E-08	mg/kg-day	1.3E-05	mg/kg-day			7.3E-03
	1,4-Dichlorobenzene	2.0E+00	mg/kg	2.0E+00	mg/kg	R	6.7E-06	mg/kg-day	NA	mg/kg-day			NA
	4-Methylphenol	4.8E+01	mg/kg	4.8E+01	mg/kg	R	1.7E-05	mg/kg-day	5.0E-03	mg/kg-day			3.5E-03
	Benz(a)anthracene	4.5E+01	mg/kg	4.5E+01	mg/kg	R	3.3E-03	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	4.1E+01	mg/kg	4.1E+01	mg/kg	R	5.1E-03	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	8.6E+01	mg/kg	6.6E+01	mg/kg	R	8.2E-03	mg/kg-day	NA	mg/kg-day			NA
	Benzo(k)fluoranthene	2.8E+01	mg/kg	2.8E+01	mg/kg	R	3.5E-03	mg/kg-day	NA	mg/kg-day			NA
	bis(2-Ethylhexyl)phthalate	3.0E+02	mg/kg	3.0E+02	mg/kg	R	1.5E-03	mg/kg-day	NA	mg/kg-day			NA
	Carbazole	1.1E+01	mg/kg	1.1E+01	mg/kg	R	3.1E-05	mg/kg-day	NA	mg/kg-day			NA
	Chrysene	5.4E+01	mg/kg	5.4E+01	mg/kg	R	3.9E-03	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	7.0E+00	mg/kg	7.0E+00	mg/kg	R	2.3E-03	mg/kg-day	NA	mg/kg-day			NA
	Dibenzofuran	4.0E+00	mg/kg	4.0E+00	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Indeno(1,2,3-cd)pyrene	2.4E+01	mg/kg	2.4E+01	mg/kg	R	5.5E-03	mg/kg-day	NA	mg/kg-day			NA
	Naphthalene	6.0E+00	mg/kg	6.0E+00	mg/kg	R	2.0E-05	mg/kg-day	NA	mg/kg-day			NA
	Pentachlorophenol	1.3E+01	mg/kg	1.3E+01	mg/kg	R	9.6E-04	mg/kg-day	3.0E-02	mg/kg-day			3.2E-02

TABLE F7.43.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Liquid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Phenanthrene	4.2E+01	mg/kg	4.2E+01	mg/kg	R	6.3E-04	mg/kg-day	NA	mg/kg-day			NA
	Pyrene	8.0E+01	mg/kg	8.0E+01	mg/kg	R	1.9E-03	mg/kg-day	3.0E-01	mg/kg-day			6.2E-03
	Acetone	3.2E+01	mg/kg	3.2E+01	mg/kg	R	6.5E-07	mg/kg-day	1.0E+00	mg/kg-day			6.5E-07
	Benzene	1.1E+01	mg/kg	1.1E+01	mg/kg	R	9.0E-06	mg/kg-day	3.0E-02	mg/kg-day			3.0E-04
	Chloroethane	1.5E+01	mg/kg	1.5E+01	mg/kg	R	4.9E-06	mg/kg-day	NA	mg/kg-day			NA
	Ethylbenzene	2.3E+01	mg/kg	2.3E+01	mg/kg	R	5.2E-05	mg/kg-day	1.0E-01	mg/kg-day			5.2E-04
	Methylene chloride	7.7E+00	mg/kg	7.7E+00	mg/kg	R	1.5E-06	mg/kg-day	6.0E-02	mg/kg-day			2.4E-05
	Toluene	4.1E+01	mg/kg	4.1E+01	mg/kg	R	7.7E-05	mg/kg-day	2.0E+00	mg/kg-day			3.9E-05
	Trichloroethene	2.0E+00	mg/kg	2.0E+00	mg/kg	R	1.6E-06	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	8.0E-01	mg/kg	8.0E-01	mg/kg	R	2.3E-07	mg/kg-day	NA	mg/kg-day			NA
	Xylenes (total)	6.7E+01	mg/kg	6.7E+01	mg/kg	R	2.9E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.2E+01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.44.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,4-Dichlorobenzene	2.0E+00	ug/l	5.1E-15	mg/m^3	R	5.0E-16	mg/kg-day	2.5E+00	mg/kg-day			2.0E-16
	Dibenzofuran	4.0E+00	ug/l	1.0E-14	mg/m^3	R	9.9E-16	mg/kg-day	NA	mg/kg-day			NA
	Naphthalene	6.0E+00	ug/l	1.5E-14	mg/m^3	R	1.5E-15	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.2E+01	ug/l	1.1E-13	mg/m^3	R	1.0E-14	mg/kg-day	NA	mg/kg-day			NA
	Acetone	3.2E+01	ug/l	8.1E-14	mg/m^3	R	7.9E-15	mg/kg-day	NA	mg/kg-day			NA
	Benzene	1.1E+01	ug/l	2.7E-14	mg/m^3	R	2.6E-15	mg/kg-day	2.5E-03	mg/kg-day			1.1E-12
	Chloroethane	1.5E+01	ug/l	3.9E-14	mg/m^3	R	3.8E-15	mg/kg-day	2.9E+00	mg/kg-day			1.3E-15
	Ethylbenzene	2.3E+01	ug/l	5.9E-14	mg/m^3	R	5.8E-15	mg/kg-day	2.9E-01	mg/kg-day			2.0E-14
	Methylene chloride	7.7E+00	ug/l	1.9E-14	mg/m^3	R	1.9E-15	mg/kg-day	8.6E-01	mg/kg-day			2.2E-15
	Toluene	4.1E+01	ug/l	1.1E-13	mg/m^3	R	1.0E-14	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	2.0E+00	ug/l	5.1E-15	mg/m^3	R	5.0E-16	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	8.0E-01	ug/l	2.0E-15	mg/m^3	R	2.0E-16	mg/kg-day	NA	mg/kg-day			NA
	Xylenes (total)	8.7E+01	ug/l	2.2E-13	mg/m^3	R	2.2E-14	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.1E-12

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.45.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Indoors)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	5.66E-04	mg/m^3	R	1.04E-03	mg/kg-day	1.40E+00	mg/kg-day			7.4E-04
	1,1-Dichloroethane	8.00E+00	ug/l	1.81E-04	mg/m^3	R	3.33E-04	mg/kg-day	1.40E-01	mg/kg-day			2.4E-03
	1,1-Dichloroethene	4.67E+00	ug/l	5.83E-04	mg/m^3	R	1.07E-03	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	1.71E-04	mg/m^3	R	3.15E-04	mg/kg-day	1.70E-02	mg/kg-day			1.9E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.99E-04	mg/m^3	R	7.35E-04	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	3.16E-04	mg/m^3	R	5.83E-04	mg/kg-day	1.40E-01	mg/kg-day			4.2E-03
	Trichloroethene	2.97E+01	ug/l	1.15E-03	mg/m^3	R	2.13E-03	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	6.59E-03	mg/m^3	R	1.21E-02	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.6E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.46.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Indoors)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	5.66E-04	mg/m^3	R	1.24E-04	mg/kg-day	1.40E+00	mg/kg-day			8.9E-05
	1,1-Dichloroethane	8.00E+00	ug/l	1.81E-04	mg/m^3	R	3.96E-05	mg/kg-day	1.40E-01	mg/kg-day			2.8E-04
	1,1-Dichloroethene	4.67E+00	ug/l	5.83E-04	mg/m^3	R	1.28E-04	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	1.71E-04	mg/m^3	R	3.74E-05	mg/kg-day	1.70E-02	mg/kg-day			2.2E-03
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.99E-04	mg/m^3	R	8.74E-05	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	3.16E-04	mg/m^3	R	6.93E-05	mg/kg-day	1.40E-01	mg/kg-day			5.0E-04
	Trichloroethene	2.97E+01	ug/l	1.15E-03	mg/m^3	R	2.53E-04	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	6.59E-03	mg/m^3	R	1.44E-03	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.1E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.47.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Outdoors)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	3.65E-06	mg/m^3	R	1.56E-06	mg/kg-day	1.40E+00	mg/kg-day			1.1E-06
	1,1-Dichloroethane	8.00E+00	ug/l	1.51E-06	mg/m^3	R	6.46E-07	mg/kg-day	1.40E-01	mg/kg-day			4.6E-06
	1,1-Dichloroethene	4.67E+00	ug/l	3.41E-06	mg/m^3	R	1.46E-06	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	1.87E-06	mg/m^3	R	8.01E-07	mg/kg-day	1.70E-02	mg/kg-day			4.7E-05
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.93E-06	mg/m^3	R	1.68E-06	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	2.23E-06	mg/m^3	R	9.53E-07	mg/kg-day	1.40E-01	mg/kg-day			6.8E-06
	Trichloroethene	2.97E+01	ug/l	8.73E-06	mg/m^3	R	3.73E-06	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	3.39E-05	mg/m^3	R	1.45E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	6.0E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.48.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Outdoors)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	3.65E-06	mg/m^3	R	4.24E-07	mg/kg-day	1.40E+00	mg/kg-day			3.0E-07
	1,1-Dichloroethane	8.00E+00	ug/l	1.51E-06	mg/m^3	R	1.76E-07	mg/kg-day	1.40E-01	mg/kg-day			1.3E-06
	1,1-Dichloroethene	4.67E+00	ug/l	3.41E-06	mg/m^3	R	3.97E-07	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	1.87E-06	mg/m^3	R	2.18E-07	mg/kg-day	1.70E-02	mg/kg-day			1.3E-05
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.93E-06	mg/m^3	R	4.57E-07	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	2.23E-06	mg/m^3	R	2.59E-07	mg/kg-day	1.40E-01	mg/kg-day			1.9E-06
	Trichloroethene	2.97E+01	ug/l	8.73E-06	mg/m^3	R	1.01E-06	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	3.39E-05	mg/m^3	R	3.94E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.6E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.49.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Woodward Parkway School)
Receptor Population: School Child
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	2.01E-04	mg/m^3	R	1.41E-05	mg/kg-day	1.4E+00	mg/kg-day			1.0E-05
	1,1-Dichloroethane	8.00E+00	ug/l	6.44E-05	mg/m^3	R	4.53E-06	mg/kg-day	1.4E-01	mg/kg-day			3.2E-05
	1,1-Dichloroethene	4.67E+00	ug/l	2.05E-04	mg/m^3	R	1.44E-05	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	6.10E-05	mg/m^3	R	4.29E-06	mg/kg-day	1.7E-02	mg/kg-day			2.5E-04
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.42E-04	mg/m^3	R	1.00E-05	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	1.13E-04	mg/m^3	R	7.95E-06	mg/kg-day	1.4E-01	mg/kg-day			5.7E-05
	Trichloroethene	2.97E+01	ug/l	4.10E-04	mg/m^3	R	2.88E-05	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	2.29E-03	mg/m^3	R	1.61E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.5E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.50.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Woodward Parkway School)
Receptor Population: School Employee
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	2.01E-04	mg/m^3	R	1.57E-05	mg/kg-day	1.40E+00	mg/kg-day			1.1E-05
	1,1-Dichloroethane	8.00E+00	ug/l	6.44E-05	mg/m^3	R	5.04E-06	mg/kg-day	1.40E-01	mg/kg-day			3.6E-05
	1,1-Dichloroethene	4.67E+00	ug/l	2.05E-04	mg/m^3	R	1.61E-05	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	6.10E-05	mg/m^3	R	4.77E-06	mg/kg-day	1.70E-02	mg/kg-day			2.8E-04
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.42E-04	mg/m^3	R	1.11E-05	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	1.13E-04	mg/m^3	R	8.85E-06	mg/kg-day	1.40E-01	mg/kg-day			6.3E-05
	Trichloroethene	2.97E+01	ug/l	4.10E-04	mg/m^3	R	3.21E-05	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	2.29E-03	mg/m^3	R	1.80E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.9E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.51.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	2.39E-04	mg/kg-day	3.00E-04	mg/kg-day			8.0E-01
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	1.04E-03	mg/kg-day	1.50E+00	mg/kg-day			6.9E-04
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	4.15E-03	mg/kg-day	3.00E-03	mg/kg-day			1.4E+00
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	6.89E-02	mg/kg-day	2.30E-02	mg/kg-day			3.0E+00
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	1.55E-03	mg/kg-day	1.00E-01	mg/kg-day			1.6E-02
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	1.42E-03	mg/kg-day	9.00E-03	mg/kg-day			1.6E-01
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	1.10E-03	mg/kg-day	3.00E-02	mg/kg-day			3.7E-02
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	1.02E-03	mg/kg-day	3.00E-03	mg/kg-day			3.4E-01
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	1.28E-04	mg/kg-day	7.00E-04	mg/kg-day			1.8E-01
	cis-1,2-Dichloroethane	2.30E+01	ug/l	2.30E+01	ug/l	R	2.94E-03	mg/kg-day	1.00E-02	mg/kg-day			2.9E-01
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	1.39E-03	mg/kg-day	1.00E-02	mg/kg-day			1.4E-01
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	1.92E-03	mg/kg-day	2.00E-01	mg/kg-day			9.6E-03
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	3.64E-03	mg/kg-day	2.00E-02	mg/kg-day			1.8E-01
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	9.46E-02	mg/kg-day	5.70E-02	mg/kg-day			1.7E+00
												Total Hazard Index	8.2E+00

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.52.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	7.90E-07	mg/kg-day	3.00E-04	mg/kg-day			2.6E-03
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	3.44E-06	mg/kg-day	1.95E-02	mg/kg-day			1.8E-04
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	2.74E-05	mg/kg-day	7.50E-05	mg/kg-day			3.7E-01
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	2.27E-04	mg/kg-day	9.20E-04	mg/kg-day			2.5E-01
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	7.96E-05	mg/kg-day	1.00E-01	mg/kg-day			8.0E-04
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	1.30E-04	mg/kg-day	9.00E-03	mg/kg-day			1.4E-02
	1,2-Dichloroethene	8.62E+00	ug/l	8.62E+00	ug/l	R	3.37E-05	mg/kg-day	3.00E-02	mg/kg-day			1.1E-03
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	1.10E-04	mg/kg-day	3.00E-03	mg/kg-day			3.7E-02
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	2.25E-05	mg/kg-day	7.00E-04	mg/kg-day			3.2E-02
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	1.68E-04	mg/kg-day	1.00E-02	mg/kg-day			1.7E-02
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	5.76E-04	mg/kg-day	1.00E-02	mg/kg-day			5.8E-02
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	4.74E-04	mg/kg-day	2.00E-01	mg/kg-day			2.4E-03
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	2.08E-04	mg/kg-day	2.00E-02	mg/kg-day			1.0E-02
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	1.04E-02	mg/kg-day	5.70E-02	mg/kg-day			1.8E-01
												Total Hazard Index	9.7E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.53.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	5.13E-05	mg/kg-day	3.00E-04	mg/kg-day			1.7E-01
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	2.23E-04	mg/kg-day	1.50E+00	mg/kg-day			1.5E-04
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	8.89E-04	mg/kg-day	3.00E-03	mg/kg-day			3.0E-01
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	1.48E-02	mg/kg-day	2.30E-02	mg/kg-day			6.4E-01
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	3.32E-04	mg/kg-day	1.00E-01	mg/kg-day			3.3E-03
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	3.05E-04	mg/kg-day	9.00E-03	mg/kg-day			3.4E-02
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	2.36E-04	mg/kg-day	3.00E-02	mg/kg-day			7.9E-03
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	2.18E-04	mg/kg-day	3.00E-03	mg/kg-day			7.3E-02
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	2.74E-05	mg/kg-day	7.00E-04	mg/kg-day			3.9E-02
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	6.30E-04	mg/kg-day	1.00E-02	mg/kg-day			6.3E-02
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	2.99E-04	mg/kg-day	1.00E-02	mg/kg-day			3.0E-02
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	4.11E-04	mg/kg-day	2.00E-01	mg/kg-day			2.1E-03
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	7.81E-04	mg/kg-day	2.00E-02	mg/kg-day			3.9E-02
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	2.03E-02	mg/kg-day	5.70E-02	mg/kg-day			3.6E-01
												Total Hazard Index	1.8E+00

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.54.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	2.68E-07	mg/kg-day	3.00E-04	mg/kg-day			8.9E-04
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	1.17E-06	mg/kg-day	1.95E-02	mg/kg-day			6.0E-05
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	9.28E-06	mg/kg-day	7.50E-05	mg/kg-day			1.2E-01
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	7.71E-05	mg/kg-day	9.20E-04	mg/kg-day			8.4E-02
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	3.44E-05	mg/kg-day	1.00E-01	mg/kg-day			3.4E-04
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	5.60E-05	mg/kg-day	9.00E-03	mg/kg-day			6.2E-03
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	1.46E-05	mg/kg-day	3.00E-02	mg/kg-day			4.9E-04
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	4.66E-05	mg/kg-day	3.00E-03	mg/kg-day			1.6E-02
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	9.99E-06	mg/kg-day	7.00E-04	mg/kg-day			1.4E-02
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	7.24E-05	mg/kg-day	1.00E-02	mg/kg-day			7.2E-03
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	2.57E-04	mg/kg-day	1.00E-02	mg/kg-day			2.6E-02
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	2.06E-04	mg/kg-day	2.00E-01	mg/kg-day			1.0E-03
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	8.97E-05	mg/kg-day	2.00E-02	mg/kg-day			4.5E-03
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	4.64E-03	mg/kg-day	5.70E-02	mg/kg-day			8.1E-02
												Total Hazard Index	3.7E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.55.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1-Dichloroethane	1.21E+01	ug/l	6.07E-03	mg/m^3	R	4.65E-04	mg/kg-day	1.40E-01	mg/kg-day			3.3E-03
	1,1-Dichloroethene	1.11E+01	ug/l	5.56E-03	mg/m^3	R	4.27E-04	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethane	8.62E+00	ug/l	4.31E-03	mg/m^3	R	3.31E-04	mg/kg-day	1.40E-03	mg/kg-day			2.4E-01
	Benzene	7.97E+00	ug/l	3.98E-03	mg/m^3	R	3.06E-04	mg/kg-day	1.70E-03	mg/kg-day			1.8E-01
	Carbon tetrachloride	1.00E+00	ug/l	5.00E-04	mg/m^3	R	3.84E-05	mg/kg-day	5.70E-04	mg/kg-day			6.7E-02
	cis-1,2-Dichloroethene	2.30E+01	ug/l	1.15E-02	mg/m^3	R	8.82E-04	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.09E+01	ug/l	5.45E-03	mg/m^3	R	4.18E-04	mg/kg-day	1.40E-01	mg/kg-day			3.0E-03
	Toluene	1.50E+01	ug/l	7.50E-03	mg/m^3	R	5.75E-04	mg/kg-day	1.14E-01	mg/kg-day			5.0E-03
	trans-1,2-Dichloroethene	2.85E+01	ug/l	1.43E-02	mg/m^3	R	1.09E-03	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	7.40E+02	ug/l	3.70E-01	mg/m^3	R	2.84E-02	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	4.9E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.56.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1-Dichloroethane	1.21E+01	ug/l	6.07E-03	mg/m^3	R	4.01E-05	mg/kg-day	1.40E-01	mg/kg-day			2.9E-04
	1,1-Dichloroethene	1.11E+01	ug/l	5.56E-03	mg/m^3	R	3.68E-05	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethane	8.62E+00	ug/l	4.31E-03	mg/m^3	R	2.85E-05	mg/kg-day	1.40E-03	mg/kg-day			2.0E-02
	Benzene	7.97E+00	ug/l	3.96E-03	mg/m^3	R	2.64E-05	mg/kg-day	1.70E-03	mg/kg-day			1.6E-02
	Carbon tetrachloride	1.00E+00	ug/l	5.00E-04	mg/m^3	R	3.31E-06	mg/kg-day	5.70E-04	mg/kg-day			5.8E-03
	cis-1,2-Dichloroethene	2.30E+01	ug/l	1.15E-02	mg/m^3	R	7.61E-05	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.09E+01	ug/l	5.45E-03	mg/m^3	R	3.61E-05	mg/kg-day	1.40E-01	mg/kg-day			2.6E-04
	Toluene	1.50E+01	ug/l	7.50E-03	mg/m^3	R	4.96E-05	mg/kg-day	1.14E-01	mg/kg-day			4.4E-04
	trans-1,2-Dichloroethene	2.85E+01	ug/l	1.43E-02	mg/m^3	R	9.43E-05	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	7.40E+02	ug/l	3.70E-01	mg/m^3	R	2.45E-03	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	4.3E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.57.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	2.89E+00	ug/l	2.89E+00	ug/l	R	1.24E-07	mg/kg-day	3.00E-04	mg/kg-day			4.1E-04
	Cadmium	1.15E+01	ug/l	1.15E+01	ug/l	R	4.92E-07	mg/kg-day	5.00E-04	mg/kg-day			9.8E-04
	Chromium III	2.55E+01	ug/l	2.55E+01	ug/l	R	1.10E-06	mg/kg-day	1.50E+00	mg/kg-day			7.3E-07
	Chromium VI	4.94E+01	ug/l	4.94E+01	ug/l	R	2.12E-06	mg/kg-day	3.00E-03	mg/kg-day			7.1E-04
	Chloroform	3.00E-01	ug/l	3.00E-01	ug/l	R	1.29E-08	mg/kg-day	1.00E-02	mg/kg-day			1.3E-06
	Dibromochloromethane	8.00E-01	ug/l	8.00E-01	ug/l	R	3.43E-08	mg/kg-day	2.00E-02	mg/kg-day			1.7E-06
	Tetrachloroethene	2.00E+00	ug/l	2.00E+00	ug/l	R	8.58E-08	mg/kg-day	1.00E-02	mg/kg-day			8.6E-06
	Trichloroethene	4.00E+00	ug/l	4.00E+00	ug/l	R	1.72E-07	mg/kg-day	5.70E-02	mg/kg-day			3.0E-06
												Total Hazard Index	2.1E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.58.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Arsenic	2.89E+00	ug/l	2.89E+00	ug/l	R	7.79E-08	mg/kg-day	3.00E-04	mg/kg-day			2.6E-04
	Cadmium	1.15E+01	ug/l	1.15E+01	ug/l	R	3.09E-07	mg/kg-day	1.25E-05	mg/kg-day			2.5E-02
	Chromium III	2.55E+01	ug/l	2.55E+01	ug/l	R	6.90E-07	mg/kg-day	1.95E-02	mg/kg-day			3.5E-05
	Chromium VI	4.94E+01	ug/l	4.94E+01	ug/l	R	2.67E-06	mg/kg-day	7.50E-05	mg/kg-day			3.6E-02
	Chloroform	3.00E-01	ug/l	3.00E-01	ug/l	R	9.39E-08	mg/kg-day	1.00E-02	mg/kg-day			9.4E-06
	Dibromochloromethane	8.00E-01	ug/l	8.00E-01	ug/l	R	1.19E-07	mg/kg-day	2.00E-02	mg/kg-day			6.0E-06
	Tetrachloroethene	2.00E+00	ug/l	2.00E+00	ug/l	R	4.01E-06	mg/kg-day	1.00E-02	mg/kg-day			4.0E-04
	Trichloroethene	4.00E+00	ug/l	4.00E+00	ug/l	R	2.33E-06	mg/kg-day	5.7E-02	mg/kg-day			4.1E-05
												Total Hazard Index	6.1E-02

R = Route EPC
* Total hazerd index is broken down by target organ in other tables.

TABLE F7.59.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.21E+03	mg/kg	8.21E+03	mg/kg	R	3.52E-04	mg/kg-day	1.00E+00	mg/kg-day			3.5E-04
	Arsenic	9.76E+00	mg/kg	9.76E+00	mg/kg	R	4.19E-07	mg/kg-day	3.00E-04	mg/kg-day			1.4E-03
	Cadmium	1.64E+02	mg/kg	1.64E+02	mg/kg	R	7.02E-06	mg/kg-day	5.00E-04	mg/kg-day			1.4E-02
	Chromium III	3.11E+02	mg/kg	3.11E+02	mg/kg	R	1.34E-05	mg/kg-day	1.50E+00	mg/kg-day			8.9E-06
	Chromium VI	4.20E+02	mg/kg	4.20E+02	mg/kg	R	1.80E-05	mg/kg-day	3.00E-03	mg/kg-day			6.0E-03
	Lead	3.85E+02	mg/kg	3.85E+02	mg/kg	R	1.65E-05	mg/kg-day	NA	mg/kg-day			NA
	Manganese	2.09E+03	mg/kg	2.09E+03	mg/kg	R	8.97E-05	mg/kg-day	2.30E-02	mg/kg-day			3.9E-03
	Mercury	3.10E-01	mg/kg	3.10E-01	mg/kg	R	1.33E-08	mg/kg-day	3.00E-04	mg/kg-day			4.4E-05
	Vanadium	4.70E+01	mg/kg	4.70E+01	mg/kg	R	2.02E-06	mg/kg-day	7.00E-03	mg/kg-day			2.9E-04
												Total Hazard Index	2.6E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.60.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	8.21E+03	mg/kg	8.21E+03	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	9.76E+00	mg/kg	9.76E+00	mg/kg	R	4.74E-08	mg/kg-day	3.0E-04	mg/kg-day			1.6E-04
	Cadmium	1.64E+02	mg/kg	1.64E+02	mg/kg	R	2.65E-08	mg/kg-day	1.3E-05	mg/kg-day			2.1E-03
	Chromium III	3.11E+02	mg/kg	3.11E+02	mg/kg	R	NA	mg/kg-day	2.0E-02	mg/kg-day			NA
	Chromium VI	4.20E+02	mg/kg	4.20E+02	mg/kg	R	NA	mg/kg-day	7.5E-05	mg/kg-day			NA
	Lead	3.85E+02	mg/kg	3.85E+02	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Manganese	2.09E+03	mg/kg	2.09E+03	mg/kg	R	NA	mg/kg-day	9.2E-04	mg/kg-day			NA
	Mercury	3.10E-01	mg/kg	3.10E-01	mg/kg	R	NA	mg/kg-day	2.1E-05	mg/kg-day			NA
	Vanadium	4.70E+01	mg/kg	4.70E+01	mg/kg	R	NA	mg/kg-day	1.8E-04	mg/kg-day			NA
												Total Hazard Index	2.3E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.61.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	5.10E-01	mg/kg-day	1.00E+00	mg/kg-day			5.1E-01
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	2.69E-04	mg/kg-day	3.00E-04	mg/kg-day			9.0E-01
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	1.61E-02	mg/kg-day	5.00E-04	mg/kg-day			3.2E+01
	Chromium III	2.82E+02	ug/l	2.82E+02	ug/l	R	3.60E-02	mg/kg-day	1.50E+00	mg/kg-day			2.4E-02
	Chromium VI	4.72E+02	ug/l	1.26E+02	ug/l	R	1.61E-02	mg/kg-day	3.00E-03	mg/kg-day			5.4E+00
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	1.09E+00	mg/kg-day	2.30E-02	mg/kg-day			4.7E+01
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	1.31E-05	mg/kg-day	5.00E-05	mg/kg-day			2.6E-01
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	4.63E-06	mg/kg-day	1.30E-05	mg/kg-day			3.6E-01
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	9.20E-04	mg/kg-day	2.00E-02	mg/kg-day			4.6E-02
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	5.11E-04	mg/kg-day	6.00E-01	mg/kg-day			8.5E-04
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	1.06E-03	mg/kg-day	2.80E-01	mg/kg-day			3.8E-03
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	1.02E-03	mg/kg-day	1.00E-01	mg/kg-day			1.0E-02
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	5.97E-04	mg/kg-day	9.00E-03	mg/kg-day			6.6E-02
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	1.79E-03	mg/kg-day	2.00E-02	mg/kg-day			8.9E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	3.20E-03	mg/kg-day	1.00E-02	mg/kg-day			3.2E-01
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	6.62E-04	mg/kg-day	1.00E-02	mg/kg-day			6.6E-02
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	3.79E-03	mg/kg-day	5.70E-02	mg/kg-day			6.7E-02
	Vinyl chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	5.41E-03	mg/kg-day	5.00E-03	mg/kg-day			1.1E+00
												Total Hazard Index	8.9E+01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.62.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	1.07E-03	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	5.63E-07	mg/kg-day	3.00E-04	mg/kg-day			1.9E-03
	Cadmium	1.28E+02	ug/l	1.26E+02	ug/l	R	3.37E-05	mg/kg-day	1.25E-05	mg/kg-day			2.7E+00
	Chromium III	2.82E+02	ug/l	2.82E+02	ug/l	R	7.53E-05	mg/kg-day	1.95E-02	mg/kg-day			3.9E-03
	Chromium VI	4.72E+02	ug/l	4.72E+02	ug/l	R	2.52E-04	mg/kg-day	7.50E-05	mg/kg-day			3.4E+00
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	2.28E-03	mg/kg-day	9.20E-04	mg/kg-day			2.5E+00
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	6.00E-06	mg/kg-day	5.00E-05	mg/kg-day			1.2E-01
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	1.54E-06	mg/kg-day	1.30E-05	mg/kg-day			1.2E-01
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	5.59E-04	mg/kg-day	2.00E-02	mg/kg-day			2.8E-02
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	1.27E-05	mg/kg-day	6.00E-01	mg/kg-day			2.1E-05
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	1.05E-04	mg/kg-day	2.80E-01	mg/kg-day			3.7E-04
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	4.24E-05	mg/kg-day	1.00E-01	mg/kg-day			4.2E-04
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	4.39E-05	mg/kg-day	9.00E-03	mg/kg-day			4.9E-03
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	3.74E-04	mg/kg-day	2.00E-02	mg/kg-day			1.9E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	1.47E-04	mg/kg-day	1.00E-02	mg/kg-day			1.5E-02
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	2.28E-04	mg/kg-day	1.00E-02	mg/kg-day			2.3E-02
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	3.48E-04	mg/kg-day	5.70E-02	mg/kg-day			6.1E-03
	Vinyl chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	1.50E-04	mg/kg-day	5.00E-03	mg/kg-day			3.0E-02
												Total Hazard Index	8.9E+00

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.63.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,1-Trichloroethane	8.30E+00	ug/l	4.15E-03	mg/m^3	R	2.65E-04	mg/kg-day	1.40E+00	mg/kg-day			1.9E-04
	1,1-Dichloroethane	8.00E+00	ug/l	4.00E-03	mg/m^3	R	2.56E-04	mg/kg-day	1.40E-01	mg/kg-day			1.8E-03
	1,1-Dichloroethene	4.67E+00	ug/l	2.33E-03	mg/m^3	R	1.49E-04	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	7.00E-03	mg/m^3	R	4.47E-04	mg/kg-day	1.70E-02	mg/kg-day			2.6E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.25E-02	mg/m^3	R	7.99E-04	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	2.59E-03	mg/m^3	R	1.66E-04	mg/kg-day	1.40E-01	mg/kg-day			1.2E-03
	Trichloroethene	2.97E+01	ug/l	1.48E-02	mg/m^3	R	9.48E-04	mg/kg-day	NA	mg/kg-day			NA
	Vinyl Chloride	4.23E+01	ug/l	2.11E-02	mg/m^3	R	1.35E-03	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.0E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.64.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	1.09E-01	mg/kg-day	1.00E+00	mg/kg-day			1.1E-01
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	5.77E-05	mg/kg-day	3.00E-04	mg/kg-day			1.9E-01
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	3.45E-03	mg/kg-day	5.00E-04	mg/kg-day			6.9E+00
	Chromium III	2.82E+02	ug/l	2.82E+02	ug/l	R	7.72E-03	mg/kg-day	1.50E+00	mg/kg-day			5.1E-03
	Chromium VI	4.72E+02	ug/l	4.72E+02	ug/l	R	1.29E-02	mg/kg-day	3.00E-03	mg/kg-day			4.3E+00
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	2.34E-01	mg/kg-day	2.30E-02	mg/kg-day			1.0E+01
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	2.80E-06	mg/kg-day	5.00E-05	mg/kg-day			5.6E-02
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	9.91E-07	mg/kg-day	1.30E-05	mg/kg-day			7.6E-02
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	1.97E-04	mg/kg-day	2.00E-02	mg/kg-day			9.9E-03
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	1.10E-04	mg/kg-day	6.00E-01	mg/kg-day			1.8E-04
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	2.27E-04	mg/kg-day	2.80E-01	mg/kg-day			8.1E-04
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	2.19E-04	mg/kg-day	1.00E-01	mg/kg-day			2.2E-03
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	1.28E-04	mg/kg-day	9.00E-03	mg/kg-day			1.4E-02
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	3.84E-04	mg/kg-day	2.00E-02	mg/kg-day			1.9E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	6.85E-04	mg/kg-day	1.00E-02	mg/kg-day			6.8E-02
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	1.42E-04	mg/kg-day	1.00E-02	mg/kg-day			1.4E-02
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	8.13E-04	mg/kg-day	5.70E-02	mg/kg-day			1.4E-02
	Vinyl chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	1.16E-03	mg/kg-day	5.00E-03	mg/kg-day			2.3E-01
												Total Hazard Index	2.2E+01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.65.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	5.75E-04	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	3.04E-07	mg/kg-day	3.00E-04	mg/kg-day			1.0E-03
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	1.82E-05	mg/kg-day	1.25E-05	mg/kg-day			1.5E+00
	Chromium III	2.82E+02	ug/l	2.82E+02	ug/l	R	4.06E-05	mg/kg-day	1.95E-02	mg/kg-day			2.1E-03
	Chromium VI	4.72E+02	ug/l	4.72E+02	ug/l	R	1.36E-04	mg/kg-day	7.50E-05	mg/kg-day			1.8E+00
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	1.23E-03	mg/kg-day	9.20E-04	mg/kg-day			1.3E+00
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	3.24E-06	mg/kg-day	5.00E-05	mg/kg-day			6.5E-02
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	8.29E-07	mg/kg-day	1.30E-05	mg/kg-day			6.4E-02
	bis(2-Ethylhexyl)phthala	7.20E+00	ug/l	7.20E+00	ug/l	R	3.01E-04	mg/kg-day	2.00E-02	mg/kg-day			1.5E-02
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	6.85E-06	mg/kg-day	6.00E-01	mg/kg-day			1.1E-05
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	5.66E-05	mg/kg-day	2.80E-01	mg/kg-day			2.0E-04
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	2.29E-05	mg/kg-day	1.00E-01	mg/kg-day			2.3E-04
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	2.37E-05	mg/kg-day	9.00E-03	mg/kg-day			2.6E-03
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	2.02E-04	mg/kg-day	2.00E-02	mg/kg-day			1.0E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	7.93E-05	mg/kg-day	1.00E-02	mg/kg-day			7.9E-03
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	1.23E-04	mg/kg-day	1.00E-02	mg/kg-day			1.2E-02
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	1.87E-04	mg/kg-day	5.70E-02	mg/kg-day			3.3E-03
	Vinyl chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	8.08E-05	mg/kg-day	5.00E-03	mg/kg-day			1.6E-02
												Total Hazard Index	4.8E+00

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.66.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,1-Trichloroethane	8.30E+00	ug/l	4.15E-03	ug/l	R	3.30E-05	mg/kg-day	1.40E+00	mg/kg-day			2.4E-05
	1,1-Dichloroethane	8.00E+00	ug/l	4.00E-03	ug/l	R	3.18E-05	mg/kg-day	1.40E-01	mg/kg-day			2.3E-04
	1,1-Dichloroethene	4.67E+00	ug/l	2.33E-03	ug/l	R	1.85E-05	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	7.00E-03	ug/l	R	5.56E-05	mg/kg-day	1.70E-02	mg/kg-day			3.3E-03
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.25E-02	ug/l	R	9.93E-05	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	2.59E-03	ug/l	R	2.06E-05	mg/kg-day	1.40E-01	mg/kg-day			1.5E-04
	Trichloroethene	2.97E+01	ug/l	1.48E-02	ug/l	R	1.18E-04	mg/kg-day	NA	mg/kg-day			NA
	Vinyl Chloride	4.23E+01	ug/l	2.11E-02	ug/l	R	1.68E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.7E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.67.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	3.41E+03	ug/l	3.41E+03	ug/l	R	3.34E-02	mg/kg-day	1.00E+00	mg/kg-day			3.3E-02
	Arsenic	1.65E+00	ug/l	1.65E+00	ug/l	R	1.61E-05	mg/kg-day	3.00E-04	mg/kg-day			5.4E-02
	Cadmium	3.84E+02	ug/l	3.84E+02	ug/l	R	3.76E-03	mg/kg-day	5.00E-04	mg/kg-day			7.5E+00
	Chromium III	4.26E+02	ug/l	3.90E+02	ug/l	R	3.81E-03	mg/kg-day	1.50E+00	mg/kg-day			2.5E-03
	Chromium VI	3.90E+02	ug/l	4.26E+02	ug/l	R	4.16E-03	mg/kg-day	3.00E-03	mg/kg-day			1.4E+00
	Copper	1.10E+02	ug/l	1.10E+02	ug/l	R	1.08E-03	mg/kg-day	4.00E-02	mg/kg-day			2.7E-02
	Cyanide	2.72E+02	ug/l	2.72E+02	ug/l	R	2.66E-03	mg/kg-day	2.00E-02	mg/kg-day			1.3E-01
	Manganese	2.21E+03	ug/l	2.21E+03	ug/l	R	2.17E-02	mg/kg-day	2.30E-02	mg/kg-day			9.4E-01
	Nickel	1.28E+02	ug/l	1.28E+02	ug/l	R	1.25E-03	mg/kg-day	2.00E-02	mg/kg-day			6.3E-02
	Thallium	7.69E+00	ug/l	7.69E+00	ug/l	R	7.53E-05	mg/kg-day	8.00E-05	mg/kg-day			9.4E-01
	alpha-Chlordane	3.15E-02	ug/l	3.15E-02	ug/l	R	3.08E-07	mg/kg-day	5.00E-04	mg/kg-day			6.2E-04
	Dieldrin	3.28E-02	ug/l	3.28E-02	ug/l	R	3.21E-07	mg/kg-day	5.00E-05	mg/kg-day			6.4E-03
	gamma-Chlordane	3.15E-02	ug/l	3.15E-02	ug/l	R	3.08E-07	mg/kg-day	5.00E-04	mg/kg-day			6.2E-04
	bis(2-Ethylhexyl)phthalate	2.03E+02	ug/l	2.03E+02	ug/l	R	1.99E-03	mg/kg-day	2.00E-02	mg/kg-day			9.9E-02
	Chrysene	1.90E+00	ug/l	1.90E+00	ug/l	R	1.86E-05	mg/kg-day	NA	mg/kg-day			NA
	Pentachlorophenol	7.75E+00	ug/l	7.75E+00	ug/l	R	7.58E-05	mg/kg-day	3.00E-02	mg/kg-day			2.5E-03
	1,1,1-Trichloroethane	1.00E+02	ug/l	1.00E+02	ug/l	R	9.78E-04	mg/kg-day	2.80E-01	mg/kg-day			3.5E-03
	1,1-Dichloroethane	2.27E+01	ug/l	2.27E+01	ug/l	R	2.22E-04	mg/kg-day	1.00E-01	mg/kg-day			2.2E-03
	Acetone	1.65E+02	ug/l	1.65E+02	ug/l	R	1.61E-03	mg/kg-day	1.00E-01	mg/kg-day			1.6E-02
	Chloroform	5.00E-01	ug/l	5.00E-01	ug/l	R	4.89E-08	mg/kg-day	1.00E-02	mg/kg-day			4.9E-04
	cis-1,2-Dichloroethene	6.60E+02	ug/l	6.60E+02	ug/l	R	6.46E-03	mg/kg-day	1.00E-02	mg/kg-day			6.5E-01
	Tetrachloroethene	1.12E+01	ug/l	1.12E+01	ug/l	R	1.10E-04	mg/kg-day	1.00E-02	mg/kg-day			1.1E-02
	trans-1,2-Dichloroethene	7.00E+00	ug/l	7.00E+00	ug/l	R	6.85E-05	mg/kg-day	2.00E-02	mg/kg-day			3.4E-03
	Trichloroethene	1.16E+03	ug/l	1.16E+03	ug/l	R	1.14E-02	mg/kg-day	5.70E-02	mg/kg-day			2.0E-01
												Total Hazard Index	1.2E+01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.68.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Manganese	8.95E+01	ug/l	8.95E+01	ug/l	R	8.76E-04	mg/kg-day	2.30E-02	mg/kg-day			3.8E-02
												Total Hazard Index	3.8E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.69.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: SubsurfaceSoil
Exposure Point: Ellsworth Allen Park
Receptor Population: Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chromium III	2.04E+01	mg/kg	2.04E+01	mg/kg	R	4.98E-06	mg/kg-day	1.50E+00	mg/kg-day			3.3E-06
	Chromium VI	6.81E+00	mg/kg	6.81E+00	mg/kg	R	1.66E-06	mg/kg-day	3.00E-03	mg/kg-day			5.5E-04
												Total Hazard Index	5.6E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.70.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: SubsurfaceSoil
Exposure Point: Ellsworth Allen Park
Receptor Population: Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Chromium III	2.04E+01	mg/kg	2.04E+01	mg/kg	R	NA	mg/kg-day	1.95E-02	mg/kg-day			NA
	Chromium VI	6.81E+00	mg/kg	6.81E+00	mg/kg	R	NA	mg/kg-day	7.50E-05	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.71.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Particulates
Exposure Point: Ellsworth Allen Park
Receptor Population: Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium III	2.04E+01	mg/kg	2.59E-08	mg/m^3	R	4.79E-10	mg/kg-day	1.10E-06	mg/kg-day			4.4E-04
	Chromium VI	6.81E+00	mg/kg	8.62E-09	mg/m^3	R	1.60E-10	mg/kg-day	1.10E-06	mg/kg-day			1.5E-04
												Total Hazard Index	5.8E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.72.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Fish
Exposure Medium: Fish Tissue
Exposure Point: Massapequa Preserve
Receptor Population: Fisher
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Cadmium	6.40E-01	mg/kg	6.40E-01	mg/kg	R	4.50E-04	mg/kg-day	5.00E-04	mg/kg-day			9.0E-01
	Chromium VI	9.80E-01	mg/kg	9.80E-01	mg/kg	R	6.89E-04	mg/kg-day	3.00E-03	mg/kg-day			2.3E-01
												Total Hazard Index	1.1E+00

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F7.73.RME
CALCULATION OF NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Fish
Exposure Medium: Fish Tissue
Exposure Point: Massapequa Preserve
Receptor Population: Fisher
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Cadmium	6.40E-01	mg/kg	6.40E-01	mg/kg	R	9.62E-05	mg/kg-day	5.00E-04	mg/kg-day			5.6E-01
	Chromium VI	9.80E-01	mg/kg	9.80E-01	mg/kg	R	1.47E-04	mg/kg-day	3.00E-03	mg/kg-day			1.4E-01
												Total Hazard Index	7.0E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F8.1.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	4.02E+04	mg/kg	4.02E+04	mg/kg	R	1.73E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	4.25E+01	mg/kg	4.25E+01	mg/kg	R	1.83E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.73E+01	mg/kg	1.73E+01	mg/kg	R	7.46E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Cadmium	2.04E+02	mg/kg	2.04E+02	mg/kg	R	8.78E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	1.61E+03	mg/kg	1.61E+03	mg/kg	R	6.93E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	5.36E+02	mg/kg	5.36E+02	mg/kg	R	2.31E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	3.35E+03	mg/kg	3.35E+03	mg/kg	R	1.44E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	2.43E+02	mg/kg	2.43E+02	mg/kg	R	1.05E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.96E+01	mg/kg	9.96E+01	mg/kg	R	4.29E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Thallium	6.30E-01	mg/kg	6.30E-01	mg/kg	R	2.72E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	7.50E+03	mg/kg	7.50E+03	mg/kg	R	3.23E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1254	9.90E-01	mg/kg	9.90E-01	mg/kg	R	4.27E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.5E-08
	Aroclor-1260	4.40E-01	mg/kg	4.40E-01	mg/kg	R	1.90E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	Tetrachloroethene	1.54E-01	mg/kg	1.54E-01	mg/kg	R	6.64E-09	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	3.5E-10
										Total Risk	1.2E-06

R = Route EPC

TABLE F8.2.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	4.02E+04	mg/kg	4.02E+04	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Antimony	4.25E+01	mg/kg	4.25E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	1.73E+01	mg/kg	1.73E+01	mg/kg	R	2.93E-07	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	4.4E-07
	Cadmium	2.04E+02	mg/kg	2.04E+02	mg/kg	R	1.15E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	1.61E+03	mg/kg	1.61E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	5.36E+02	mg/kg	5.36E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	3.35E+03	mg/kg	3.35E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cyanide	2.43E+02	mg/kg	2.43E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	9.96E+01	mg/kg	9.96E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Thallium	6.30E-01	mg/kg	6.30E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Zinc	7.50E+03	mg/kg	7.50E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Aroclor-1254	9.90E-01	mg/kg	9.90E-01	mg/kg	R	7.82E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.6E-07
	Aroclor-1260	4.40E-01	mg/kg	4.40E-01	mg/kg	R	3.48E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	7.0E-08
	Tetrachloroethene	1.54E-01	mg/kg	1.54E-01	mg/kg	R	NA	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	NA
										Total Risk	6.6E-07

R = Route EPC

TABLE F8.3.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Aluminum	4.02E+04	mg/kg	1.02E-04	mg/m^3	R	3.33E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	4.25E+01	mg/kg	1.08E-07	mg/m^3	R	3.53E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.73E+01	mg/kg	4.38E-08	mg/m^3	R	1.43E-10	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	2.2E-09
	Cadmium	2.04E+02	mg/kg	5.16E-07	mg/m^3	R	1.69E-09	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Chromium III	1.61E+03	mg/kg	4.07E-06	mg/m^3	R	1.33E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	5.36E+02	mg/kg	1.36E-06	mg/m^3	R	4.45E-09	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Copper	3.35E+03	mg/kg	8.47E-06	mg/m^3	R	2.78E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	2.43E+02	mg/kg	6.15E-07	mg/m^3	R	2.02E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.96E+01	mg/kg	2.52E-07	mg/m^3	R	8.26E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Thallium	6.30E-01	mg/kg	1.59E-09	mg/m^3	R	5.23E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	7.50E+03	mg/kg	1.90E-05	mg/m^3	R	6.22E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1254	9.90E-01	mg/kg	2.51E-09	mg/m^3	R	8.21E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-11
	Aroclor-1260	4.40E-01	mg/kg	1.11E-09	mg/m^3	R	3.65E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.3E-12
	Tetrachloroethene	1.54E-01	mg/kg	3.90E-10	mg/m^3	R	1.28E-12	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.6E-15
										Total Risk	2.0E-07

R = Route EPC

TABLE F8.4.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	4.37E-04	mg/m^3	R	5.59E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Toluene	3.68E-02	mg/kg	8.15E-04	mg/m^3	R	1.04E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	3.19E-02	mg/kg	7.06E-04	mg/m^3	R	9.02E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	5.4E-09
										Total Risk	6.5E-09

R = Route EPC

TABLE F8.5.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	1.22E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	1.13E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	2.18E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	2.30E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-11
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	2.65E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	1.35E-08	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.7E-11
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	5.09E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	9.36E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.6E-09
										Total Risk	5.7E-09

R = Route EPC

TABLE F8.6.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	1.48E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	1.04E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	8.84E-07	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	1.3E-06
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	5.21E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	9.44E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	2.73E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	1.28E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	1.36E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	3.15E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	1.63E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	2.50E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	2.57E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	3.33E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	6.7E-08
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	3.52E-07	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	7.0E-07
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	9.36E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.9E-07
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	4.16E-08	mg/kg-day	7.30E+00	$(mg/kg-day)^{-1}$	3.0E-07
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	3.45E-09	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	1.8E-10
										Total Risk	2.6E-06

R = Route EPC

TABLE F8.7.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	3.50E-07	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	5.3E-07
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	6.88E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	6.16E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.2E-07
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	6.51E-07	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.3E-06
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	1.73E-07	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	3.5E-07
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	7.14E-08	mg/kg-day	7.30E+00	$(mg/kg-day)^{-1}$	5.2E-07
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	NA
										Total Risk	2.8E-06

R = Route EPC

TABLE F8.8.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	1.07E-05	mg/m^3	R	7.49E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	7.51E-09	mg/m^3	R	5.25E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	6.41E-09	mg/m^3	R	4.48E-10	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	6.8E-09
	Cadmium	2.98E+01	mg/kg	3.78E-08	mg/m^3	R	2.64E-09	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Chromium III	5.40E+02	mg/kg	6.84E-07	mg/m^3	R	4.78E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.97E-07	mg/m^3	R	1.38E-08	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	5.8E-07
	Copper	7.33E+02	mg/kg	9.28E-07	mg/m^3	R	6.49E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	9.83E-08	mg/m^3	R	6.87E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	2.28E-10	mg/m^3	R	1.59E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	1.18E-07	mg/m^3	R	8.25E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.81E-09	mg/m^3	R	1.27E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.86E-06	mg/m^3	R	1.30E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	2.41E-10	mg/m^3	R	1.69E-11	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-11
	Aroclor-1254	2.02E+00	mg/kg	2.55E-09	mg/m^3	R	1.78E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-10
	Aroclor-1260	5.36E-01	mg/kg	6.78E-10	mg/m^3	R	4.74E-11	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.5E-11
	Benzo(a)pyrene	2.38E-01	mg/kg	3.01E-10	mg/m^3	R	2.11E-11	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	6.5E-11
	Tetrachloroethene	1.97E-02	mg/kg	2.50E-11	mg/m^3	R	1.75E-12	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	3.5E-15
										Total Risk	6.0E-07

R = Route EPC

TABLE F8.9.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	5.47E-05	mg/m^3	R	3.82E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	7.6E-09
	Toluene	3.68E-02	mg/kg	6.55E-05	mg/m^3	R	4.57E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	3.19E-02	mg/kg	8.17E-05	mg/m^3	R	5.71E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.4E-08
										Total Risk	4.2E-08

R = Route EPC

TABLE F8.10.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	1.57E-04	mg/m^3	R	1.57E-04	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	Toluene	3.68E-02	mg/kg	2.93E-04	mg/m^3	R	2.93E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	3.19E-02	mg/kg	2.54E-04	mg/m^3	R	2.54E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-07
										Total Risk	1.3E-07

R = Route EPC

TABLE F8.11.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	2.84E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	1.99E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	1.70E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-07
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.00E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	1.81E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	5.23E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	2.46E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	2.61E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	6.04E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	3.13E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	4.80E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	4.94E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	6.40E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	6.77E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	1.80E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.6E-08
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	7.98E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.8E-08
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	6.62E-10	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	3.4E-11
										Total Risk	5.0E-07

R = Route EPC

TABLE F8.12.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	7.00E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.38E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	1.23E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-09
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	1.30E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-08
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	3.46E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.9E-09
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	1.43E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-08
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	5.6E-08

R = Route EPC

TABLE F8.13.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	2.14E-05	mg/m^3	R	2.99E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	1.50E-08	mg/m^3	R	2.10E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	1.28E-08	mg/m^3	R	1.79E-11	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	Cadmium	2.98E+01	mg/kg	7.55E-08	mg/m^3	R	1.06E-10	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	6.6E-10
	Chromium III	5.40E+02	mg/kg	1.37E-06	mg/m^3	R	1.91E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	3.95E-07	mg/m^3	R	5.52E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	2.3E-08
	Copper	7.33E+02	mg/kg	1.86E-06	mg/m^3	R	2.60E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	1.97E-07	mg/m^3	R	2.75E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	4.56E-10	mg/m^3	R	6.37E-13	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	2.36E-07	mg/m^3	R	3.30E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	3.62E-09	mg/m^3	R	5.06E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	3.72E-06	mg/m^3	R	5.21E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	4.83E-10	mg/m^3	R	6.75E-13	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-12
	Aroclor-1254	2.02E+00	mg/kg	5.11E-09	mg/m^3	R	7.14E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-11
	Aroclor-1260	5.36E-01	mg/kg	1.36E-09	mg/m^3	R	1.90E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-12
	Benzo(a)pyrene	2.38E-01	mg/kg	6.03E-10	mg/m^3	R	8.42E-13	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-12
	Tetrachloroethene	1.97E-02	mg/kg	5.00E-11	mg/m^3	R	6.99E-14	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-16
										Total Risk	2.4E-08

R = Route EPC

TABLE F8.14.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	3.93E-03	mg/m^3	R	3.93E-03	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Toluene	3.68E-02	mg/kg	7.33E-03	mg/m^3	R	7.33E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	3.19E-02	mg/kg	6.35E-03	mg/m^3	R	6.35E-03	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.3E-08
										Total Risk	6.4E-08

R = Route EPC

TABLE F8.15.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	6.22E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	4.36E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	3.72E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-07
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	2.19E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	3.97E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	1.15E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	5.39E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	5.71E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	1.32E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	6.85E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	1.05E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	1.08E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	1.40E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	1.48E-07	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	3.94E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.9E-08
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	1.75E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	1.45E-09	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	7.5E-11
										Total Risk	1.1E-06

R = Route EPC

TABLE F8.16.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	6.18E-08	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	9.3E-08
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.21E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	1.09E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	2.2E-08
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	1.15E-07	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	2.3E-07
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	3.05E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	6.1E-08
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	1.26E-08	mg/kg-day	7.30E+00	$(mg/kg-day)^{-1}$	9.2E-08
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	NA
										Total Risk	5.0E-07

R = Route EPC

TABLE F8.17.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	1.07E-05	mg/m^3	R	3.68E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	7.51E-09	mg/m^3	R	2.58E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	6.41E-09	mg/m^3	R	2.20E-11	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	3.3E-10
	Cadmium	2.98E+01	mg/kg	3.78E-08	mg/m^3	R	1.30E-10	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	8.2E-10
	Chromium III	5.40E+02	mg/kg	6.84E-07	mg/m^3	R	2.35E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.97E-07	mg/m^3	R	6.79E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Copper	7.33E+02	mg/kg	9.28E-07	mg/m^3	R	3.19E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	9.83E-08	mg/m^3	R	3.38E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	2.28E-10	mg/m^3	R	7.83E-13	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	1.18E-07	mg/m^3	R	4.06E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.81E-09	mg/m^3	R	6.22E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.86E-06	mg/m^3	R	6.40E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	2.41E-10	mg/m^3	R	8.29E-13	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-12
	Aroclor-1254	2.02E+00	mg/kg	2.55E-09	mg/m^3	R	8.78E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-11
	Aroclor-1260	5.36E-01	mg/kg	6.78E-10	mg/m^3	R	2.33E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.7E-12
	Benzo(a)pyrene	2.38E-01	mg/kg	3.01E-10	mg/m^3	R	1.04E-12	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	3.2E-12
	Tetrachloroethene	1.97E-02	mg/kg	2.50E-11	mg/m^3	R	8.59E-14	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.7E-16
										Total Risk	3.0E-08

R = Route EPC

TABLE F8.18.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	3.03E-04	mg/m^3	R	1.04E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-09
	Toluene	3.68E-02	mg/kg	5.64E-04	mg/m^3	R	1.95E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	3.19E-02	mg/kg	4.89E-04	mg/m^3	R	1.69E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.0E-08
										Total Risk	1.2E-08

R = Route EPC

TABLE F8.19.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	9.46E-04	mg/m^3	R	9.46E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	6.97E-05	mg/m^3	R	6.97E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	5.81E-06	mg/m^3	R	5.81E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	1.30E-06	mg/m^3	R	1.30E-06	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.3E-09
	cis-1,2-Dichloroethene	6.60E+02	ug/l	1.43E-03	mg/m^3	R	1.43E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	9.24E-05	mg/m^3	R	9.24E-05	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	trans-1,2-Dichloroethene	7.00E+00	ug/l	3.55E-05	mg/m^3	R	3.55E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	6.28E-03	mg/m^3	R	6.28E-03	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.6E-06
										Total Risk	2.7E-06

R = Route EPC

TABLE F8.20.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	2.61E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	2.41E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	4.66E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	4.91E-09	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	4.0E-10
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	5.65E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	2.87E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	5.7E-10
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	1.09E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	2.00E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-07
										Total Risk	1.2E-07

R = Route EPC

TABLE F8.21.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	3.74E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	3.44E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	6.66E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	7.02E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	7.9E-12
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	8.09E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	4.11E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-11
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	1.55E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	2.86E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.4E-09
										Total Risk	2.4E-09

R = Route EPC

TABLE F8.22.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	1.28E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	1.18E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	2.29E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	2.41E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-11
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	2.78E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	1.41E-08	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.8E-11
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	5.34E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	9.82E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.9E-09
										Total Risk	5.9E-09

R = Route EPC

TABLE F8.23.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	2-Methylnaphthalene	2.9E+01	mg/kg	1.2E-05	mg/m^3	R	4.0E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Anthracene	6.7E+01	mg/kg	2.8E-05	mg/m^3	R	9.3E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.9E+02	mg/kg	2.1E-04	mg/m^3	R	6.8E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE F8.24.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	2-Methylnaphthalene	5.50E+00	mg/kg	5.78E-07	mg/m^3	R	4.04E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Anthracene	6.70E+01	mg/kg	7.04E-06	mg/m^3	R	4.92E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.90E+02	mg/kg	5.15E-05	mg/m^3	R	3.60E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE F8.25.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	5.64E-16	mg/m^3	R	1.14E-18	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-20
	Dibenzofuran	4.00E+00	ug/l	1.13E-15	mg/m^3	R	2.27E-18	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Naphthalene	6.00E+00	ug/l	1.69E-15	mg/m^3	R	3.41E-18	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.22E+01	ug/l	1.19E-14	mg/m^3	R	2.40E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	3.18E+01	ug/l	8.96E-15	mg/m^3	R	1.81E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzene	1.06E+01	ug/l	3.00E-15	mg/m^3	R	6.04E-18	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-19
	Chloroethane	1.55E+01	ug/l	4.36E-15	mg/m^3	R	8.80E-18	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Ethylbenzene	2.35E+01	ug/l	6.61E-15	mg/m^3	R	1.33E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Methylene chloride	7.65E+00	ug/l	2.16E-15	mg/m^3	R	4.35E-18	mg/kg-day	1.65E-03	$(mg/kg\text{-}day)^{-1}$	7.2E-21
	Toluene	4.15E+01	ug/l	1.17E-14	mg/m^3	R	2.36E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	2.00E+00	ug/l	5.64E-16	mg/m^3	R	1.14E-18	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	6.8E-21
	Vinyl chloride	8.00E-01	ug/l	2.25E-16	mg/m^3	R	4.55E-19	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-19
	Xylenes (total)	8.71E+01	ug/l	2.45E-14	mg/m^3	R	4.95E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	3.4E-19

R = Route EPC

TABLE F8.26.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	5.29E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	3.38E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-07
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	2.34E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	1.15E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	3.78E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	1.05E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	2.88E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	2.45E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	2.58E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	1.53E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	1.96E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	1.14E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	8.3E-07
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	1.24E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	9.1E-08
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	1.75E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	3.95E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	1.85E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.0E-10
										Total Risk	1.6E-06

R = Route EPC

TABLE F8.27.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	1.34E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-07
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	3.09E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	1.95E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	2.13E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	3.00E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	NA	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	2.0E-06

R = Route EPC

TABLE F8.28.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Antimony	3.03E+00	mg/kg	3.84E-09	mg/m^3	R	2.68E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	2.45E-09	mg/m^3	R	1.71E-10	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	4.0E-09
	Cadmium	1.34E+01	mg/kg	1.70E-08	mg/m^3	R	1.19E-09	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	7.5E-09
	Chromium III	6.57E+01	mg/kg	8.32E-08	mg/m^3	R	5.82E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	2.74E-08	mg/m^3	R	1.92E-09	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	8.0E-08
	Copper	6.03E+01	mg/kg	7.63E-08	mg/m^3	R	5.33E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	2.08E-08	mg/m^3	R	1.46E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	1.77E-10	mg/m^3	R	1.24E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	1.87E-08	mg/m^3	R	1.31E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	1.11E-08	mg/m^3	R	7.72E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	1.42E-07	mg/m^3	R	9.94E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	8.23E-10	mg/m^3	R	5.75E-11	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-10
	Benzo(b)fluoranthene	7.10E-01	mg/kg	8.99E-10	mg/m^3	R	6.28E-11	mg/kg-day	3.10E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-11
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.27E-10	mg/m^3	R	8.85E-12	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-11
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.86E-11	mg/m^3	R	2.00E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.34E-10	mg/m^3	R	9.39E-12	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.6E-14
										Total Risk	9.2E-08

R = Route EPC

TABLE F8.29.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	4.04E-05	mg/m^3	R	2.82E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.89E-04	mg/m^3	R	1.32E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	7.9E-08
										Total Risk	7.9E-08

R = Route EPC

TABLE F8.30.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	1.20E-04	mg/m^3	R	2.10E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	5.64E-04	mg/m^3	R	9.85E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.9E-08
										Total Risk	5.9E-08

R = Route EPC

TABLE F8.31.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	1.02E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	6.49E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	9.7E-08
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	4.50E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	2.21E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	7.26E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	2.02E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	5.53E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	4.70E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	4.95E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	2.93E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	3.77E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	2.18E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	2.38E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	3.35E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	7.58E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	3.56E-09	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.9E-11
										Total Risk	3.0E-07

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE F8.32.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	2.68E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-09
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	6.18E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	3.90E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	4.26E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-09
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	6.00E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-09
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	NA	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	4.0E-08

R = Route EPC

TABLE F8.33.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Antimony	3.03E+00	mg/kg	7.67E-09	mg/m^3	R	1.07E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	4.90E-09	mg/m^3	R	6.84E-12	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	Cadmium	1.34E+01	mg/kg	3.39E-08	mg/m^3	R	4.74E-11	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-10
	Chromium III	6.57E+01	mg/kg	1.66E-07	mg/m^3	R	2.33E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	5.48E-08	mg/m^3	R	7.66E-11	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	3.2E-09
	Copper	6.03E+01	mg/kg	1.53E-07	mg/m^3	R	2.13E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	4.17E-08	mg/m^3	R	5.83E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	3.54E-10	mg/m^3	R	4.95E-13	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	3.74E-08	mg/m^3	R	5.22E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	2.21E-08	mg/m^3	R	3.09E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	2.85E-07	mg/m^3	R	3.98E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	1.65E-09	mg/m^3	R	2.30E-12	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	7.1E-12
	Benzo(b)fluoranthene	7.10E-01	mg/kg	1.80E-09	mg/m^3	R	2.51E-12	mg/kg-day	3.10E-01	$(mg/kg\text{-}day)^{-1}$	7.8E-13
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	2.53E-10	mg/m^3	R	3.54E-13	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-12
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	5.72E-11	mg/m^3	R	7.99E-14	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	2.69E-10	mg/m^3	R	3.76E-13	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.3E-15
										Total Risk	3.6E-09

R = Route EPC

TABLE F8.34.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	3.00E-03	mg/m^3	R	4.19E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.41E-02	mg/m^3	R	1.97E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-07
										Total Risk	1.2E-07

R = Route EPC

TABLE F8.35.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.97E-03	mg/m^3	R	1.38E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Anthracene	6.70E+01	mg/kg	4.55E-03	mg/m^3	R	3.18E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.90E+02	mg/kg	3.33E-02	mg/m^3	R	2.33E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE F8.36.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC. Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	4.41E-06	mg/m^3	R	7.71E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Anthracene	6.70E+01	mg/kg	1.02E-05	mg/m^3	R	1.78E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.90E+02	mg/kg	7.46E-05	mg/m^3	R	1.30E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE F8.37.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	1.14E+05	mg/kg	1.14E+05	mg/kg	R	3.83E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Antimony	1.53E+01	mg/kg	1.53E+01	mg/kg	R	5.14E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	2.25E+01	mg/kg	2.25E+01	mg/kg	R	7.55E-07	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	1.1E-06
	Barium	4.88E+02	mg/kg	4.88E+02	mg/kg	R	1.64E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cadmium	2.88E+01	mg/kg	2.88E+01	mg/kg	R	9.67E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	8.46E+02	mg/kg	8.46E+02	mg/kg	R	2.84E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	8.46E+02	mg/kg	8.46E+02	mg/kg	R	2.84E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	1.19E+04	mg/kg	1.19E+04	mg/kg	R	4.00E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Mercury	1.92E+00	mg/kg	1.92E+00	mg/kg	R	6.44E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	1.73E+02	mg/kg	1.73E+02	mg/kg	R	5.82E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Thallium	6.80E-01	mg/kg	6.80E-01	mg/kg	R	2.28E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Vanadium	1.31E+02	mg/kg	1.31E+02	mg/kg	R	4.41E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Zinc	3.83E+03	mg/kg	3.83E+03	mg/kg	R	1.28E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	4,4'-DDD	1.93E+01	mg/kg	1.93E+01	mg/kg	R	6.49E-07	mg/kg-day	2.40E-01	$(mg/kg-day)^{-1}$	1.6E-07
	4,4'-DDE	4.17E+00	mg/kg	4.17E+00	mg/kg	R	1.40E-07	mg/kg-day	3.40E-01	$(mg/kg-day)^{-1}$	4.8E-08
	4,4'-DDT	5.00E+00	mg/kg	5.00E+00	mg/kg	R	1.68E-07	mg/kg-day	3.40E-01	$(mg/kg-day)^{-1}$	5.7E-08
	Aroclor-1248	2.17E-01	mg/kg	2.17E-01	mg/kg	R	7.28E-09	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.5E-08
	Aroclor-1254	1.03E+00	mg/kg	1.03E+00	mg/kg	R	3.45E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	6.9E-08
	Aroclor-1260	1.02E+00	mg/kg	1.02E+00	mg/kg	R	3.41E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	6.8E-08
	Dieldrin	3.46E-02	mg/kg	3.46E-02	mg/kg	R	1.16E-09	mg/kg-day	1.60E+01	$(mg/kg-day)^{-1}$	1.9E-08
	Benz(a)anthracene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	8.39E-06	mg/kg-day	7.30E-01	$(mg/kg-day)^{-1}$	6.1E-06
	Benzo(a)pyrene	1.60E+02	mg/kg	1.60E+02	mg/kg	R	5.37E-06	mg/kg-day	7.30E+00	$(mg/kg-day)^{-1}$	3.9E-05
	Benzo(b)fluoranthene	2.70E+02	mg/kg	2.70E+02	mg/kg	R	9.06E-06	mg/kg-day	7.30E-01	$(mg/kg-day)^{-1}$	6.6E-06
	Benzo(k)fluoranthene	1.00E+02	mg/kg	1.00E+02	mg/kg	R	3.35E-06	mg/kg-day	7.30E-02	$(mg/kg-day)^{-1}$	2.4E-07
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	1.79E+03	mg/kg	R	6.00E-05	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	8.4E-07
	Carbazole	5.20E+01	mg/kg	5.20E+01	mg/kg	R	1.74E-06	mg/kg-day	2.00E-02	$(mg/kg-day)^{-1}$	3.5E-08
	Chrysene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	8.39E-06	mg/kg-day	7.30E-03	$(mg/kg-day)^{-1}$	6.1E-08
	Di-n-octyl phthalate	4.43E+02	mg/kg	4.43E+02	mg/kg	R	1.49E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	2.60E+01	mg/kg	R	8.72E-07	mg/kg-day	7.30E+00	$(mg/kg-day)^{-1}$	6.4E-06
	Fluoranthene	6.50E+02	mg/kg	6.50E+02	mg/kg	R	2.18E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA

TABLE F8.37.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	9.40E+01	mg/kg	R	3.15E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.3E-06
	Phenanthrene	4.90E+02	mg/kg	4.90E+02	mg/kg	R	1.64E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Pyrene	5.00E+02	mg/kg	5.00E+02	mg/kg	R	1.68E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	6.3E-05

R = Route EPC

TABLE F8.38.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	1.14E+05	mg/kg	1.14E+05	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Antimony	1.53E+01	mg/kg	1.53E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	2.25E+01	mg/kg	2.25E+01	mg/kg	R	3.11E-08	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	4.7E-08
	Barium	4.88E+02	mg/kg	4.88E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cadmium	2.88E+01	mg/kg	2.88E+01	mg/kg	R	1.33E-09	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	8.46E+02	mg/kg	8.46E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	8.46E+02	mg/kg	8.46E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	1.19E+04	mg/kg	1.19E+04	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Mercury	1.92E+00	mg/kg	1.92E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	1.73E+02	mg/kg	1.73E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Thallium	6.80E-01	mg/kg	6.80E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Vanadium	1.31E+02	mg/kg	1.31E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Zinc	3.83E+03	mg/kg	3.83E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	4,4'-DDD	1.93E+01	mg/kg	1.93E+01	mg/kg	R	2.68E-08	mg/kg-day	2.40E-01	$(mg/kg-day)^{-1}$	6.4E-09
	4,4'-DDE	4.17E+00	mg/kg	4.17E+00	mg/kg	R	5.77E-09	mg/kg-day	3.40E-01	$(mg/kg-day)^{-1}$	2.0E-09
	4,4'-DDT	5.00E+00	mg/kg	5.00E+00	mg/kg	R	6.92E-09	mg/kg-day	3.40E-01	$(mg/kg-day)^{-1}$	2.4E-09
	Aroclor-1248	2.17E-01	mg/kg	2.17E-01	mg/kg	R	1.40E-09	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	2.8E-09
	Aroclor-1254	1.03E+00	mg/kg	1.03E+00	mg/kg	R	6.63E-09	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.3E-08
	Aroclor-1260	1.02E+00	mg/kg	1.02E+00	mg/kg	R	6.57E-09	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.3E-08
	Dieldrin	3.46E-02	mg/kg	3.46E-02	mg/kg	R	1.59E-10	mg/kg-day	1.60E+01	$(mg/kg-day)^{-1}$	2.6E-09
	Benz(a)anthracene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.50E-06	mg/kg-day	7.30E-01	$(mg/kg-day)^{-1}$	1.1E-06
	Benzo(a)pyrene	1.60E+02	mg/kg	1.60E+02	mg/kg	R	9.59E-07	mg/kg-day	7.30E+00	$(mg/kg-day)^{-1}$	7.0E-06
	Benzo(b)fluoranthene	2.70E+02	mg/kg	2.70E+02	mg/kg	R	1.62E-06	mg/kg-day	7.30E-01	$(mg/kg-day)^{-1}$	1.2E-06
	Benzo(k)fluoranthene	1.00E+02	mg/kg	1.00E+02	mg/kg	R	6.00E-07	mg/kg-day	7.30E-02	$(mg/kg-day)^{-1}$	4.4E-08
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	1.79E+03	mg/kg	R	8.24E-06	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	1.2E-07
	Carbazole	5.20E+01	mg/kg	5.20E+01	mg/kg	R	2.40E-07	mg/kg-day	2.00E-02	$(mg/kg-day)^{-1}$	4.8E-09
	Chrysene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.50E-06	mg/kg-day	7.30E-03	$(mg/kg-day)^{-1}$	1.1E-08
	Di-n-octyl phthalate	4.43E+02	mg/kg	4.43E+02	mg/kg	R	2.04E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	2.60E+01	mg/kg	R	1.56E-07	mg/kg-day	7.30E+00	$(mg/kg-day)^{-1}$	1.1E-06
	Fluoranthene	6.50E+02	mg/kg	6.50E+02	mg/kg	R	3.90E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA

TABLE F8.38.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	9.40E+01	mg/kg	R	5.64E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-07
	Phenanthrene	4.90E+02	mg/kg	4.90E+02	mg/kg	R	2.94E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Pyrene	5.00E+02	mg/kg	5.00E+02	mg/kg	R	3.00E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	1.1E-05

R = Route EPC

TABLE F8.39.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Aluminum	1.14E+05	mg/kg	2.89E-04	mg/m^3	R	4.04E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	1.53E+01	mg/kg	3.88E-08	mg/m^3	R	5.42E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	2.25E+01	mg/kg	5.70E-08	mg/m^3	R	7.96E-11	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	Barium	4.88E+02	mg/kg	1.23E-06	mg/m^3	R	1.73E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cadmium	2.88E+01	mg/kg	7.29E-08	mg/m^3	R	1.02E-10	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	6.4E-10
	Chromium III	8.46E+02	mg/kg	2.14E-06	mg/m^3	R	2.99E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	8.46E+02	mg/kg	2.14E-06	mg/m^3	R	2.99E-09	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Copper	1.19E+04	mg/kg	3.02E-05	mg/m^3	R	4.22E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.92E+00	mg/kg	4.86E-09	mg/m^3	R	6.79E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.73E+02	mg/kg	4.39E-07	mg/m^3	R	6.14E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Thallium	6.80E-01	mg/kg	1.72E-09	mg/m^3	R	2.41E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	1.31E+02	mg/kg	3.33E-07	mg/m^3	R	4.65E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	3.83E+03	mg/kg	9.69E-06	mg/m^3	R	1.35E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	4,4'-DDD	1.93E+01	mg/kg	4.90E-08	mg/m^3	R	6.84E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	4,4'-DDE	4.17E+00	mg/kg	1.06E-08	mg/m^3	R	1.47E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	4,4'-DDT	5.00E+00	mg/kg	1.27E-08	mg/m^3	R	1.77E-11	mg/kg-day	3.40E-01	$(mg/kg\text{-}day)^{-1}$	6.0E-12
	Aroclor-1248	2.17E-01	mg/kg	5.49E-10	mg/m^3	R	7.68E-13	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-12
	Aroclor-1254	1.03E+00	mg/kg	2.60E-09	mg/m^3	R	3.64E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.3E-12
	Aroclor-1260	1.02E+00	mg/kg	2.57E-09	mg/m^3	R	3.60E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.2E-12
	Dieldrin	3.46E-02	mg/kg	8.75E-11	mg/m^3	R	1.22E-13	mg/kg-day	1.61E+01	$(mg/kg\text{-}day)^{-1}$	2.0E-12
	Benz(a)anthracene	2.50E+02	mg/kg	6.33E-07	mg/m^3	R	8.85E-10	mg/kg-day	3.10E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-10
	Benzo(a)pyrene	1.60E+02	mg/kg	4.05E-07	mg/m^3	R	5.66E-10	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-09
	Benzo(b)fluoranthene	2.70E+02	mg/kg	6.84E-07	mg/m^3	R	9.55E-10	mg/kg-day	3.10E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-10
	Benzo(k)fluoranthene	1.00E+02	mg/kg	2.53E-07	mg/m^3	R	3.54E-10	mg/kg-day	3.10E-02	$(mg/kg\text{-}day)^{-1}$	1.1E-11
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	4.52E-06	mg/m^3	R	6.32E-09	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	8.9E-11
	Carbazole	5.20E+01	mg/kg	1.32E-07	mg/m^3	R	1.84E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chrysene	2.50E+02	mg/kg	6.33E-07	mg/m^3	R	8.85E-10	mg/kg-day	3.10E-03	$(mg/kg\text{-}day)^{-1}$	2.7E-12
	Di-n-octyl phthalate	4.43E+02	mg/kg	1.12E-06	mg/m^3	R	1.57E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	6.58E-08	mg/m^3	R	9.20E-11	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	2.9E-10
	Fluoranthene	6.50E+02	mg/kg	1.65E-06	mg/m^3	R	2.30E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA

TABLE F8.39.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	2.38E-07	mg/m^3	R	3.33E-10	mg/kg-day	3.10E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	Phenanthrene	4.90E+02	mg/kg	1.24E-06	mg/m^3	R	1.73E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Pyrene	5.00E+02	mg/kg	1.27E-06	mg/m^3	R	1.77E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	1.3E-07

R = Route EPC

TABLE F8.40.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.10E-04	mg/m^3	R	1.10E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Anthracene	6.70E+01	mg/kg	2.55E-04	mg/m^3	R	2.55E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.90E+02	mg/kg	1.86E-03	mg/m^3	R	1.86E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE F8.41.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	9.06E-14	mg/m^3	R	6.33E-15	mg/kg-day	2.20E-02	$(mg/kg-day)^{-1}$	1.4E-16
	Dibenzofuran	4.00E+00	ug/l	1.81E-13	mg/m^3	R	1.27E-14	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Naphthalene	6.00E+00	ug/l	2.72E-13	mg/m^3	R	1.90E-14	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Phenanthrene	4.22E+01	ug/l	1.91E-12	mg/m^3	R	1.33E-13	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Acetone	3.18E+01	ug/l	1.44E-12	mg/m^3	R	1.01E-13	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Benzene	1.06E+01	ug/l	4.82E-13	mg/m^3	R	3.37E-14	mg/kg-day	2.70E-02	$(mg/kg-day)^{-1}$	9.1E-16
	Chloroethane	1.55E+01	ug/l	7.01E-13	mg/m^3	R	4.90E-14	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Ethylbenzene	2.35E+01	ug/l	1.06E-12	mg/m^3	R	7.43E-14	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Methylene chloride	7.65E+00	ug/l	3.47E-13	mg/m^3	R	2.42E-14	mg/kg-day	1.65E-03	$(mg/kg-day)^{-1}$	4.0E-17
	Toluene	4.15E+01	ug/l	1.88E-12	mg/m^3	R	1.31E-13	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	2.00E+00	ug/l	9.06E-14	mg/m^3	R	6.33E-15	mg/kg-day	6.00E-03	$(mg/kg-day)^{-1}$	3.8E-17
	Vinyl chloride	8.00E-01	ug/l	3.62E-14	mg/m^3	R	2.53E-15	mg/kg-day	3.00E-01	$(mg/kg-day)^{-1}$	7.6E-16
	Xylenes (total)	8.71E+01	ug/l	3.95E-12	mg/m^3	R	2.76E-13	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
										Total Risk	1.9E-15

R = Route EPC

TABLE F8.42.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC. Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	2.03E-16	mg/m^3	R	3.55E-18	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	7.8E-20
	Dibenzofuran	4.00E+00	ug/l	4.06E-16	mg/m^3	R	7.09E-18	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Naphthalene	6.00E+00	ug/l	6.09E-16	mg/m^3	R	1.06E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.22E+01	ug/l	4.28E-15	mg/m^3	R	7.47E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	3.18E+01	ug/l	3.22E-15	mg/m^3	R	5.63E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzene	1.06E+01	ug/l	1.08E-15	mg/m^3	R	1.89E-17	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	5.1E-19
	Chloroethane	1.55E+01	ug/l	1.57E-15	mg/m^3	R	2.74E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Ethylbenzene	2.35E+01	ug/l	2.38E-15	mg/m^3	R	4.16E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Methylene chloride	7.65E+00	ug/l	7.76E-16	mg/m^3	R	1.36E-17	mg/kg-day	1.65E-03	$(mg/kg\text{-}day)^{-1}$	2.2E-20
	Toluene	4.15E+01	ug/l	4.21E-15	mg/m^3	R	7.35E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	2.00E+00	ug/l	2.03E-16	mg/m^3	R	3.55E-18	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-20
	Vinyl chloride	8.00E-01	ug/l	8.12E-17	mg/m^3	R	1.42E-18	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	4.3E-19
	Xylenes (total)	8.71E+01	ug/l	8.84E-15	mg/m^3	R	1.54E-16	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	1.1E-18

R = Route EPC

TABLE F8.43.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Liquid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	R	1.29E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	4.67E+01	mg/kg	4.67E+01	mg/kg	R	2.16E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.65E+01	mg/kg	1.65E+01	mg/kg	R	7.59E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-08
	Barium	8.24E+02	mg/kg	8.24E+02	mg/kg	R	3.80E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cadmium	1.36E+02	mg/kg	1.36E+02	mg/kg	R	6.27E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	1.14E+04	mg/kg	1.14E+04	mg/kg	R	5.26E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.14E+04	mg/kg	1.14E+04	mg/kg	R	1.05E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	4.47E+03	mg/kg	4.47E+03	mg/kg	R	2.06E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Manganese	4.54E+02	mg/kg	4.54E+02	mg/kg	R	2.09E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	7.80E-01	mg/kg	7.80E-01	mg/kg	R	3.60E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.20E+02	mg/kg	1.20E+02	mg/kg	R	5.54E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Thallium	2.66E+00	mg/kg	2.66E+00	mg/kg	R	1.23E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	5.09E+02	mg/kg	5.09E+02	mg/kg	R	2.35E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	5.50E+03	mg/kg	5.50E+03	mg/kg	R	1.52E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	4,4'-DDD	4.49E+00	mg/kg	4.49E+00	mg/kg	R	2.90E-06	mg/kg-day	2.40E-01	$(mg/kg\text{-}day)^{-1}$	6.9E-07
	4,4'-DDE	2.96E+00	mg/kg	2.96E+00	mg/kg	R	1.61E-06	mg/kg-day	3.40E-01	$(mg/kg\text{-}day)^{-1}$	5.5E-07
	4,4'-DDT	3.38E+00	mg/kg	3.38E+00	mg/kg	R	4.20E-06	mg/kg-day	3.40E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Aroclor-1260	9.49E+00	mg/kg	9.49E+00	mg/kg	R	2.14E-05	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-05
	Endrin aldehyde	6.90E-01	mg/kg	6.90E-01	mg/kg	R	3.76E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Heptachlor epoxide	3.44E-02	mg/kg	3.44E-02	mg/kg	R	1.36E-09	mg/kg-day	9.10E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	1,4-Dichlorobenzene	2.00E+00	mg/kg	2.00E+00	mg/kg	R	9.55E-08	mg/kg-day	2.40E-02	$(mg/kg\text{-}day)^{-1}$	2.3E-09
	4-Methylphenol	4.80E+01	mg/kg	4.80E+01	mg/kg	R	2.49E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benz(a)anthracene	4.50E+01	mg/kg	4.50E+01	mg/kg	R	4.64E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	4.10E+01	mg/kg	4.10E+01	mg/kg	R	7.32E-05	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.3E-04
	Benzo(b)fluoranthene	6.60E+01	mg/kg	6.60E+01	mg/kg	R	1.18E-04	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	8.6E-05
	Benzo(k)fluoranthene	2.80E+01	mg/kg	2.80E+01	mg/kg	R	5.00E-05	mg/kg-day	7.30E-02	$(mg/kg\text{-}day)^{-1}$	3.6E-06
	bis(2-Ethylhexyl)phthalate	3.00E+02	mg/kg	3.00E+02	mg/kg	R	2.16E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	3.0E-07
	Carbazole	1.10E+01	mg/kg	1.10E+01	mg/kg	R	4.42E-07	mg/kg-day	2.00E-02	$(mg/kg\text{-}day)^{-1}$	8.8E-09
	Chrysene	5.40E+01	mg/kg	5.40E+01	mg/kg	R	5.57E-05	mg/kg-day	7.30E-03	$(mg/kg\text{-}day)^{-1}$	4.1E-07
	Dibenz(a,h)anthracene	7.00E+00	mg/kg	7.00E+00	mg/kg	R	3.32E-05	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-04
	Dibenzofuran	4.00E+00	mg/kg	4.00E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA

TABLE F8.43.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Liquid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Indeno(1,2,3-cd)pyrene	2.40E+01	mg/kg	2.40E+01	mg/kg	R	7.92E-05	mg/kg-day	7.30E-01	$(mg/kg-day)^{-1}$	5.8E-05
	Naphthalene	6.00E+00	mg/kg	6.00E+00	mg/kg	R	2.82E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Pentachlorophenol	1.30E+01	mg/kg	1.30E+01	mg/kg	R	1.38E-05	mg/kg-day	1.20E-01	$(mg/kg-day)^{-1}$	1.7E-06
	Phenanthrene	4.22E+01	mg/kg	4.22E+01	mg/kg	R	8.94E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Pyrene	8.00E+01	mg/kg	8.00E+01	mg/kg	R	2.67E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Acetone	3.18E+01	mg/kg	3.18E+01	mg/kg	R	9.31E-09	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Benzene	1.06E+01	mg/kg	1.06E+01	mg/kg	R	1.29E-07	mg/kg-day	5.50E-02	$(mg/kg-day)^{-1}$	7.1E-09
	Chloroethane	1.55E+01	mg/kg	1.55E+01	mg/kg	R	7.02E-08	mg/kg-day	2.90E-03	$(mg/kg-day)^{-1}$	2.0E-10
	Ethylbenzene	2.35E+01	mg/kg	2.35E+01	mg/kg	R	7.46E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Methylene chloride	7.65E+00	mg/kg	7.65E+00	mg/kg	R	2.07E-08	mg/kg-day	7.50E-03	$(mg/kg-day)^{-1}$	1.6E-10
	Toluene	4.15E+01	mg/kg	4.15E+01	mg/kg	R	1.10E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	2.00E+00	mg/kg	2.00E+00	mg/kg	R	2.29E-08	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	2.5E-10
	Vinyl chloride	8.00E-01	mg/kg	8.00E-01	mg/kg	R	3.30E-09	mg/kg-day	1.90E+00	$(mg/kg-day)^{-1}$	6.3E-09
	Xylenes (total)	8.71E+01	mg/kg	8.71E+01	mg/kg	R	4.16E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
										Total Risk	9.7E-04

R = Route EPC

TABLE F8.44.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	5.07E-15	mg/m^3	R	7.09E-18	mg/kg-day	2.20E-02	$(mg/kg-day)^{-1}$	1.6E-19
	Dibenzofuran	4.00E+00	ug/l	1.01E-14	mg/m^3	R	1.42E-17	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Naphthalene	6.00E+00	ug/l	1.52E-14	mg/m^3	R	2.13E-17	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Phenanthrene	4.22E+01	ug/l	1.07E-13	mg/m^3	R	1.49E-16	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Acetone	3.18E+01	ug/l	8.06E-14	mg/m^3	R	1.13E-16	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Benzene	1.06E+01	ug/l	2.70E-14	mg/m^3	R	3.77E-17	mg/kg-day	2.70E-02	$(mg/kg-day)^{-1}$	1.0E-18
	Chloroethane	1.55E+01	ug/l	3.93E-14	mg/m^3	R	5.49E-17	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Ethylbenzene	2.35E+01	ug/l	5.95E-14	mg/m^3	R	8.32E-17	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Methylene chloride	7.65E+00	ug/l	1.94E-14	mg/m^3	R	2.71E-17	mg/kg-day	1.65E-03	$(mg/kg-day)^{-1}$	4.5E-20
	Toluene	4.15E+01	ug/l	1.05E-13	mg/m^3	R	1.47E-16	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	2.00E+00	ug/l	5.07E-15	mg/m^3	R	7.09E-18	mg/kg-day	6.00E-03	$(mg/kg-day)^{-1}$	4.3E-20
	Vinyl chloride	8.00E-01	ug/l	2.03E-15	mg/m^3	R	2.84E-18	mg/kg-day	3.00E-01	$(mg/kg-day)^{-1}$	8.5E-19
	Xylenes (total)	8.71E+01	ug/l	2.21E-13	mg/m^3	R	3.09E-16	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
										Total Risk	2.1E-18

R = Route EPC

TABLE F8.45.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Indoors)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	5.66E-04	mg/m^3	R	8.93E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	1.81E-04	mg/m^3	R	2.85E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	5.83E-04	mg/m^3	R	9.20E-05	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-05
	Chlorobenzene	1.40E+01	ug/l	1.71E-04	mg/m^3	R	2.70E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.99E-04	mg/m^3	R	6.30E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	3.16E-04	mg/m^3	R	4.99E-05	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.0E-07
	Trichloroethene	2.97E+01	ug/l	1.15E-03	mg/m^3	R	1.82E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Vinyl chloride	4.23E+01	ug/l	6.59E-03	mg/m^3	R	1.04E-03	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-04
										Total Risk	3.3E-04

R = Route EPC

TABLE F8.46.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Indoors)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	5.66E-04	mg/m^3	R	5.31E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	1.81E-04	mg/m^3	R	1.70E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	5.83E-04	mg/m^3	R	5.47E-05	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	9.6E-06
	Chlorobenzene	1.40E+01	ug/l	1.71E-04	mg/m^3	R	1.60E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.99E-04	mg/m^3	R	3.75E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	3.16E-04	mg/m^3	R	2.97E-05	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	5.9E-08
	Trichloroethene	2.97E+01	ug/l	1.15E-03	mg/m^3	R	1.08E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	6.5E-07
	Vinyl chloride	4.23E+01	ug/l	6.59E-03	mg/m^3	R	6.19E-04	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-04
										Total Risk	2.0E-04

R = Route EPC

TABLE F8.47.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Outdoors)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	3.65E-06	mg/m^3	R	1.34E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	1.51E-06	mg/m^3	R	5.54E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	3.41E-06	mg/m^3	R	1.25E-07	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-08
	Chlorobenzene	1.40E+01	ug/l	1.87E-06	mg/m^3	R	6.86E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.93E-06	mg/m^3	R	1.44E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	2.23E-06	mg/m^3	R	8.17E-08	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-10
	Trichloroethene	2.97E+01	ug/l	8.73E-06	mg/m^3	R	3.20E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Vinyl chloride	4.23E+01	ug/l	3.39E-05	mg/m^3	R	1.24E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.7E-07
										Total Risk	4.0E-07

R = Route EPC

TABLE F8.48.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Outdoors)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	3.65E-06	mg/m^3	R	1.45E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	1.51E-06	mg/m^3	R	6.02E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	3.41E-06	mg/m^3	R	1.36E-07	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	Chlorobenzene	1.40E+01	ug/l	1.87E-06	mg/m^3	R	7.46E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.93E-06	mg/m^3	R	1.57E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	2.23E-06	mg/m^3	R	8.88E-08	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.8E-10
	Trichloroethene	2.97E+01	ug/l	8.73E-06	mg/m^3	R	3.48E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.1E-09
	Vinyl chloride	4.23E+01	ug/l	3.39E-05	mg/m^3	R	1.35E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-07
										Total Risk	4.3E-07

R = Route EPC

TABLE F8.49.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Woodward Parkway School)
Receptor Population: School Child
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	2.01E-04	mg/m^3	R	1.41E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	6.44E-05	mg/m^3	R	4.53E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	2.05E-04	mg/m^3	R	1.44E-06	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	2.5E-07
	Chlorobenzene	1.40E+01	ug/l	6.10E-05	mg/m^3	R	4.29E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.42E-04	mg/m^3	R	1.00E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	1.13E-04	mg/m^3	R	7.95E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	Trichloroethene	2.97E+01	ug/l	4.10E-04	mg/m^3	R	2.88E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.7E-08
	Vinyl chloride	4.23E+01	ug/l	2.29E-03	mg/m^3	R	1.61E-05	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	4.8E-06
										Total Risk	5.1E-06

R = Route EPC

TABLE F8.50.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Woodward Parkway School)
Receptor Population: School Employee
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	2.01E-04	mg/m^3	R	5.62E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	6.44E-05	mg/m^3	R	1.80E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	2.05E-04	mg/m^3	R	5.74E-06	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	Chlorobenzene	1.40E+01	ug/l	6.10E-05	mg/m^3	R	1.71E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.42E-04	mg/m^3	R	3.98E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	1.13E-04	mg/m^3	R	3.16E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	6.3E-09
	Trichloroethene	2.97E+01	ug/l	4.10E-04	mg/m^3	R	1.15E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	6.9E-08
	Vinyl chloride	4.23E+01	ug/l	2.29E-03	mg/m^3	R	6.42E-05	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-05
										Total Risk	2.0E-05

R = Route EPC

TABLE F8.51.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	2.05E-05	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	3.1E-05
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	8.93E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	3.56E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	5.91E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	1.33E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	1.22E-04	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	7.3E-05
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	9.45E-05	mg/kg-day	9.10E-02	$(mg/kg-day)^{-1}$	8.6E-06
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	8.73E-05	mg/kg-day	5.50E-02	$(mg/kg-day)^{-1}$	4.8E-06
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	1.10E-05	mg/kg-day	1.30E-01	$(mg/kg-day)^{-1}$	1.4E-06
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	2.52E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	1.19E-04	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	6.2E-06
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	1.64E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	3.12E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	8.11E-03	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	8.9E-05
										Total Risk	2.1E-04

R = Route EPC

TABLE F8.52.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	6.77E-08	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	1.0E-07
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	2.95E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	2.35E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	1.95E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	6.82E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	1.11E-05	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	6.7E-06
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	2.89E-06	mg/kg-day	9.10E-02	$(mg/kg-day)^{-1}$	2.6E-07
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	9.42E-06	mg/kg-day	5.50E-02	$(mg/kg-day)^{-1}$	5.2E-07
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	1.92E-06	mg/kg-day	1.30E-01	$(mg/kg-day)^{-1}$	2.5E-07
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	1.44E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	4.94E-05	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	2.6E-06
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	4.06E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	1.78E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	8.93E-04	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	9.8E-06
										Total Risk	2.0E-05

R = Route EPC

TABLE F8.53RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	1.76E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-05
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	7.65E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	3.05E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	5.06E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	1.14E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	1.05E-04	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	6.3E-05
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	8.10E-05	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.4E-06
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	7.48E-05	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	4.1E-06
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	9.39E-06	mg/kg-day	1.30E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-06
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	2.16E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	1.02E-04	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-06
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	1.41E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	2.68E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	6.95E-03	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	7.6E-05
										Total Risk	1.8E-04

R = Route EPC

TABLE F8.54.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	9.18E-08	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	1.4E-07
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	3.99E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	3.18E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	2.64E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	1.18E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	1.92E-05	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	1.2E-05
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	4.99E-06	mg/kg-day	9.10E-02	$(mg/kg-day)^{-1}$	4.5E-07
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	1.60E-05	mg/kg-day	5.50E-02	$(mg/kg-day)^{-1}$	8.8E-07
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	3.43E-06	mg/kg-day	1.30E-01	$(mg/kg-day)^{-1}$	4.5E-07
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	2.48E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	8.79E-05	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	4.6E-06
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	7.05E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	3.07E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	1.59E-03	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	1.7E-05
										Total Risk	3.5E-05

R = Route EPC

TABLE F8.55.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1-Dichloroethane	1.21E+01	ug/l	6.07E-03	mg/m^3	R	3.99E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	5.56E-03	mg/m^3	R	3.66E-05	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	6.4E-06
	1,2-Dichloroethane	8.62E+00	ug/l	4.31E-03	mg/m^3	R	2.83E-05	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	2.6E-06
	Benzene	7.97E+00	ug/l	3.98E-03	mg/m^3	R	2.62E-05	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	7.1E-07
	Carbon tetrachloride	1.00E+00	ug/l	5.00E-04	mg/m^3	R	3.29E-06	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	cis-1,2-Dichloroethene	2.30E+01	ug/l	1.15E-02	mg/m^3	R	7.56E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	5.45E-03	mg/m^3	R	3.58E-05	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	7.2E-08
	Toluene	1.50E+01	ug/l	7.50E-03	mg/m^3	R	4.93E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	trans-1,2-Dichloroethene	2.85E+01	ug/l	1.43E-02	mg/m^3	R	9.37E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	3.70E-01	mg/m^3	R	2.43E-03	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.5E-05
										Total Risk	2.5E-05

R = Route EPC

TABLE F8.56.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1-Dichloroethane	1.21E+01	ug/l	6.07E-03	mg/m^3	R	1.38E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	5.56E-03	mg/m^3	R	1.26E-05	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	1,2-Dichloroethane	8.62E+00	ug/l	4.31E-03	mg/m^3	R	9.78E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	8.9E-07
	Benzene	7.97E+00	ug/l	3.98E-03	mg/m^3	R	9.04E-06	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Carbon tetrachloride	1.00E+00	ug/l	5.00E-04	mg/m^3	R	1.13E-06	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	6.0E-08
	cis-1,2-Dichloroethene	2.30E+01	ug/l	1.15E-02	mg/m^3	R	2.61E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	5.45E-03	mg/m^3	R	1.24E-05	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.5E-08
	Toluene	1.50E+01	ug/l	7.50E-03	mg/m^3	R	1.70E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	trans-1,2-Dichloroethene	2.85E+01	ug/l	1.43E-02	mg/m^3	R	3.23E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	3.70E-01	mg/m^3	R	8.40E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.0E-06
										Total Risk	8.5E-06

R = Route EPC

TABLE F8.57.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	2.89E+00	ug/l	2.89E+00	ug/l	R	1.24E-08	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	1.9E-08
	Cadmium	1.15E+01	ug/l	1.15E+01	ug/l	R	4.92E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	2.55E+01	ug/l	2.55E+01	ug/l	R	1.10E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	4.94E+01	ug/l	4.94E+01	ug/l	R	2.12E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chloroform	3.00E-01	ug/l	3.00E-01	ug/l	R	1.29E-09	mg/kg-day	6.10E-03	$(mg/kg-day)^{-1}$	7.9E-12
	Dibromochloromethane	8.00E-01	ug/l	8.00E-01	ug/l	R	3.43E-09	mg/kg-day	8.40E-02	$(mg/kg-day)^{-1}$	2.9E-10
	Tetrachloroethene	2.00E+00	ug/l	2.00E+00	ug/l	R	8.58E-09	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	4.5E-10
	Trichloroethene	4.00E+00	ug/l	4.00E+00	ug/l	R	1.72E-08	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	1.9E-10
										Total Risk	2.0E-08

R = Route EPC

TABLE F8.58.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Arsenic	2.89E+00	ug/l	2.89E+00	ug/l	R	7.79E-09	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	1.2E-08
	Cadmium	1.15E+01	ug/l	1.15E+01	ug/l	R	3.09E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	2.55E+01	ug/l	2.55E+01	ug/l	R	6.90E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	4.94E+01	ug/l	4.94E+01	ug/l	R	2.67E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chloroform	3.00E-01	ug/l	3.00E-01	ug/l	R	9.39E-09	mg/kg-day	6.10E-03	$(mg/kg-day)^{-1}$	5.7E-11
	Dibromochloromethane	8.00E-01	ug/l	8.00E-01	ug/l	R	1.19E-08	mg/kg-day	8.40E-02	$(mg/kg-day)^{-1}$	1.0E-09
	Tetrachloroethene	2.00E+00	ug/l	2.00E+00	ug/l	R	4.01E-07	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	2.1E-08
	Trichloroethene	4.00E+00	ug/l	4.00E+00	ug/l	R	2.33E-07	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	2.6E-09
										Total Risk	3.6E-08

R = Route EPC

TABLE F8.59.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.21E+03	mg/kg	8.21E+03	mg/kg	R	3.52E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	9.76E+00	mg/kg	9.76E+00	mg/kg	R	4.19E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.3E-08
	Cadmium	1.64E+02	mg/kg	1.64E+02	mg/kg	R	7.02E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	3.11E+02	mg/kg	3.11E+02	mg/kg	R	1.34E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	4.20E+02	mg/kg	4.20E+02	mg/kg	R	1.80E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Manganese	2.09E+03	mg/kg	2.09E+03	mg/kg	R	8.97E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	3.10E-01	mg/kg	3.10E-01	mg/kg	R	1.33E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	4.70E+01	mg/kg	4.70E+01	mg/kg	R	2.02E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	6.3E-08

R = Route EPC

TABLE F8.60.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	8.21E+03	mg/kg	8.21E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	9.76E+00	mg/kg	9.76E+00	mg/kg	R	4.74E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	7.1E-09
	Cadmium	1.64E+02	mg/kg	1.64E+02	mg/kg	R	2.65E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	3.11E+02	mg/kg	3.11E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	4.20E+02	mg/kg	4.20E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Manganese	2.09E+03	mg/kg	2.09E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	3.10E-01	mg/kg	3.10E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	4.70E+01	mg/kg	4.70E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	7.1E-09

R = Route EPC

TABLE F8.61.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	4.37E-02	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	2.31E-05	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	3.5E-05
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	1.38E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	4.72E+02	ug/l	2.82E+02	ug/l	R	3.09E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	2.82E+02	ug/l	1.26E+02	ug/l	R	1.38E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	9.35E-02	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	1.12E-06	mg/kg-day	1.60E+01	$(mg/kg-day)^{-1}$	1.8E-05
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	3.96E-07	mg/kg-day	9.10E+00	$(mg/kg-day)^{-1}$	3.6E-06
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	7.89E-05	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	1.1E-06
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	4.38E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	9.09E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	8.77E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	5.11E-05	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	3.1E-05
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	1.53E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	2.74E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	5.68E-05	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	3.0E-06
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	3.25E-04	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	3.6E-06
	Vinyl chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	4.64E-04	mg/kg-day	1.90E+00	$(mg/kg-day)^{-1}$	8.8E-04
										Total Risk	9.8E-04

R = Route EPC

TABLE F8.62.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	9.15E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	4.83E-08	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	7.2E-08
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	2.89E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	4.72E+02	ug/l	2.82E+02	ug/l	R	6.46E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	2.82E+02	ug/l	4.72E+02	ug/l	R	2.16E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	1.96E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	5.14E-07	mg/kg-day	1.60E+01	$(mg/kg-day)^{-1}$	8.2E-06
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	1.32E-07	mg/kg-day	9.10E+00	$(mg/kg-day)^{-1}$	1.2E-06
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	4.79E-05	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	6.7E-07
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	1.09E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	9.00E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	3.64E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	3.76E-06	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	2.3E-06
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	3.21E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	1.26E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	1.95E-05	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	1.0E-06
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	2.98E-05	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	3.3E-07
	Vinyl chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	1.28E-05	mg/kg-day	1.90E+00	$(mg/kg-day)^{-1}$	2.4E-05
										Total Risk	3.8E-05

R = Route EPC

TABLE F8.63.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,1-Trichloroethane	8.30E+00	ug/l	4.15E-03	mg/m^3	R	2.27E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	4.00E-03	mg/m^3	R	2.19E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	2.33E-03	mg/m^3	R	1.28E-05	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	Chlorobenzene	1.40E+01	ug/l	7.00E-03	mg/m^3	R	3.84E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.25E-02	mg/m^3	R	6.85E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	2.59E-03	mg/m^3	R	1.42E-05	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	Trichloroethene	2.97E+01	ug/l	1.48E-02	mg/m^3	R	8.13E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.9E-07
	Vinyl Chloride	4.23E+01	ug/l	2.11E-02	mg/m^3	R	1.16E-04	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.5E-05
										Total Risk	3.8E-05

R = Route EPC

TABLE F8.64.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	3.75E-02	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	1.98E-05	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-05
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	1.18E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	4.72E+02	ug/l	2.82E+02	ug/l	R	2.65E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.82E+02	ug/l	4.72E+02	ug/l	R	4.43E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	8.01E-02	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	9.60E-07	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.5E-05
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	3.40E-07	mg/kg-day	9.10E+00	$(mg/kg\text{-}day)^{-1}$	3.1E-06
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	6.76E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	9.5E-07
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	3.76E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	7.80E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	7.51E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	4.38E-05	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	2.6E-05
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	1.32E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	2.35E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	4.87E-05	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-06
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	2.79E-04	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	3.1E-06
	Vinyl chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	3.97E-04	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	7.5E-04
										Total Risk	8.4E-04

R = Route EPC

TABLE F8.65.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	1.97E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	1.04E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-07
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	6.23E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	4.72E+02	ug/l	2.82E+02	ug/l	R	1.39E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.82E+02	ug/l	4.72E+02	ug/l	R	4.66E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	4.22E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	1.11E-06	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	1.8E-05
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	2.84E-07	mg/kg-day	9.10E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-06
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	1.03E-04	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	2.35E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	1.94E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	7.84E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	8.12E-06	mg/kg-day	6.00E-01	$(mg/kg\text{-}day)^{-1}$	4.9E-06
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	6.92E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	2.72E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	4.21E-05	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-06
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	6.43E-05	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	7.1E-07
	Vinyl chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	2.77E-05	mg/kg-day	1.90E+00	$(mg/kg\text{-}day)^{-1}$	5.3E-05
										Total Risk	8.2E-05

R = Route EPC

TABLE F8.66.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,1-Trichloroethane	8.30E+00	ug/l	4.15E-03	mg/m^3	R	1.13E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	4.00E-03	mg/m^3	R	1.09E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	2.33E-03	mg/m^3	R	6.36E-06	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-06
	Chlorobenzene	1.40E+01	ug/l	7.00E-03	mg/m^3	R	1.91E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.25E-02	mg/m^3	R	3.41E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	2.59E-03	mg/m^3	R	7.06E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Trichloroethene	2.97E+01	ug/l	1.48E-02	mg/m^3	R	4.04E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Vinyl Chloride	4.23E+01	ug/l	2.11E-02	mg/m^3	R	5.76E-05	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-05
										Total Risk	1.9E-05

R = Route EPC

TABLE F8.67.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker (Outdoors)
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	3.41E+03	ug/l	3.41E+03	ug/l	R	1.19E-02	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	1.65E+00	ug/l	1.65E+00	ug/l	R	5.76E-06	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	8.6E-06
	Cadmium	3.84E+02	ug/l	3.84E+02	ug/l	R	1.34E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	3.90E+02	ug/l	3.90E+02	ug/l	R	1.36E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	4.26E+02	ug/l	4.26E+02	ug/l	R	1.49E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	1.10E+02	ug/l	1.10E+02	ug/l	R	3.86E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cyanide	2.72E+02	ug/l	2.72E+02	ug/l	R	9.51E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	2.21E+03	ug/l	2.21E+03	ug/l	R	7.73E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	1.28E+02	ug/l	1.28E+02	ug/l	R	4.47E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Thallium	7.69E+00	ug/l	7.69E+00	ug/l	R	2.69E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	alpha-Chlordane	3.15E-02	ug/l	3.15E-02	ug/l	R	1.10E-07	mg/kg-day	3.50E-01	$(mg/kg-day)^{-1}$	3.8E-08
	Dieldrin	3.28E-02	ug/l	3.28E-02	ug/l	R	1.15E-07	mg/kg-day	1.60E+01	$(mg/kg-day)^{-1}$	1.8E-06
	gamma-Chlordane	3.15E-02	ug/l	3.15E-02	ug/l	R	1.10E-07	mg/kg-day	3.50E-01	$(mg/kg-day)^{-1}$	3.8E-08
	bis(2-Ethylhexyl)phthalate	2.03E+02	ug/l	2.03E+02	ug/l	R	7.09E-04	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	9.9E-06
	Chrysene	1.90E+00	ug/l	1.90E+00	ug/l	R	6.64E-06	mg/kg-day	7.30E-03	$(mg/kg-day)^{-1}$	4.8E-08
	Pentachlorophenol	7.75E+00	ug/l	7.75E+00	ug/l	R	2.71E-05	mg/kg-day	1.20E-01	$(mg/kg-day)^{-1}$	3.2E-06
	1,1,1-Trichloroethane	1.00E+02	ug/l	1.00E+02	ug/l	R	3.49E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	2.27E+01	ug/l	R	7.92E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	1.65E+02	ug/l	R	5.77E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	5.00E-01	ug/l	R	1.75E-06	mg/kg-day	6.10E-03	$(mg/kg-day)^{-1}$	1.1E-08
	cis-1,2-Dichloroethene	6.60E+02	ug/l	6.60E+02	ug/l	R	2.31E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	1.12E+01	ug/l	R	3.92E-05	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	2.0E-06
	trans-1,2-Dichloroethene	7.00E+00	ug/l	7.00E+00	ug/l	R	2.45E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	1.16E+03	ug/l	R	4.05E-03	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	4.5E-05
										Total Risk	7.0E-05

R = Route EPC

TABLE F8.68.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker (Outdoors)
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Manganese	8.95E+01	ug/l	8.95E+01	ug/l	R	3.13E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE F8.69.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Ellsworth Allen Park
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC . Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chromium III	2.04E+01	mg/kg	2.04E+01	mg/kg	R	9.24E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	6.81E+00	mg/kg	6.81E+00	mg/kg	R	3.08E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE F8.70.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Ellsworth Allen Park
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Chromium III	2.04E+01	mg/kg	2.04E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	6.81E+00	mg/kg	6.81E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE F8.71.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Particulates
Exposure Point: Ellsworth Allen Park
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Chromium III	2.04E+01	mg/kg	2.59E-08	mg/m^3	R	8.89E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	6.81E+00	mg/kg	8.62E-09	mg/m^3	R	2.96E-11	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-09
										Total Risk	1.2E-09

R = Route EPC

TABLE F8.72.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Fish
Exposure Medium: Fish Tissue
Exposure Point: Massapequa Preserve
Receptor Population: Fisher
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Cadmium	6.40E-01	mg/kg	6.40E-01	mg/kg	R	3.86E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	9.80E-01	mg/kg	9.80E-01	mg/kg	R	5.91E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE F8.73.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Fish
Exposure Medium: Fish Tissue
Exposure Point: Massapequa Preserve
Receptor Population: Fisher
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Cadmium	6.40E-01	mg/kg	6.40E-01	mg/kg	R	9.62E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	9.80E-01	mg/kg	9.80E-01	mg/kg	R	1.47E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

APPENDIX G

APPENDIX G

CTE RAGS D FORMAT TABLE 7s AND 8s

(Electronic copy available on Final BHHRA CD-ROM submittal and upon request)

TABLE G7.1.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	4.02E+04	mg/kg	4.02E+04	mg/kg	R	6.7E-03	mg/kg-day	1.0E+00	mg/kg-day			6.7E-03
	Antimony	4.25E+01	mg/kg	4.25E+01	mg/kg	R	7.1E-06	mg/kg-day	4.0E-04	mg/kg-day			1.8E-02
	Arsenic	1.73E+01	mg/kg	1.73E+01	mg/kg	R	2.9E-06	mg/kg-day	3.0E-04	mg/kg-day			9.7E-03
	Cadmium	2.04E+02	mg/kg	2.04E+02	mg/kg	R	3.4E-05	mg/kg-day	5.0E-04	mg/kg-day			6.8E-02
	Chromium III	1.61E+03	mg/kg	1.61E+03	mg/kg	R	2.7E-04	mg/kg-day	1.5E+00	mg/kg-day			1.8E-04
	Chromium VI	5.36E+02	mg/kg	5.36E+02	mg/kg	R	9.0E-05	mg/kg-day	3.0E-03	mg/kg-day			3.0E-02
	Copper	3.35E+03	mg/kg	3.35E+03	mg/kg	R	5.6E-04	mg/kg-day	4.0E-02	mg/kg-day			1.4E-02
	Cyanide	2.43E+02	mg/kg	2.43E+02	mg/kg	R	4.1E-05	mg/kg-day	2.0E-02	mg/kg-day			2.0E-03
	Nickel	9.96E+01	mg/kg	9.96E+01	mg/kg	R	1.7E-05	mg/kg-day	2.0E-02	mg/kg-day			8.3E-04
	Thallium	6.30E-01	mg/kg	6.30E-01	mg/kg	R	1.1E-07	mg/kg-day	8.0E-05	mg/kg-day			1.3E-03
	Zinc	7.50E+03	mg/kg	7.50E+03	mg/kg	R	1.3E-03	mg/kg-day	3.0E-01	mg/kg-day			4.2E-03
	Aroclor-1254	9.90E-01	mg/kg	9.90E-01	mg/kg	R	1.7E-07	mg/kg-day	5.0E-05	mg/kg-day			3.3E-03
	Aroclor-1260	4.40E-01	mg/kg	4.40E-01	mg/kg	R	7.4E-08	mg/kg-day	5.0E-05	mg/kg-day			1.5E-03
	Tetrachloroethene	1.54E-01	mg/kg	1.54E-01	mg/kg	R	2.6E-08	mg/kg-day	1.0E-02	mg/kg-day			2.6E-06
												Total Hazard Index	1.6E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.2.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	4.02E+04	mg/kg	4.02E+04	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Antimony	4.25E+01	mg/kg	4.25E+01	mg/kg	R	NA	mg/kg-day	6.0E-05	mg/kg-day			NA
	Arsenic	1.73E+01	mg/kg	1.73E+01	mg/kg	R	1.1E-06	mg/kg-day	3.0E-04	mg/kg-day			3.8E-03
	Cadmium	2.04E+02	mg/kg	2.04E+02	mg/kg	R	4.5E-07	mg/kg-day	1.3E-05	mg/kg-day			3.6E-02
	Chromium III	1.61E+03	mg/kg	1.61E+03	mg/kg	R	NA	mg/kg-day	2.0E-02	mg/kg-day			NA
	Chromium VI	5.36E+02	mg/kg	5.36E+02	mg/kg	R	NA	mg/kg-day	7.5E-05	mg/kg-day			NA
	Copper	3.35E+03	mg/kg	3.35E+03	mg/kg	R	NA	mg/kg-day	4.0E-02	mg/kg-day			NA
	Cyanide	2.43E+02	mg/kg	2.43E+02	mg/kg	R	NA	mg/kg-day	2.0E-02	mg/kg-day			NA
	Nickel	9.96E+01	mg/kg	9.96E+01	mg/kg	R	NA	mg/kg-day	8.0E-04	mg/kg-day			NA
	Thallium	6.30E-01	mg/kg	6.30E-01	mg/kg	R	NA	mg/kg-day	8.0E-05	mg/kg-day			NA
	Zinc	7.50E+03	mg/kg	7.50E+03	mg/kg	R	NA	mg/kg-day	3.0E-01	mg/kg-day			NA
	Aroclor-1254	9.90E-01	mg/kg	9.90E-01	mg/kg	R	3.0E-07	mg/kg-day	5.0E-05	mg/kg-day			6.1E-03
	Aroclor-1260	4.40E-01	mg/kg	4.40E-01	mg/kg	R	1.4E-07	mg/kg-day	5.0E-05	mg/kg-day			2.7E-03
	Tetrachloroethene	1.54E-01	mg/kg	1.54E-01	mg/kg	R	NA	mg/kg-day	1.0E-02	mg/kg-day			NA
												Total Hazard Index	4.8E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.3.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Aluminum	4.02E+04	mg/kg	1.02E-04	mg/m^3	R	4.1E-07	mg/kg-day	1.4E-02	mg/kg-day			2.9E-05
	Antimony	4.25E+01	mg/kg	1.08E-07	mg/m^3	R	4.3E-10	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	1.73E+01	mg/kg	4.38E-08	mg/m^3	R	1.8E-10	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.04E+02	mg/kg	5.16E-07	mg/m^3	R	2.1E-09	mg/kg-day	2.0E-04	mg/kg-day			1.0E-05
	Chromium III	1.61E+03	mg/kg	4.07E-06	mg/m^3	R	1.6E-08	mg/kg-day	NA	mg/kg-day			NA
	Chromium VI	5.36E+02	mg/kg	1.36E-06	mg/m^3	R	5.5E-09	mg/kg-day	3.0E-05	mg/kg-day			1.8E-04
	Copper	3.35E+03	mg/kg	8.47E-06	mg/m^3	R	3.4E-08	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	2.43E+02	mg/kg	1.02E-04	mg/m^3	R	4.1E-07	mg/kg-day	NA	mg/kg-day			NA
	Nickel	9.96E+01	mg/kg	2.52E-07	mg/m^3	R	1.0E-09	mg/kg-day	NA	mg/kg-day			NA
	Thallium	6.30E-01	mg/kg	1.59E-09	mg/m^3	R	6.4E-12	mg/kg-day	NA	mg/kg-day			NA
	Zinc	7.50E+03	mg/kg	1.90E-05	mg/m^3	R	7.6E-08	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1254	9.90E-01	mg/kg	2.51E-09	mg/m^3	R	1.0E-11	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1260	4.40E-01	mg/kg	1.11E-09	mg/m^3	R	4.5E-12	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.54E-01	mg/kg	3.90E-10	mg/m^3	R	1.6E-12	mg/kg-day	1.4E-01	mg/kg-day			1.1E-11
												Total Hazard Index	2.2E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.4.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	4.37E-04	mg/m^3	R	2.26E-07	mg/kg-day	1.40E-01	mg/kg-day			1.3E-05
	Toluene	3.68E-02	mg/kg	8.15E-04	mg/m^3	R	4.21E-07	mg/kg-day	1.14E-01	mg/kg-day			2.9E-05
	Trichloroethene	3.19E-02	mg/kg	7.06E-04	mg/m^3	R	3.65E-07	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	4.1E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.5.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	1.0E+02	ug/l	3.7E-05	mg/m^3	R	1.5E-07	mg/kg-day	1.4E+00	mg/kg-day			1.1E-07
	1,1-Dichloroethane	2.3E+01	ug/l	3.4E-06	mg/m^3	R	1.4E-08	mg/kg-day	1.4E-01	mg/kg-day			9.9E-08
	Acetone	1.7E+02	ug/l	6.7E-07	mg/m^3	R	2.7E-09	mg/kg-day	NA	mg/kg-day			NA
	Chloroform	5.0E-01	ug/l	7.0E-08	mg/m^3	R	2.8E-10	mg/kg-day	8.6E-05	mg/kg-day			3.3E-06
	cis-1,2-Dichloroethene	6.6E+02	ug/l	8.1E-05	mg/m^3	R	3.3E-07	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.1E+01	ug/l	4.1E-06	mg/m^3	R	1.7E-08	mg/kg-day	1.4E-01	mg/kg-day			1.2E-07
	trans-1,2-Dichloroethene	7.0E+00	ug/l	1.6E-06	mg/m^3	R	6.3E-09	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.2E+03	ug/l	2.9E-04	mg/m^3	R	1.1E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.6E-06

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.6.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	4.1E-03	mg/kg-day	1.0E+00	mg/kg-day			4.1E-03
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	2.9E-06	mg/kg-day	4.0E-04	mg/kg-day			7.3E-03
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	2.5E-06	mg/kg-day	3.0E-04	mg/kg-day			8.3E-03
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.5E-05	mg/kg-day	5.0E-04	mg/kg-day			2.9E-02
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	2.6E-04	mg/kg-day	1.5E+00	mg/kg-day			1.8E-04
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	7.6E-05	mg/kg-day	3.0E-03	mg/kg-day			2.5E-02
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	3.6E-04	mg/kg-day	4.0E-02	mg/kg-day			9.0E-03
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	3.8E-05	mg/kg-day	2.0E-02	mg/kg-day			1.9E-03
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	8.8E-08	mg/kg-day	3.0E-04	mg/kg-day			2.9E-04
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	4.6E-05	mg/kg-day	2.0E-02	mg/kg-day			2.3E-03
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	7.0E-07	mg/kg-day	5.0E-03	mg/kg-day			1.4E-04
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	7.2E-04	mg/kg-day	3.0E-01	mg/kg-day			2.4E-03
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	9.3E-08	mg/kg-day	5.0E-05	mg/kg-day			1.9E-03
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	9.9E-07	mg/kg-day	5.0E-05	mg/kg-day			2.0E-02
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	2.6E-07	mg/kg-day	5.0E-05	mg/kg-day			5.2E-03
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	1.2E-07	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	9.7E-09	mg/kg-day	1.0E-02	mg/kg-day			9.7E-07
												Total Hazard Index	1.2E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.7.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	6.0E-05	mg/kg-day			NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	9.8E-08	mg/kg-day	3.0E-04	mg/kg-day			3.3E-04
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.9E-08	mg/kg-day	1.3E-05	mg/kg-day			1.5E-03
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	2.0E-02	mg/kg-day			NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	7.5E-05	mg/kg-day			NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	4.0E-02	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	2.0E-02	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	2.1E-05	mg/kg-day			NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	8.0E-04	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	2.0E-04	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	3.0E-01	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	1.7E-08	mg/kg-day	5.0E-05	mg/kg-day			3.4E-04
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	1.8E-07	mg/kg-day	5.0E-05	mg/kg-day			3.6E-03
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	4.8E-08	mg/kg-day	5.0E-05	mg/kg-day			9.7E-04
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	2.0E-08	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	1.0E-02	mg/kg-day			NA
												Total Hazard Index	6.8E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.8.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	1.07E-05	mg/m^3	R	1.3E-06	mg/kg-day	1.4E-02	mg/kg-day			9.0E-05
	Antimony	5.94E+00	mg/kg	7.51E-09	mg/m^3	R	8.8E-10	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	5.06E+00	mg/kg	6.41E-09	mg/m^3	R	7.5E-10	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.98E+01	mg/kg	3.78E-08	mg/m^3	R	4.4E-09	mg/kg-day	2.0E-04	mg/kg-day			2.2E-05
	Chromium III	5.40E+02	mg/kg	6.84E-07	mg/m^3	R	8.0E-08	mg/kg-day	NA	mg/kg-day			NA
	Chromium VI	1.56E+02	mg/kg	1.97E-07	mg/m^3	R	2.3E-08	mg/kg-day	3.0E-05	mg/kg-day			7.7E-04
	Copper	7.33E+02	mg/kg	9.28E-07	mg/m^3	R	1.1E-07	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	9.83E-08	mg/m^3	R	1.2E-08	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	2.28E-10	mg/m^3	R	2.7E-11	mg/kg-day	8.6E-05	mg/kg-day			3.1E-07
	Nickel	9.32E+01	mg/kg	1.18E-07	mg/m^3	R	1.4E-08	mg/kg-day	NA	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	1.81E-09	mg/m^3	R	2.1E-10	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	1.86E-06	mg/m^3	R	2.2E-07	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	2.41E-10	mg/m^3	R	2.8E-11	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1254	2.02E+00	mg/kg	2.55E-09	mg/m^3	R	3.0E-10	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1260	5.36E-01	mg/kg	6.78E-10	mg/m^3	R	8.0E-11	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	2.38E-01	mg/kg	3.01E-10	mg/m^3	R	3.5E-11	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	2.50E-11	mg/m^3	R	2.9E-12	mg/kg-day	1.4E-01	mg/kg-day			2.1E-11
												Total Hazard Index	8.9E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.9.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	5.47E-05	mg/m^3	R	6.42E-06	mg/kg-day	1.40E-01	mg/kg-day			4.6E-05
	Toluene	3.68E-02	mg/kg	6.55E-05	mg/m^3	R	7.68E-06	mg/kg-day	1.14E-01	mg/kg-day			6.7E-05
	Trichloroethene	3.19E-02	mg/kg	8.17E-05	mg/m^3	R	9.60E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.1E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.10.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	1.57E-04	mg/m^3	R	4.62E-06	mg/kg-day	1.40E-01	mg/kg-day			3.3E-05
	Toluene	3.68E-02	mg/kg	2.93E-04	mg/m^3	R	8.61E-06	mg/kg-day	1.14E-01	mg/kg-day			7.6E-05
	Trichloroethene	3.19E-02	mg/kg	2.54E-04	mg/m^3	R	7.46E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.1E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.11.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	4.14E-03	mg/kg-day	NA	mg/kg-day			NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	2.90E-06	mg/kg-day	4.00E-04	mg/kg-day			7.3E-03
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	2.48E-06	mg/kg-day	3.00E-04	mg/kg-day			8.3E-03
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.46E-05	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	2.64E-04	mg/kg-day	1.00E+00	mg/kg-day			2.6E-04
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	7.63E-05	mg/kg-day	2.00E-02	mg/kg-day			3.8E-03
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	3.59E-04	mg/kg-day	4.00E-02	mg/kg-day			9.0E-03
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	3.80E-05	mg/kg-day	2.00E-02	mg/kg-day			1.9E-03
	Lead	1.45E+02	mg/kg	1.45E+02	mg/kg	R	7.09E-05	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	8.81E-08	mg/kg-day	3.00E-04	mg/kg-day			2.9E-04
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	4.56E-05	mg/kg-day	2.00E-02	mg/kg-day			2.3E-03
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	7.00E-07	mg/kg-day	5.00E-03	mg/kg-day			1.4E-04
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	7.20E-04	mg/kg-day	3.00E-01	mg/kg-day			2.4E-03
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	9.33E-08	mg/kg-day	5.00E-05	mg/kg-day			1.9E-03
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	9.87E-07	mg/kg-day	5.00E-05	mg/kg-day			2.0E-02
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	2.62E-07	mg/kg-day	5.00E-05	mg/kg-day			5.2E-03
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	1.16E-07	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	9.66E-09	mg/kg-day	1.00E-01	mg/kg-day			9.7E-08
												Total Hazard Index	6.2E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.12.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	6.00E-05	mg/kg-day			NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	4.90E-08	mg/kg-day	3.00E-04	mg/kg-day			1.6E-04
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	9.63E-09	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	1.30E-02	mg/kg-day			NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	5.00E-04	mg/kg-day			NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	4.00E-02	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	2.00E-02	mg/kg-day			NA
	Lead	1.45E+02	mg/kg	1.45E+02	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	2.10E-05	mg/kg-day			NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	8.00E-04	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	2.00E-04	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	3.00E-01	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	8.62E-09	mg/kg-day	5.00E-05	mg/kg-day			1.7E-04
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	9.12E-08	mg/kg-day	5.00E-05	mg/kg-day			1.8E-03
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	2.42E-08	mg/kg-day	5.00E-05	mg/kg-day			4.8E-04
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	9.99E-09	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	1.00E-01	mg/kg-day			NA
												Total Hazard Index	2.6E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.13.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	2.14E-05	mg/m^3	R	1.26E-06	mg/kg-day	NA	mg/kg-day			NA
	Antimony	5.94E+00	mg/kg	1.50E-08	mg/m^3	R	8.82E-10	mg/kg-day	1.10E-04	mg/kg-day			8.0E-06
	Arsenic	5.06E+00	mg/kg	1.28E-08	mg/m^3	R	7.52E-10	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.98E+01	mg/kg	7.55E-08	mg/m^3	R	4.43E-09	mg/kg-day	2.60E-04	mg/kg-day			1.7E-05
	Chromium III	5.40E+02	mg/kg	1.37E-06	mg/m^3	R	8.03E-08	mg/kg-day	1.10E-06	mg/kg-day			7.3E-02
	Chromium VI	1.56E+02	mg/kg	3.95E-07	mg/m^3	R	2.32E-08	mg/kg-day	1.10E-06	mg/kg-day			2.1E-02
	Copper	7.33E+02	mg/kg	1.86E-06	mg/m^3	R	1.09E-07	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	1.97E-07	mg/m^3	R	1.15E-08	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	4.56E-10	mg/m^3	R	2.68E-11	mg/kg-day	8.60E-04	mg/kg-day			3.1E-08
	Nickel	9.32E+01	mg/kg	2.36E-07	mg/m^3	R	1.39E-08	mg/kg-day	NA	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	3.62E-09	mg/m^3	R	2.13E-10	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	3.72E-06	mg/m^3	R	2.19E-07	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	4.83E-10	mg/m^3	R	2.83E-11	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1254	2.02E+00	mg/kg	5.11E-09	mg/m^3	R	3.00E-10	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1260	5.36E-01	mg/kg	1.36E-09	mg/m^3	R	7.96E-11	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	2.38E-01	mg/kg	6.03E-10	mg/m^3	R	3.54E-11	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	5.00E-11	mg/m^3	R	2.93E-12	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	9.4E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.14.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	3.93E-03	mg/m^3	R	2.31E-04	mg/kg-day	NA	mg/kg-day			NA
	Toluene	3.68E-02	mg/kg	7.33E-03	mg/m^3	R	4.30E-04	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	3.19E-02	mg/kg	6.35E-03	mg/m^3	R	3.73E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.15.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	1.7E-03	mg/kg-day	1.0E+00	mg/kg-day			1.7E-03
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	1.2E-06	mg/kg-day	4.0E-04	mg/kg-day			2.9E-03
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	1.0E-06	mg/kg-day	3.0E-04	mg/kg-day			3.3E-03
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	5.9E-06	mg/kg-day	5.0E-04	mg/kg-day			1.2E-02
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	1.1E-04	mg/kg-day	1.5E+00	mg/kg-day			7.1E-05
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	3.1E-05	mg/kg-day	3.0E-03	mg/kg-day			1.0E-02
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	1.5E-04	mg/kg-day	4.0E-02	mg/kg-day			3.6E-03
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	1.5E-05	mg/kg-day	2.0E-02	mg/kg-day			7.7E-04
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	3.6E-08	mg/kg-day	3.0E-04	mg/kg-day			1.2E-04
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	1.8E-05	mg/kg-day	2.0E-02	mg/kg-day			9.2E-04
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	2.8E-07	mg/kg-day	5.0E-03	mg/kg-day			5.7E-05
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	2.9E-04	mg/kg-day	3.0E-01	mg/kg-day			9.7E-04
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	3.8E-08	mg/kg-day	5.0E-05	mg/kg-day			7.5E-04
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	4.0E-07	mg/kg-day	5.0E-05	mg/kg-day			8.0E-03
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	1.1E-07	mg/kg-day	5.0E-05	mg/kg-day			2.1E-03
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	4.7E-08	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	3.9E-09	mg/kg-day	1.0E-02	mg/kg-day			3.9E-07
												Total Hazard Index	4.7E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.16.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	1.0E+00	mg/kg-day			1.7E-03
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	4.0E-04	mg/kg-day			2.9E-03
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	2.4E-08	mg/kg-day	3.0E-04	mg/kg-day			3.3E-03
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	4.7E-09	mg/kg-day	5.0E-04	mg/kg-day			1.2E-02
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	1.5E+00	mg/kg-day			7.1E-05
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	3.0E-03	mg/kg-day			1.0E-02
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	4.0E-02	mg/kg-day			3.6E-03
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	2.0E-02	mg/kg-day			7.7E-04
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	3.0E-04	mg/kg-day			1.2E-04
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	2.0E-02	mg/kg-day			9.2E-04
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	5.0E-03	mg/kg-day			5.7E-05
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	3.0E-01	mg/kg-day			9.7E-04
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	4.2E-09	mg/kg-day	5.0E-05	mg/kg-day			7.5E-04
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	4.4E-08	mg/kg-day	5.0E-05	mg/kg-day			8.0E-03
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	1.2E-08	mg/kg-day	5.0E-05	mg/kg-day			2.1E-03
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	4.8E-09	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	1.0E-02	mg/kg-day			3.9E-07
												Total Hazard Index	4.7E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.17.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	1.1E-05	mg/m^3	R	6.3E-08	mg/kg-day	1.4E-02	mg/kg-day			4.5E-06
	Antimony	5.94E+00	mg/kg	7.5E-09	mg/m^3	R	4.4E-11	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	5.06E+00	mg/kg	6.4E-09	mg/m^3	R	3.7E-11	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.98E+01	mg/kg	3.8E-08	mg/m^3	R	2.2E-10	mg/kg-day	2.0E-04	mg/kg-day			1.1E-06
	Chromium III	5.40E+02	mg/kg	6.6E-07	mg/m^3	R	4.0E-09	mg/kg-day	NA	mg/kg-day			NA
	Chromium VI	1.56E+02	mg/kg	2.0E-07	mg/m^3	R	1.2E-09	mg/kg-day	3.0E-05	mg/kg-day			3.8E-05
	Copper	7.33E+02	mg/kg	9.3E-07	mg/m^3	R	5.4E-09	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	7.77E+01	mg/kg	9.8E-08	mg/m^3	R	5.7E-10	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.80E-01	mg/kg	2.3E-10	mg/m^3	R	1.3E-12	mg/kg-day	8.6E-05	mg/kg-day			1.5E-08
	Nickel	9.32E+01	mg/kg	1.2E-07	mg/m^3	R	6.9E-10	mg/kg-day	NA	mg/kg-day			NA
	Silver	1.43E+00	mg/kg	1.8E-09	mg/m^3	R	1.1E-11	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.47E+03	mg/kg	1.9E-06	mg/m^3	R	1.1E-08	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1248	1.91E-01	mg/kg	2.4E-10	mg/m^3	R	1.4E-12	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1254	2.02E+00	mg/kg	2.6E-09	mg/m^3	R	1.5E-11	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1260	5.36E-01	mg/kg	6.8E-10	mg/m^3	R	4.0E-12	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	2.38E-01	mg/kg	3.0E-10	mg/m^3	R	1.8E-12	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.97E-02	mg/kg	2.5E-11	mg/m^3	R	1.5E-13	mg/kg-day	1.4E-01	mg/kg-day			1.0E-12
												Total Hazard Index	4.4E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.18.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	3.03E-04	mg/m^3	R	1.77E-06	mg/kg-day	1.40E-01	mg/kg-day			1.3E-05
	Toluene	3.68E-02	mg/kg	5.64E-04	mg/m^3	R	3.30E-06	mg/kg-day	1.14E-01	mg/kg-day			2.9E-05
	Trichloroethene	3.19E-02	mg/kg	4.89E-04	mg/m^3	R	2.86E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	4.2E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.19.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	1.0E+02	ug/l	9.5E-04	mg/m^3	R	1.11E-04	mg/kg-day	1.40E+00	mg/kg-day			7.9E-05
	1,1-Dichloroethane	2.3E+01	ug/l	7.0E-05	mg/m^3	R	8.20E-06	mg/kg-day	1.40E-01	mg/kg-day			5.9E-05
	Acetone	1.7E+02	ug/l	5.8E-06	mg/m^3	R	6.82E-07	mg/kg-day	NA	mg/kg-day			NA
	Chloroform	5.0E-01	ug/l	1.3E-06	mg/m^3	R	1.52E-07	mg/kg-day	8.60E-05	mg/kg-day			1.8E-03
	cis-1,2-Dichloroethene	6.6E+02	ug/l	1.4E-03	mg/m^3	R	1.68E-04	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.1E+01	ug/l	9.2E-05	mg/m^3	R	1.09E-05	mg/kg-day	1.40E-01	mg/kg-day			7.8E-05
	trans-1,2-Dichloroethene	7.0E+00	ug/l	3.6E-05	mg/m^3	R	4.17E-06	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.2E+03	ug/l	8.3E-03	mg/m^3	R	7.37E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.0E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.20.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	1.10E-06	mg/kg-day	1.40E+00	mg/kg-day			7.8E-07
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	1.01E-07	mg/kg-day	1.40E-01	mg/kg-day			7.2E-07
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	1.96E-08	mg/kg-day	NA	mg/kg-day			NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	2.06E-09	mg/kg-day	8.60E-05	mg/kg-day			2.4E-05
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	2.37E-06	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	1.21E-07	mg/kg-day	1.40E-01	mg/kg-day			8.6E-07
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	4.56E-08	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	8.39E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.6E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.21.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	2.19E-06	mg/kg-day	1.40E+01	mg/kg-day			1.6E-07
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	2.02E-07	mg/kg-day	1.00E+00	mg/kg-day			2.0E-07
	Acetone	1.85E+02	ug/l	6.68E-07	mg/m^3	R	3.91E-08	mg/kg-day	NA	mg/kg-day			NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	4.12E-09	mg/kg-day	8.60E-04	mg/kg-day			4.8E-06
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	4.75E-06	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	2.41E-07	mg/kg-day	NA	mg/kg-day			NA
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	9.13E-08	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.18E+03	ug/l	2.86E-04	mg/m^3	R	1.68E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	5.1E-06

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.22.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	2.18E-07	mg/kg-day	1.40E+00	mg/kg-day			1.6E-07
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	2.01E-08	mg/kg-day	1.40E-01	mg/kg-day			1.4E-07
	Acetone	1.65E+02	ug/l	8.68E-07	mg/m^3	R	3.89E-09	mg/kg-day	NA	mg/kg-day			NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	4.10E-10	mg/kg-day	8.60E-05	mg/kg-day			4.8E-06
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	4.73E-07	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	2.40E-08	mg/kg-day	1.40E-01	mg/kg-day			1.7E-07
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	9.09E-09	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	1.67E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	5.2E-06

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.23.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.23E-05	mg/m^3	R	4.93E-08	mg/kg-day	8.57E-04	mg/kg-day			5.8E-05
	Anthracene	6.70E+01	mg/kg	2.83E-05	mg/m^3	R	1.14E-07	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	2.07E-04	mg/m^3	R	8.34E-07	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	5.8E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.24.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	2-Methylnaphthalene	5.50E+00	mg/kg	5.78E-07	mg/m^3	R	6.79E-08	mg/kg-day	8.57E-04	mg/kg-day			7.9E-05
	Anthracene	6.70E+01	mg/kg	7.04E-06	mg/m^3	R	8.27E-07	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	5.15E-05	mg/m^3	R	6.05E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	7.9E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.25.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	5.64E-16	mg/m^3	R	2.79E-18	mg/kg-day	2.29E-01	mg/kg-day			1.22E-17
	Naphthalene	4.00E+00	ug/l	1.69E-15	mg/m^3	R	8.38E-18	mg/kg-day	8.57E-04	mg/kg-day			9.77E-15
	Phenanthrene	6.00E+00	ug/l	1.19E-14	mg/m^3	R	5.88E-17	mg/kg-day	NA	mg/kg-day			NA
	Acetone	4.22E+01	ug/l	8.96E-15	mg/m^3	R	4.44E-17	mg/kg-day	NA	mg/kg-day			NA
	Benzene	3.18E+01	ug/l	3.00E-15	mg/m^3	R	1.48E-17	mg/kg-day	1.70E-03	mg/kg-day			8.73E-15
	Chloroethane	1.06E+01	ug/l	4.36E-15	mg/m^3	R	2.16E-17	mg/kg-day	2.90E+00	mg/kg-day			7.45E-18
	Ethylbenzene	1.55E+01	ug/l	6.61E-15	mg/m^3	R	3.27E-17	mg/kg-day	2.90E-01	mg/kg-day			1.13E-16
	Methylene chloride	2.35E+01	ug/l	2.16E-15	mg/m^3	R	1.07E-17	mg/kg-day	8.60E-01	mg/kg-day			1.24E-17
	Toluene	7.65E+00	ug/l	1.17E-14	mg/m^3	R	5.79E-17	mg/kg-day	1.14E-01	mg/kg-day			5.08E-16
	Trichloroethene	4.15E+01	ug/l	5.64E-16	mg/m^3	R	2.79E-18	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	2.00E+00	ug/l	2.25E-16	mg/m^3	R	1.12E-18	mg/kg-day	NA	mg/kg-day			NA
	Xylenes (total)	8.00E-01	ug/l	2.45E-14	mg/m^3	R	1.22E-16	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.92E-14

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.26.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	1.48E-06	mg/kg-day	4.00E-04	mg/kg-day			3.7E-03
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	9.46E-07	mg/kg-day	3.00E-04	mg/kg-day			3.2E-03
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	6.56E-06	mg/kg-day	5.00E-04	mg/kg-day			1.3E-02
	Chromium III	8.57E+01	mg/kg	8.57E+01	mg/kg	R	3.22E-05	mg/kg-day	1.50E+00	mg/kg-day			2.1E-05
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	1.06E-05	mg/kg-day	3.00E-03	mg/kg-day			3.5E-03
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	2.95E-05	mg/kg-day	4.00E-02	mg/kg-day			7.4E-04
	Cyanide	1.85E+01	mg/kg	1.85E+01	mg/kg	R	8.06E-06	mg/kg-day	2.00E-02	mg/kg-day			4.0E-04
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	6.85E-08	mg/kg-day	3.00E-04	mg/kg-day			2.3E-04
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	7.22E-06	mg/kg-day	2.00E-02	mg/kg-day			3.6E-04
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	4.27E-06	mg/kg-day	7.00E-03	mg/kg-day			6.1E-04
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	5.50E-05	mg/kg-day	3.00E-01	mg/kg-day			1.8E-04
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	3.18E-07	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	3.47E-07	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	4.89E-08	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	1.10E-08	mg/kg-day	9.00E-03	mg/kg-day			1.2E-06
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	5.19E-08	mg/kg-day	5.70E-02	mg/kg-day			9.1E-07
												Total Hazard Index	2.6E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.27.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	3.75E-08	mg/kg-day	3.75E-08	mg/kg-day			1.2E-04
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	8.65E-09	mg/kg-day	8.65E-09	mg/kg-day			6.9E-04
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	5.46E-08	mg/kg-day	5.46E-08	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	5.96E-08	mg/kg-day	5.96E-08	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	8.40E-09	mg/kg-day	8.40E-09	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	8.2E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.28.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Antimony	3.03E+00	mg/kg	3.84E-09	mg/m^3	R	4.50E-10	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	1.93E+00	mg/kg	2.45E-09	mg/m^3	R	2.87E-10	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	1.34E+01	mg/kg	1.70E-08	mg/m^3	R	1.99E-09	mg/kg-day	2.00E-04	mg/kg-day			1.0E-05
	Chromium III	6.57E+01	mg/kg	8.32E-08	mg/m^3	R	9.77E-09	mg/kg-day	NA	mg/kg-day			NA
	Chromium VI	2.16E+01	mg/kg	2.74E-08	mg/m^3	R	3.22E-09	mg/kg-day	3.00E-05	mg/kg-day			1.1E-04
	Copper	6.03E+01	mg/kg	7.63E-08	mg/m^3	R	8.96E-09	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	1.65E+01	mg/kg	2.08E-08	mg/m^3	R	2.45E-09	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.40E-01	mg/kg	1.77E-10	mg/m^3	R	2.08E-11	mg/kg-day	8.60E-05	mg/kg-day			2.4E-07
	Nickel	1.48E+01	mg/kg	1.87E-08	mg/m^3	R	2.19E-09	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	8.73E+00	mg/kg	1.11E-08	mg/m^3	R	1.30E-09	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.12E+02	mg/kg	1.42E-07	mg/m^3	R	1.67E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	6.50E-01	mg/kg	8.23E-10	mg/m^3	R	9.67E-11	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	8.99E-10	mg/m^3	R	1.06E-10	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.27E-10	mg/m^3	R	1.49E-11	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.86E-11	mg/m^3	R	3.36E-12	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	1.34E-10	mg/m^3	R	1.58E-11	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.2E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.29.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	4.04E-05	mg/m^3	R	4.74E-06	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	1.89E-04	mg/m^3	R	2.22E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.30.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point:Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	1.20E-04	mg/m^3	R	3.52E-06	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	5.64E-04	mg/m^3	R	1.66E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.31.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	1.48E-06	mg/kg-day	4.00E-04	mg/kg-day			3.7E-03
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	9.46E-07	mg/kg-day	3.00E-04	mg/kg-day			3.2E-03
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	6.56E-06	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	3.22E-05	mg/kg-day	1.00E+00	mg/kg-day			3.2E-05
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	1.06E-05	mg/kg-day	2.00E-02	mg/kg-day			5.3E-04
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	2.95E-05	mg/kg-day	4.00E-02	mg/kg-day			7.4E-04
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	8.06E-06	mg/kg-day	2.00E-02	mg/kg-day			4.0E-04
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	6.85E-08	mg/kg-day	3.00E-04	mg/kg-day			2.3E-04
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	7.22E-06	mg/kg-day	2.00E-02	mg/kg-day			3.6E-04
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	4.27E-06	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	5.50E-05	mg/kg-day	3.00E-01	mg/kg-day			1.8E-04
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	3.18E-07	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	3.47E-07	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	4.89E-08	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	1.10E-08	mg/kg-day	9.00E-03	mg/kg-day			1.2E-06
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	5.19E-08	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	9.3E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.32.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	NA	mg/kg-day	6.00E-05	mg/kg-day			NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	1.87E-08	mg/kg-day	3.00E-04	mg/kg-day			6.2E-05
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	4.33E-09	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	NA	mg/kg-day	1.30E-02	mg/kg-day			NA
	Chromium VI	2.16E+01	mg/kg	2.18E+01	mg/kg	R	NA	mg/kg-day	5.00E-04	mg/kg-day			NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	NA	mg/kg-day	4.00E-02	mg/kg-day			NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	NA	mg/kg-day	2.00E-02	mg/kg-day			NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	NA	mg/kg-day	2.10E-05	mg/kg-day			NA
	Nickel	1.48E+01	mg/kg	1.46E+01	mg/kg	R	NA	mg/kg-day	8.00E-04	mg/kg-day			NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	NA	mg/kg-day	3.00E-01	mg/kg-day			NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	2.73E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	2.98E-08	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	4.20E-09	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	NA	mg/kg-day	9.00E-03	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	6.2E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.33.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Antimony	3.03E+00	mg/kg	7.67E-09	mg/m^3	R	4.50E-10	mg/kg-day	1.10E-04	mg/kg-day			4.1E-06
	Arsenic	1.93E+00	mg/kg	4.90E-09	mg/m^3	R	2.87E-10	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	1.34E+01	mg/kg	3.39E-08	mg/m^3	R	1.99E-09	mg/kg-day	2.60E-04	mg/kg-day			7.7E-06
	Chromium III	6.57E+01	mg/kg	1.68E-07	mg/m^3	R	9.77E-09	mg/kg-day	1.10E-06	mg/kg-day			8.9E-03
	Chromium VI	2.16E+01	mg/kg	5.48E-08	mg/m^3	R	3.22E-09	mg/kg-day	1.10E-06	mg/kg-day			2.9E-03
	Copper	6.03E+01	mg/kg	1.53E-07	mg/m^3	R	8.96E-09	mg/kg-day	NA	mg/kg-day			NA
	Cyanide	1.65E+01	mg/kg	4.17E-08	mg/m^3	R	2.45E-09	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.40E-01	mg/kg	3.54E-10	mg/m^3	R	2.08E-11	mg/kg-day	8.60E-04	mg/kg-day			2.4E-08
	Nickel	1.48E+01	mg/kg	3.74E-08	mg/m^3	R	2.19E-09	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	8.73E+00	mg/kg	2.21E-08	mg/m^3	R	1.30E-09	mg/kg-day	NA	mg/kg-day			NA
	Zinc	1.12E+02	mg/kg	2.85E-07	mg/m^3	R	1.67E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	6.50E-01	mg/kg	1.65E-09	mg/m^3	R	9.67E-11	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	7.10E-01	mg/kg	1.80E-09	mg/m^3	R	1.06E-10	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	2.53E-10	mg/m^3	R	1.49E-11	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	5.72E-11	mg/m^3	R	3.36E-12	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	2.69E-10	mg/m^3	R	1.58E-11	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.2E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.34.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	3.00E-03	mg/m^3	R	1.8E-04	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	1.06E-01	mg/kg	1.41E-02	mg/m^3	R	8.3E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.35.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.97E-03	mg/m^3	R	2.31E-04	mg/kg-day	8.57E-04	mg/kg-day			2.7E-01
	Anthracene	6.70E+01	mg/kg	4.55E-03	mg/m^3	R	5.35E-04	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	3.33E-02	mg/m^3	R	3.91E-03	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.7E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.36.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	4.41E-06	mg/m^3	R	1.30E-07	mg/kg-day	8.6E-04	mg/kg-day			1.5E-04
	Anthracene	6.70E+01	mg/kg	1.02E-05	mg/m^3	R	2.99E-07	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	7.46E-05	mg/m^3	R	2.19E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.5E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.37.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	1.14E+05	mg/kg	1.14E+05	mg/kg	R	5.59E-02	mg/kg-day	NA	mg/kg-day			NA
	Antimony	1.53E+01	mg/kg	1.53E+01	mg/kg	R	7.50E-06	mg/kg-day	4.00E-04	mg/kg-day			1.9E-02
	Arsenic	2.25E+01	mg/kg	2.25E+01	mg/kg	R	1.10E-05	mg/kg-day	3.00E-04	mg/kg-day			3.7E-02
	Barium	4.88E+02	mg/kg	4.88E+02	mg/kg	R	2.39E-04	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.86E+01	mg/kg	2.86E+01	mg/kg	R	1.41E-05	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	8.46E+02	mg/kg	8.46E+02	mg/kg	R	4.14E-04	mg/kg-day	1.00E+00	mg/kg-day			4.1E-04
	Chromium VI	8.46E+02	mg/kg	8.46E+02	mg/kg	R	4.14E-04	mg/kg-day	2.00E-02	mg/kg-day			2.1E-02
	Copper	1.19E+04	mg/kg	1.19E+04	mg/kg	R	5.84E-03	mg/kg-day	4.00E-02	mg/kg-day			1.5E-01
	Mercury	1.92E+00	mg/kg	1.92E+00	mg/kg	R	9.39E-07	mg/kg-day	3.00E-04	mg/kg-day			3.1E-03
	Nickel	1.73E+02	mg/kg	1.73E+02	mg/kg	R	8.49E-05	mg/kg-day	2.00E-02	mg/kg-day			4.2E-03
	Thallium	6.80E-01	mg/kg	6.80E-01	mg/kg	R	3.33E-07	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	1.31E+02	mg/kg	1.31E+02	mg/kg	R	6.43E-05	mg/kg-day	NA	mg/kg-day			NA
	Zinc	3.83E+03	mg/kg	3.83E+03	mg/kg	R	1.87E-03	mg/kg-day	3.00E-01	mg/kg-day			6.2E-03
	4,4'-DDD	1.93E+01	mg/kg	1.93E+01	mg/kg	R	9.46E-06	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDE	4.17E+00	mg/kg	4.17E+00	mg/kg	R	2.04E-06	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDT	5.00E+00	mg/kg	5.00E+00	mg/kg	R	2.45E-06	mg/kg-day	5.00E-04	mg/kg-day			4.9E-03
	Aroclor-1248	2.17E-01	mg/kg	2.17E-01	mg/kg	R	1.06E-07	mg/kg-day	5.00E-05	mg/kg-day			2.1E-03
	Aroclor-1254	1.03E+00	mg/kg	1.03E+00	mg/kg	R	5.03E-07	mg/kg-day	5.00E-05	mg/kg-day			1.0E-02
	Aroclor-1260	1.02E+00	mg/kg	1.02E+00	mg/kg	R	4.97E-07	mg/kg-day	5.00E-05	mg/kg-day			9.9E-03
	Dieldrin	3.46E-02	mg/kg	3.46E-02	mg/kg	R	1.69E-08	mg/kg-day	5.00E-05	mg/kg-day			3.4E-04
	Benz(a)anthracene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.22E-04	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	1.60E+02	mg/kg	1.60E+02	mg/kg	R	7.83E-05	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	2.70E+02	mg/kg	2.70E+02	mg/kg	R	1.32E-04	mg/kg-day	NA	mg/kg-day			NA
	Benzo(k)fluoranthene	1.00E+02	mg/kg	1.00E+02	mg/kg	R	4.89E-05	mg/kg-day	NA	mg/kg-day			NA
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	1.79E+03	mg/kg	R	8.74E-04	mg/kg-day	NA	mg/kg-day			NA
	Carbazole	5.20E+01	mg/kg	5.20E+01	mg/kg	R	2.54E-05	mg/kg-day	NA	mg/kg-day			NA
	Chrysene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.22E-04	mg/kg-day	NA	mg/kg-day			NA
	Di-n-octyl phthalate	4.43E+02	mg/kg	4.43E+02	mg/kg	R	2.17E-04	mg/kg-day	2.00E-02	mg/kg-day			1.1E-02
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	2.60E+01	mg/kg	R	1.27E-05	mg/kg-day	NA	mg/kg-day			NA
	Fluoranthene	6.50E+02	mg/kg	6.50E+02	mg/kg	R	3.16E-04	mg/kg-day	4.00E-01	mg/kg-day			8.0E-04
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	9.40E+01	mg/kg	R	4.60E-05	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	4.90E+02	mg/kg	R	2.40E-04	mg/kg-day	NA	mg/kg-day			NA
	Pyrene	5.00E+02	mg/kg	5.00E+02	mg/kg	R	2.45E-04	mg/kg-day	3.00E-01	mg/kg-day			8.2E-04
												Total Hazard Index	2.8E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.38.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	1.14E+05	mg/kg	1.14E+05	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Antimony	1.53E+01	mg/kg	1.53E+01	mg/kg	R	NA	mg/kg-day	6.00E-05	mg/kg-day			NA
	Arsenic	2.25E+01	mg/kg	2.25E+01	mg/kg	R	2.18E-07	mg/kg-day	3.00E-04	mg/kg-day			7.3E-04
	Barium	4.88E+02	mg/kg	4.88E+02	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	2.88E+01	mg/kg	2.88E+01	mg/kg	R	9.30E-09	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	8.46E+02	mg/kg	8.46E+02	mg/kg	R	NA	mg/kg-day	1.30E-02	mg/kg-day			NA
	Chromium VI	8.46E+02	mg/kg	8.46E+02	mg/kg	R	NA	mg/kg-day	5.00E-04	mg/kg-day			NA
	Copper	1.19E+04	mg/kg	1.19E+04	mg/kg	R	NA	mg/kg-day	4.00E-02	mg/kg-day			NA
	Mercury	1.92E+00	mg/kg	1.92E+00	mg/kg	R	NA	mg/kg-day	2.10E-05	mg/kg-day			NA
	Nickel	1.73E+02	mg/kg	1.73E+02	mg/kg	R	NA	mg/kg-day	8.00E-04	mg/kg-day			NA
	Thallium	6.80E-01	mg/kg	6.80E-01	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	1.31E+02	mg/kg	1.31E+02	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Zinc	3.83E+03	mg/kg	3.83E+03	mg/kg	R	NA	mg/kg-day	3.00E-01	mg/kg-day			NA
	4,4'-DDD	1.93E+01	mg/kg	1.93E+01	mg/kg	R	1.87E-07	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDE	4.17E+00	mg/kg	4.17E+00	mg/kg	R	4.04E-08	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDT	5.00E+00	mg/kg	5.00E+00	mg/kg	R	4.84E-08	mg/kg-day	5.00E-04	mg/kg-day			9.7E-05
	Aroclor-1248	2.17E-01	mg/kg	2.17E-01	mg/kg	R	9.81E-09	mg/kg-day	5.00E-05	mg/kg-day			2.0E-04
	Aroclor-1254	1.03E+00	mg/kg	1.03E+00	mg/kg	R	4.64E-08	mg/kg-day	5.00E-05	mg/kg-day			9.3E-04
	Aroclor-1260	1.02E+00	mg/kg	1.02E+00	mg/kg	R	4.60E-08	mg/kg-day	5.00E-05	mg/kg-day			9.2E-04
	Dieldrin	3.46E-02	mg/kg	3.46E-02	mg/kg	R	1.12E-09	mg/kg-day	5.00E-05	mg/kg-day			2.2E-05
	Benz(a)anthracene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.05E-05	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	1.60E+02	mg/kg	1.60E+02	mg/kg	R	6.72E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	2.70E+02	mg/kg	2.70E+02	mg/kg	R	1.13E-05	mg/kg-day	NA	mg/kg-day			NA
	Benzo(k)fluoranthene	1.00E+02	mg/kg	1.00E+02	mg/kg	R	4.20E-06	mg/kg-day	NA	mg/kg-day			NA
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	1.79E+03	mg/kg	R	5.77E-05	mg/kg-day	NA	mg/kg-day			NA
	Carbazole	5.20E+01	mg/kg	5.20E+01	mg/kg	R	1.68E-06	mg/kg-day	NA	mg/kg-day			NA
	Chrysene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.05E-05	mg/kg-day	NA	mg/kg-day			NA
	Di-n-octyl phthalate	4.43E+02	mg/kg	4.43E+02	mg/kg	R	1.43E-05	mg/kg-day	2.00E-02	mg/kg-day			7.2E-04
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	2.60E+01	mg/kg	R	1.09E-06	mg/kg-day	NA	mg/kg-day			NA
	Fluoranthene	6.50E+02	mg/kg	6.50E+02	mg/kg	R	2.73E-05	mg/kg-day	4.00E-01	mg/kg-day			6.8E-05
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	9.40E+01	mg/kg	R	3.95E-06	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	4.90E+02	mg/kg	R	2.06E-05	mg/kg-day	NA	mg/kg-day			NA
	Pyrene	5.00E+02	mg/kg	5.00E+02	mg/kg	R	2.10E-05	mg/kg-day	3.00E-01	mg/kg-day			7.0E-05
												Total Hazard Index	3.7E-03

R = Route EPC

* Total hazard index is broken down by target organ in other tables.

TABLE G7.39.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (particulates)	Aluminum	1.14E+05	mg/kg	2.89E-04	mg/m^3	R	1.70E-05	mg/kg-day	NA	mg/kg-day			NA
	Antimony	1.53E+01	mg/kg	3.88E-08	mg/m^3	R	2.28E-09	mg/kg-day	1.10E-04	mg/kg-day			2.1E-05
	Arsenic	2.25E+01	mg/kg	5.70E-08	mg/m^3	R	3.34E-09	mg/kg-day	NA	mg/kg-day			NA
	Barium	4.88E+02	mg/kg	1.23E-06	mg/m^3	R	7.25E-08	mg/kg-day	1.43E-03	mg/kg-day			5.1E-05
	Cadmium	2.88E+01	mg/kg	7.29E-08	mg/m^3	R	4.28E-09	mg/kg-day	2.60E-04	mg/kg-day			1.6E-05
	Chromium III	8.46E+02	mg/kg	2.14E-06	mg/m^3	R	1.26E-07	mg/kg-day	1.10E-06	mg/kg-day			1.1E-01
	Chromium VI	8.46E+02	mg/kg	2.14E-06	mg/m^3	R	1.26E-07	mg/kg-day	1.10E-06	mg/kg-day			1.1E-01
	Copper	1.19E+04	mg/kg	3.02E-05	mg/m^3	R	1.77E-06	mg/kg-day	NA	mg/kg-day			NA
	Mercury	1.92E+00	mg/kg	4.88E-09	mg/m^3	R	2.85E-10	mg/kg-day	8.60E-04	mg/kg-day			3.3E-07
	Nickel	1.73E+02	mg/kg	4.39E-07	mg/m^3	R	2.58E-08	mg/kg-day	NA	mg/kg-day			NA
	Thallium	6.80E-01	mg/kg	1.72E-09	mg/m^3	R	1.01E-10	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	1.31E+02	mg/kg	3.33E-07	mg/m^3	R	1.95E-08	mg/kg-day	NA	mg/kg-day			NA
	Zinc	3.83E+03	mg/kg	9.69E-06	mg/m^3	R	5.89E-07	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDD	1.93E+01	mg/kg	4.90E-08	mg/m^3	R	2.87E-09	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDE	4.17E+00	mg/kg	1.06E-08	mg/m^3	R	6.19E-10	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDT	5.00E+00	mg/kg	1.27E-08	mg/m^3	R	7.43E-10	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1248	2.17E-01	mg/kg	5.49E-10	mg/m^3	R	3.22E-11	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1254	1.03E+00	mg/kg	2.60E-09	mg/m^3	R	1.53E-10	mg/kg-day	NA	mg/kg-day			NA
	Aroclor-1260	1.02E+00	mg/kg	2.57E-09	mg/m^3	R	1.51E-10	mg/kg-day	NA	mg/kg-day			NA
	Dieldrin	3.46E-02	mg/kg	8.75E-11	mg/m^3	R	5.14E-12	mg/kg-day	NA	mg/kg-day			NA
	Benz(a)anthracene	2.50E+02	mg/kg	6.33E-07	mg/m^3	R	3.72E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	1.60E+02	mg/kg	4.05E-07	mg/m^3	R	2.38E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	2.70E+02	mg/kg	6.84E-07	mg/m^3	R	4.01E-08	mg/kg-day	NA	mg/kg-day			NA
	Benzo(k)fluoranthene	1.00E+02	mg/kg	2.53E-07	mg/m^3	R	1.49E-08	mg/kg-day	NA	mg/kg-day			NA
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	4.52E-06	mg/m^3	R	2.66E-07	mg/kg-day	NA	mg/kg-day			NA
	Carbazole	5.20E+01	mg/kg	1.32E-07	mg/m^3	R	7.73E-09	mg/kg-day	NA	mg/kg-day			NA
	Chrysene	2.50E+02	mg/kg	6.33E-07	mg/m^3	R	3.72E-08	mg/kg-day	NA	mg/kg-day			NA
	Di-n-octyl phthalate	4.43E+02	mg/kg	1.12E-06	mg/m^3	R	6.59E-08	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	6.58E-08	mg/m^3	R	3.86E-09	mg/kg-day	NA	mg/kg-day			NA
	Fluoranthene	6.50E+02	mg/kg	1.65E-06	mg/m^3	R	9.66E-08	mg/kg-day	NA	mg/kg-day			NA
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	2.38E-07	mg/m^3	R	1.40E-08	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	1.24E-06	mg/m^3	R	7.28E-08	mg/kg-day	NA	mg/kg-day			NA
	Pyrene	5.00E+02	mg/kg	1.27E-06	mg/m^3	R	7.43E-08	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.3E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.40.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.10E-04	mg/m^3	R	6.48E-06	mg/kg-day	NA	mg/kg-day			NA
	Anthracene	6.70E+01	mg/kg	2.55E-04	mg/m^3	R	1.50E-05	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	4.90E+02	mg/kg	1.86E-03	mg/m^3	R	1.09E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.41.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	9.06E-14	mg/m^3	R	1.06E-14	mg/kg-day	2.29E-01	mg/kg-day			4.6E-14
	Naphthalene	4.00E+00	ug/l	2.72E-13	mg/m^3	R	3.19E-14	mg/kg-day	8.57E-04	mg/kg-day			3.7E-11
	Phenanthrene	6.00E+00	ug/l	1.91E-12	mg/m^3	R	2.24E-13	mg/kg-day	NA	mg/kg-day			NA
	Acetone	4.22E+01	ug/l	1.44E-12	mg/m^3	R	1.69E-13	mg/kg-day	NA	mg/kg-day			NA
	Benzene	3.18E+01	ug/l	4.82E-13	mg/m^3	R	5.66E-14	mg/kg-day	1.70E-03	mg/kg-day			3.3E-11
	Chloroethane	1.06E+01	ug/l	7.01E-13	mg/m^3	R	8.24E-14	mg/kg-day	2.90E+00	mg/kg-day			2.8E-14
	Ethylbenzene	1.55E+01	ug/l	1.06E-12	mg/m^3	R	1.25E-13	mg/kg-day	2.90E-01	mg/kg-day			4.3E-13
	Methylene chloride	2.35E+01	ug/l	3.47E-13	mg/m^3	R	4.07E-14	mg/kg-day	8.60E-01	mg/kg-day			4.7E-14
	Toluene	7.65E+00	ug/l	1.88E-12	mg/m^3	R	2.21E-13	mg/kg-day	1.14E-01	mg/kg-day			1.9E-12
	Trichloroethene	4.15E+01	ug/l	9.06E-14	mg/m^3	R	1.06E-14	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	2.00E+00	ug/l	3.62E-14	mg/m^3	R	4.26E-15	mg/kg-day	NA	mg/kg-day			NA
	Xylenes (total)	8.00E-01	ug/l	3.95E-12	mg/m^3	R	4.63E-13	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	7.3E-11

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.42.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	2.03E-16	mg/m^3	R	5.96E-18	mg/kg-day	2.29E-01	mg/kg-day			2.6E-17
	Naphthalene	4.00E+00	ug/l	6.09E-16	mg/m^3	R	1.79E-17	mg/kg-day	8.57E-04	mg/kg-day			2.1E-14
	Phenanthrene	6.00E+00	ug/l	4.28E-15	mg/m^3	R	1.26E-16	mg/kg-day	NA	mg/kg-day			NA
	Acetone	4.22E+01	ug/l	3.22E-15	mg/m^3	R	9.47E-17	mg/kg-day	NA	mg/kg-day			NA
	Benzene	3.18E+01	ug/l	1.08E-15	mg/m^3	R	3.17E-17	mg/kg-day	1.70E-03	mg/kg-day			1.9E-14
	Chloroethane	1.06E+01	ug/l	1.57E-15	mg/m^3	R	4.61E-17	mg/kg-day	2.90E+00	mg/kg-day			1.6E-17
	Ethylbenzene	1.55E+01	ug/l	2.38E-15	mg/m^3	R	6.98E-17	mg/kg-day	2.90E-01	mg/kg-day			2.4E-16
	Methylene chloride	2.35E+01	ug/l	7.76E-16	mg/m^3	R	2.28E-17	mg/kg-day	8.60E-01	mg/kg-day			2.7E-17
	Toluene	7.65E+00	ug/l	4.21E-15	mg/m^3	R	1.24E-16	mg/kg-day	1.14E-01	mg/kg-day			1.1E-15
	Trichloroethene	4.15E+01	ug/l	2.03E-16	mg/m^3	R	5.96E-18	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	2.00E+00	ug/l	8.12E-17	mg/m^3	R	2.38E-18	mg/kg-day	NA	mg/kg-day			NA
	Xylenes (total)	8.00E-01	ug/l	8.84E-15	mg/m^3	R	2.59E-16	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	4.1E-14

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.43.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Liquid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	2.80E+04	mg/kg	2.80E+04	mg/kg	R	9.04E-04	mg/kg-day	NA	mg/kg-day			NA
	Antimony	4.67E+01	mg/kg	4.67E+01	mg/kg	R	1.51E-08	mg/kg-day	8.00E-05	mg/kg-day			2.5E-02
	Arsenic	1.85E+01	mg/kg	1.65E+01	mg/kg	R	5.31E-07	mg/kg-day	3.00E-04	mg/kg-day			1.8E-03
	Barium	8.24E+02	mg/kg	8.24E+02	mg/kg	R	2.66E-05	mg/kg-day	NA	mg/kg-day			NA
	Cadmium	1.36E+02	mg/kg	1.36E+02	mg/kg	R	4.39E-06	mg/kg-day	NA	mg/kg-day			NA
	Chromium III	1.14E+04	mg/kg	1.14E+04	mg/kg	R	3.68E-04	mg/kg-day	1.30E-02	mg/kg-day			2.8E-02
	Chromium VI	1.14E+04	mg/kg	1.14E+04	mg/kg	R	7.36E-04	mg/kg-day	5.00E-04	mg/kg-day			1.5E+00
	Copper	4.47E+03	mg/kg	4.47E+03	mg/kg	R	1.44E-04	mg/kg-day	4.00E-02	mg/kg-day			3.6E-03
	Lead	3.42E+02	mg/kg	3.42E+02	mg/kg	R	4.42E-08	mg/kg-day	NA	mg/kg-day			NA
	Manganese	4.54E+02	mg/kg	4.54E+02	mg/kg	R	1.47E-05	mg/kg-day	NA	mg/kg-day			NA
	Mercury	7.80E-01	mg/kg	7.80E-01	mg/kg	R	2.52E-08	mg/kg-day	2.10E-05	mg/kg-day			1.2E-03
	Nickel	1.20E+02	mg/kg	1.20E+02	mg/kg	R	3.87E-07	mg/kg-day	8.00E-04	mg/kg-day			4.8E-04
	Thallium	2.66E+00	mg/kg	2.66E+00	mg/kg	R	8.59E-08	mg/kg-day	NA	mg/kg-day			NA
	Vanadium	5.09E+02	mg/kg	5.09E+02	mg/kg	R	1.64E-05	mg/kg-day	NA	mg/kg-day			NA
	Zinc	5.50E+03	mg/kg	5.50E+03	mg/kg	R	1.07E-04	mg/kg-day	3.00E-01	mg/kg-day			3.6E-04
	4,4'-DDD	4.49E+00	mg/kg	4.49E+00	mg/kg	R	2.03E-04	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDE	2.96E+00	mg/kg	2.96E+00	mg/kg	R	1.13E-04	mg/kg-day	NA	mg/kg-day			NA
	4,4'-DDT	3.38E+00	mg/kg	3.38E+00	mg/kg	R	2.94E-04	mg/kg-day	5.00E-04	mg/kg-day			5.9E-01
	Aroclor-1260	9.49E+00	mg/kg	9.49E+00	mg/kg	R	1.50E-03	mg/kg-day	5.00E-05	mg/kg-day			3.0E+01
	Endrin aldehyde	6.90E-01	mg/kg	6.90E-01	mg/kg	R	2.63E-06	mg/kg-day	NA	mg/kg-day			NA
	Heptachlor epoxide	3.44E-02	mg/kg	3.44E-02	mg/kg	R	9.51E-08	mg/kg-day	1.30E-05	mg/kg-day			7.3E-03
	1,4-Dichlorobenzene	2.00E+00	mg/kg	2.00E+00	mg/kg	R	6.68E-06	mg/kg-day	NA	mg/kg-day			NA
	4-Methylphenol	4.80E+01	mg/kg	4.80E+01	mg/kg	R	1.74E-05	mg/kg-day	5.00E-03	mg/kg-day			3.5E-03
	Benz(a)anthracene	4.50E+01	mg/kg	4.50E+01	mg/kg	R	3.25E-03	mg/kg-day	NA	mg/kg-day			NA
	Benzo(a)pyrene	4.10E+01	mg/kg	4.10E+01	mg/kg	R	5.12E-03	mg/kg-day	NA	mg/kg-day			NA
	Benzo(b)fluoranthene	6.60E+01	mg/kg	6.60E+01	mg/kg	R	8.25E-03	mg/kg-day	NA	mg/kg-day			NA
	Benzo(k)fluoranthene	2.80E+01	mg/kg	2.80E+01	mg/kg	R	3.50E-03	mg/kg-day	NA	mg/kg-day			NA
	bis(2-Ethylhexyl)phthalate	3.00E+02	mg/kg	3.00E+02	mg/kg	R	1.51E-03	mg/kg-day	NA	mg/kg-day			NA
	Carbazole	1.10E+01	mg/kg	1.10E+01	mg/kg	R	3.09E-05	mg/kg-day	NA	mg/kg-day			NA
	Chrysene	5.40E+01	mg/kg	5.40E+01	mg/kg	R	3.90E-03	mg/kg-day	NA	mg/kg-day			NA
	Dibenz(a,h)anthracene	7.00E+00	mg/kg	7.00E+00	mg/kg	R	2.33E-03	mg/kg-day	NA	mg/kg-day			NA
	Dibenzofuran	4.00E+00	mg/kg	4.00E+00	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Indeno(1,2,3-cd)pyrene	2.40E+01	mg/kg	2.40E+01	mg/kg	R	5.54E-03	mg/kg-day	NA	mg/kg-day			NA
	Naphthalene	6.00E+00	mg/kg	6.00E+00	mg/kg	R	1.97E-05	mg/kg-day	NA	mg/kg-day			NA
	Pentachlorophenol	1.30E+01	mg/kg	1.30E+01	mg/kg	R	9.63E-04	mg/kg-day	3.00E-02	mg/kg-day			3.2E-02

TABLE G7.43.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Liquid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
	Phenanthrene	4.22E+01	mg/kg	4.22E+01	mg/kg	R	6.26E-04	mg/kg-day	NA	mg/kg-day			NA
	Pyrene	8.00E+01	mg/kg	8.00E+01	mg/kg	R	1.87E-03	mg/kg-day	3.00E-01	mg/kg-day			6.2E-03
	Acetone	3.18E+01	mg/kg	3.18E+01	mg/kg	R	6.52E-07	mg/kg-day	1.00E+00	mg/kg-day			6.5E-07
	Benzene	1.06E+01	mg/kg	1.06E+01	mg/kg	R	9.04E-06	mg/kg-day	3.00E-02	mg/kg-day			3.0E-04
	Chloroethane	1.55E+01	mg/kg	1.55E+01	mg/kg	R	4.92E-06	mg/kg-day	NA	mg/kg-day			NA
	Ethylbenzene	2.35E+01	mg/kg	2.35E+01	mg/kg	R	5.22E-05	mg/kg-day	1.00E-01	mg/kg-day			5.2E-04
	Methylene chloride	7.65E+00	mg/kg	7.65E+00	mg/kg	R	1.45E-06	mg/kg-day	6.00E-02	mg/kg-day			2.4E-05
	Toluene	4.15E+01	mg/kg	4.15E+01	mg/kg	R	7.71E-05	mg/kg-day	2.00E+00	mg/kg-day			3.9E-05
	Trichloroethene	2.00E+00	mg/kg	2.00E+00	mg/kg	R	1.60E-06	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	8.00E-01	mg/kg	8.00E-01	mg/kg	R	2.31E-07	mg/kg-day	NA	mg/kg-day			NA
	Xylenes (total)	8.71E+01	mg/kg	8.71E+01	mg/kg	R	2.92E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.2E+01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.44.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	5.07E-15	mg/m^3	R	2.98E-16	mg/kg-day	2.50E+00	mg/kg-day			1.2E-16
	Naphthalene	4.00E+00	ug/l	1.52E-14	mg/m^3	R	8.94E-16	mg/kg-day	NA	mg/kg-day			NA
	Phenanthrene	6.00E+00	ug/l	1.07E-13	mg/m^3	R	6.28E-15	mg/kg-day	NA	mg/kg-day			NA
	Acetone	4.22E+01	ug/l	8.06E-14	mg/m^3	R	4.73E-15	mg/kg-day	NA	mg/kg-day			NA
	Benzene	3.18E+01	ug/l	2.70E-14	mg/m^3	R	1.58E-15	mg/kg-day	2.50E-03	mg/kg-day			6.3E-13
	Chloroethane	1.06E+01	ug/l	3.93E-14	mg/m^3	R	2.31E-15	mg/kg-day	2.90E+00	mg/kg-day			7.9E-16
	Ethylbenzene	1.55E+01	ug/l	5.95E-14	mg/m^3	R	3.49E-15	mg/kg-day	2.86E-01	mg/kg-day			1.2E-14
	Methylene chloride	2.35E+01	ug/l	1.94E-14	mg/m^3	R	1.14E-15	mg/kg-day	8.60E-01	mg/kg-day			1.3E-15
	Toluene	7.65E+00	ug/l	1.05E-13	mg/m^3	R	6.18E-15	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	4.15E+01	ug/l	5.07E-15	mg/m^3	R	2.98E-16	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	2.00E+00	ug/l	2.03E-15	mg/m^3	R	1.19E-16	mg/kg-day	NA	mg/kg-day			NA
	Xylenes (total)	8.00E-01	ug/l	2.21E-13	mg/m^3	R	1.30E-14	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	6.5E-13

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.45.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Indoors)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	6.50E-04	mg/m^3	R	9.98E-04	mg/kg-day	1.40E+00	mg/kg-day			7.1E-04
	1,1-Dichloroethane	8.00E+00	ug/l	2.08E-04	mg/m^3	R	3.19E-04	mg/kg-day	1.40E-01	mg/kg-day			2.3E-03
	1,1-Dichloroethene	4.67E+00	ug/l	6.69E-04	mg/m^3	R	1.03E-03	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	1.97E-04	mg/m^3	R	3.02E-04	mg/kg-day	1.70E-02	mg/kg-day			1.8E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	4.59E-04	mg/m^3	R	7.05E-04	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	3.64E-04	mg/m^3	R	5.59E-04	mg/kg-day	1.40E-01	mg/kg-day			4.0E-03
	Trichloroethene	2.97E+01	ug/l	1.33E-03	mg/m^3	R	2.04E-03	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	7.55E-03	mg/m^3	R	1.16E-02	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.5E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.46.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Indoors)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	6.50E-04	mg/m^3	R	1.86E-06	mg/kg-day	1.4E+00	mg/kg-day			1.3E-06
	1,1-Dichloroethane	8.00E+00	ug/l	2.08E-04	mg/m^3	R	5.93E-07	mg/kg-day	1.4E-01	mg/kg-day			4.2E-06
	1,1-Dichloroethene	4.67E+00	ug/l	6.69E-04	mg/m^3	R	1.91E-06	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	1.97E-04	mg/m^3	R	5.61E-07	mg/kg-day	1.7E-02	mg/kg-day			3.3E-05
	cis-1,2-Dichloroethene	2.50E+01	ug/l	4.59E-04	mg/m^3	R	1.31E-06	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	3.64E-04	mg/m^3	R	1.04E-06	mg/kg-day	1.4E-01	mg/kg-day			7.4E-06
	Trichloroethene	2.97E+01	ug/l	1.33E-03	mg/m^3	R	3.79E-06	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	7.55E-03	mg/m^3	R	2.15E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	4.6E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.47.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Outdoors)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	3.65E-06	mg/m^3	R	5.60E-07	mg/kg-day	1.40E+00	mg/kg-day			4.0E-07
	1,1-Dichloroethane	8.00E+00	ug/l	1.51E-06	mg/m^3	R	2.32E-07	mg/kg-day	1.40E-01	mg/kg-day			1.7E-06
	1,1-Dichloroethene	4.67E+00	ug/l	3.41E-06	mg/m^3	R	5.24E-07	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	1.87E-06	mg/m^3	R	2.87E-07	mg/kg-day	1.70E-02	mg/kg-day			1.7E-05
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.93E-06	mg/m^3	R	6.03E-07	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	2.23E-06	mg/m^3	R	3.42E-07	mg/kg-day	1.40E-01	mg/kg-day			2.4E-06
	Trichloroethene	2.97E+01	ug/l	8.73E-06	mg/m^3	R	1.34E-06	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	3.39E-05	mg/m^3	R	5.21E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.1E-05

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.48.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Outdoors)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	3.65E-06	mg/m^3	R	1.20E-07	mg/kg-day	1.40E+00	mg/kg-day			8.6E-08
	1,1-Dichloroethane	8.00E+00	ug/l	1.51E-06	mg/m^3	R	4.97E-08	mg/kg-day	1.40E-01	mg/kg-day			3.6E-07
	1,1-Dichloroethene	4.67E+00	ug/l	3.41E-06	mg/m^3	R	1.12E-07	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	1.87E-06	mg/m^3	R	6.16E-08	mg/kg-day	1.70E-02	mg/kg-day			3.6E-06
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.93E-06	mg/m^3	R	1.29E-07	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	2.23E-06	mg/m^3	R	7.33E-08	mg/kg-day	1.40E-01	mg/kg-day			5.2E-07
	Trichloroethene	2.97E+01	ug/l	8.73E-06	mg/m^3	R	2.87E-07	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	3.39E-05	mg/m^3	R	1.12E-06	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	4.6E-06

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.49.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current and Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Woodward Parkway School)
Receptor Population: School Child
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	2.01E-04	mg/m^3	R	9.93E-06	mg/kg-day	1.40E+00	mg/kg-day			7.1E-06
	1,1-Dichloroethane	8.00E+00	ug/l	6.44E-05	mg/m^3	R	3.18E-06	mg/kg-day	1.40E-01	mg/kg-day			2.3E-05
	1,1-Dichloroethene	4.67E+00	ug/l	2.05E-04	mg/m^3	R	1.01E-05	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	6.10E-05	mg/m^3	R	3.01E-06	mg/kg-day	1.70E-02	mg/kg-day			1.8E-04
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.42E-04	mg/m^3	R	7.03E-06	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	1.13E-04	mg/m^3	R	5.59E-06	mg/kg-day	1.40E-01	mg/kg-day			4.0E-05
	Trichloroethene	2.97E+01	ug/l	4.10E-04	mg/m^3	R	2.02E-05	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	2.29E-03	mg/m^3	R	1.13E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.5E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.50.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current and Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Woodward Parkway School)
Receptor Population: School Employee
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	2.01E-04	mg/m^3	R	1.57E-05	mg/kg-day	1.40E+00	mg/kg-day			1.1E-05
	1,1-Dichloroethane	8.00E+00	ug/l	6.44E-05	mg/m^3	R	5.04E-06	mg/kg-day	1.40E-01	mg/kg-day			3.6E-05
	1,1-Dichloroethene	4.67E+00	ug/l	2.05E-04	mg/m^3	R	1.61E-05	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	6.10E-05	mg/m^3	R	4.77E-06	mg/kg-day	1.70E-02	mg/kg-day			2.8E-04
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.42E-04	mg/m^3	R	1.11E-05	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	1.13E-04	mg/m^3	R	8.85E-06	mg/kg-day	1.40E-01	mg/kg-day			6.3E-05
	Trichloroethene	2.97E+01	ug/l	4.10E-04	mg/m^3	R	3.21E-05	mg/kg-day	NA	mg/kg-day			NA
	Vinyl chloride	4.23E+01	ug/l	2.29E-03	mg/m^3	R	1.80E-04	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	3.9E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.51.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	8.86E-05	mg/kg-day	3.0E-04	mg/kg-day			3.0E-01
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	3.85E-04	mg/kg-day	1.5E+00	mg/kg-day			2.6E-04
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	1.54E-03	mg/kg-day	3.0E-03	mg/kg-day			5.1E-01
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	2.55E-02	mg/kg-day	2.3E-02	mg/kg-day			1.1E+00
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	5.74E-04	mg/kg-day	1.0E-01	mg/kg-day			5.7E-03
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	5.26E-04	mg/kg-day	9.0E-03	mg/kg-day			5.8E-02
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	4.08E-04	mg/kg-day	3.0E-02	mg/kg-day			1.4E-02
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	3.77E-04	mg/kg-day	3.0E-03	mg/kg-day			1.3E-01
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	4.73E-05	mg/kg-day	7.0E-04	mg/kg-day			6.8E-02
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	1.09E-03	mg/kg-day	1.0E-02	mg/kg-day			1.1E-01
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	5.16E-04	mg/kg-day	1.0E-02	mg/kg-day			5.2E-02
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	7.10E-04	mg/kg-day	2.0E-01	mg/kg-day			3.5E-03
	trans-1,2-Dichloroethen	2.85E+01	ug/l	2.85E+01	ug/l	R	1.35E-03	mg/kg-day	2.0E-02	mg/kg-day			6.7E-02
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	3.50E-02	mg/kg-day	5.7E-02	mg/kg-day			6.1E-01
												Total Hazard Index	3.0E+00

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.52.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	2.61E-07	mg/kg-day	3.00E-04	mg/kg-day			8.7E-04
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	1.13E-06	mg/kg-day	1.95E-02	mg/kg-day			5.8E-05
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	9.04E-08	mg/kg-day	7.50E-05	mg/kg-day			1.2E-01
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	7.51E-05	mg/kg-day	9.20E-04	mg/kg-day			8.2E-02
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	4.44E-05	mg/kg-day	1.00E-01	mg/kg-day			4.4E-04
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	7.23E-05	mg/kg-day	9.00E-03	mg/kg-day			8.0E-03
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	1.88E-05	mg/kg-day	3.00E-02	mg/kg-day			6.3E-04
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	6.01E-05	mg/kg-day	3.00E-03	mg/kg-day			2.0E-02
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	1.29E-05	mg/kg-day	7.00E-04	mg/kg-day			1.8E-02
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	9.34E-05	mg/kg-day	1.00E-02	mg/kg-day			9.3E-03
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	3.31E-04	mg/kg-day	1.00E-02	mg/kg-day			3.3E-02
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	2.65E-04	mg/kg-day	2.00E-01	mg/kg-day			1.3E-03
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	1.16E-04	mg/kg-day	2.00E-02	mg/kg-day			5.8E-03
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	5.99E-03	mg/kg-day	5.70E-02	mg/kg-day			1.1E-01
												Total Hazard Index	4.1E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.53.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	3.59E-05	mg/kg-day	3.00E-04	mg/kg-day			1.2E-01
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	1.56E-04	mg/kg-day	1.50E+00	mg/kg-day			1.0E-04
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	6.22E-04	mg/kg-day	3.00E-03	mg/kg-day			2.1E-01
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	1.03E-02	mg/kg-day	2.30E-02	mg/kg-day			4.5E-01
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	2.33E-04	mg/kg-day	1.00E-01	mg/kg-day			2.3E-03
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	2.13E-04	mg/kg-day	9.00E-03	mg/kg-day			2.4E-02
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	1.65E-04	mg/kg-day	3.00E-02	mg/kg-day			5.5E-03
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	1.53E-04	mg/kg-day	3.00E-03	mg/kg-day			5.1E-02
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	1.92E-05	mg/kg-day	7.00E-04	mg/kg-day			2.7E-02
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	4.41E-04	mg/kg-day	1.00E-02	mg/kg-day			4.4E-02
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	2.09E-04	mg/kg-day	1.00E-02	mg/kg-day			2.1E-02
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	2.88E-04	mg/kg-day	2.00E-01	mg/kg-day			1.4E-03
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	5.47E-04	mg/kg-day	2.00E-02	mg/kg-day			2.7E-02
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	1.42E-02	mg/kg-day	5.70E-02	mg/kg-day			2.5E-01
												Total Hazard Index	1.2E+00

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.54.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	1.15E-07	mg/kg-day	3.00E-04	mg/kg-day			3.8E-04
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	5.02E-07	mg/kg-day	1.95E-02	mg/kg-day			2.6E-05
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	4.00E-06	mg/kg-day	7.50E-05	mg/kg-day			5.3E-02
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	3.32E-05	mg/kg-day	9.20E-04	mg/kg-day			3.6E-02
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	2.26E-05	mg/kg-day	1.00E-01	mg/kg-day			2.3E-04
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	3.68E-05	mg/kg-day	9.00E-03	mg/kg-day			4.1E-03
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	9.56E-06	mg/kg-day	3.00E-02	mg/kg-day			3.2E-04
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	3.06E-05	mg/kg-day	3.00E-03	mg/kg-day			1.0E-02
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	6.56E-06	mg/kg-day	7.00E-04	mg/kg-day			9.4E-03
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	4.75E-05	mg/kg-day	1.00E-02	mg/kg-day			4.8E-03
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	1.68E-04	mg/kg-day	1.00E-02	mg/kg-day			1.7E-02
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	1.35E-04	mg/kg-day	2.00E-01	mg/kg-day			6.7E-04
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	5.89E-05	mg/kg-day	2.00E-02	mg/kg-day			2.9E-03
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	3.04E-03	mg/kg-day	5.70E-02	mg/kg-day			5.3E-02
												Total Hazard Index	1.9E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.55.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1-Dichloroethane	1.21E+01	ug/l	8.07E-03	mg/m^3	R	1.28E-04	mg/kg-day	1.40E-01	mg/kg-day			9.1E-04
	1,1-Dichloroethene	1.11E+01	ug/l	5.56E-03	mg/m^3	R	1.17E-04	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethane	8.62E+00	ug/l	4.31E-03	mg/m^3	R	9.09E-05	mg/kg-day	1.40E-03	mg/kg-day			6.5E-02
	Benzene	7.97E+00	ug/l	3.98E-03	mg/m^3	R	8.40E-05	mg/kg-day	1.70E-03	mg/kg-day			4.9E-02
	Carbon tetrachloride	1.00E+00	ug/l	5.00E-04	mg/m^3	R	1.05E-05	mg/kg-day	5.70E-04	mg/kg-day			1.9E-02
	cis-1,2-Dichloroethene	2.30E+01	ug/l	1.15E-02	mg/m^3	R	2.43E-04	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.09E+01	ug/l	5.45E-03	mg/m^3	R	1.15E-04	mg/kg-day	1.40E-01	mg/kg-day			8.2E-04
	Toluene	1.50E+01	ug/l	7.50E-03	mg/m^3	R	1.58E-04	mg/kg-day	1.14E-01	mg/kg-day			1.4E-03
	trans-1,2-Dichloroathene	2.85E+01	ug/l	1.43E-02	mg/m^3	R	3.01E-04	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	7.40E+02	ug/l	3.70E-01	mg/m^3	R	7.81E-03	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	1.4E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.56.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation (vapors)	1,1-Dichloroethane	1.21E+01	ug/l	6.07E-03	mg/m^3	R	2.08E-05	mg/kg-day	1.40E-01	mg/kg-day			1.5E-04
	1,1-Dichloroethene	1.11E+01	ug/l	5.56E-03	mg/m^3	R	1.90E-05	mg/kg-day	NA	mg/kg-day			NA
	1,2-Dichloroethane	8.62E+00	ug/l	4.31E-03	mg/m^3	R	1.46E-05	mg/kg-day	1.40E-03	mg/kg-day			1.1E-02
	Benzene	7.97E+00	ug/l	3.98E-03	mg/m^3	R	1.36E-05	mg/kg-day	1.70E-03	mg/kg-day			8.0E-03
	Carbon tetrachloride	1.00E+00	ug/l	5.00E-04	mg/m^3	R	1.71E-06	mg/kg-day	5.70E-04	mg/kg-day			3.0E-03
	cis-1,2-Dichloroethene	2.30E+01	ug/l	1.15E-02	mg/m^3	R	3.94E-05	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	1.09E+01	ug/l	5.45E-03	mg/m^3	R	1.87E-05	mg/kg-day	1.40E-01	mg/kg-day			1.3E-04
	Toluene	1.50E+01	ug/l	7.50E-03	mg/m^3	R	2.57E-05	mg/kg-day	1.14E-01	mg/kg-day			2.3E-04
	trans-1,2-Dichloroethene	2.85E+01	ug/l	1.43E-02	mg/m^3	R	4.88E-05	mg/kg-day	NA	mg/kg-day			NA
	Trichloroethene	7.40E+02	ug/l	3.70E-01	mg/m^3	R	1.27E-03	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.2E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.57.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Arsenic	2.89E+00	ug/l	2.89E+00	ug/l	R	1.24E-07	mg/kg-day	3.0E-04	mg/kg-day			4.1E-04
	Cadmium	1.15E+01	ug/l	1.15E+01	ug/l	R	4.92E-07	mg/kg-day	5.0E-04	mg/kg-day			9.8E-04
	Chromium III	2.55E+01	ug/l	2.55E+01	ug/l	R	1.10E-06	mg/kg-day	1.5E+00	mg/kg-day			7.3E-07
	Chromium VI	4.94E+01	ug/l	4.94E+01	ug/l	R	2.12E-06	mg/kg-day	3.0E-03	mg/kg-day			7.1E-04
	Chloroform	3.00E-01	ug/l	3.00E-01	ug/l	R	1.29E-08	mg/kg-day	1.0E-02	mg/kg-day			1.3E-06
	Dibromochloromethane	8.00E-01	ug/l	8.00E-01	ug/l	R	3.43E-08	mg/kg-day	2.0E-02	mg/kg-day			1.7E-06
	Tetrachloroethene	2.00E+00	ug/l	2.00E+00	ug/l	R	8.58E-08	mg/kg-day	1.0E-02	mg/kg-day			8.6E-06
	Trichloroethene	4.00E+00	ug/l	4.00E+00	ug/l	R	1.72E-07	mg/kg-day	5.7E-02	mg/kg-day			3.0E-06
												Total Hazard Index	2.1E-03

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.58.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Arsenic	2.89E+00	ug/l	2.89E+00	ug/l	R	7.79E-08	mg/kg-day	3.0E-04	mg/kg-day			2.6E-04
	Cadmium	1.15E+01	ug/l	1.15E+01	ug/l	R	3.09E-07	mg/kg-day	1.3E-05	mg/kg-day			2.5E-02
	Chromium III	2.55E+01	ug/l	2.55E+01	ug/l	R	6.90E-07	mg/kg-day	2.0E-02	mg/kg-day			3.5E-05
	Chromium VI	4.94E+01	ug/l	4.94E+01	ug/l	R	2.67E-06	mg/kg-day	7.5E-05	mg/kg-day			3.6E-02
	Chloroform	3.00E-01	ug/l	3.00E-01	ug/l	R	9.39E-08	mg/kg-day	1.0E-02	mg/kg-day			9.4E-06
	Dibromochloromethane	8.00E-01	ug/l	8.00E-01	ug/l	R	1.19E-07	mg/kg-day	2.0E-02	mg/kg-day			6.0E-06
	Tetrachloroethene	2.00E+00	ug/l	2.00E+00	ug/l	R	4.01E-06	mg/kg-day	1.0E-02	mg/kg-day			4.0E-04
	Trichloroethene	4.00E+00	ug/l	4.00E+00	ug/l	R	2.33E-06	mg/kg-day	5.7E-02	mg/kg-day			4.1E-05
												Total Hazard Index	6.1E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.59.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current and Future
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	8.21E+03	mg/kg	8.21E+03	mg/kg	R	3.52E-04	mg/kg-day	1.0E+00	mg/kg-day			3.5E-04
	Arsenic	9.76E+00	mg/kg	9.76E+00	mg/kg	R	4.19E-07	mg/kg-day	3.0E-04	mg/kg-day			1.4E-03
	Cadmium	1.64E+02	mg/kg	1.64E+02	mg/kg	R	7.02E-06	mg/kg-day	5.0E-04	mg/kg-day			1.4E-02
	Chromium III	3.11E+02	mg/kg	3.11E+02	mg/kg	R	1.34E-05	mg/kg-day	1.5E+00	mg/kg-day			8.9E-06
	Chromium VI	4.20E+02	mg/kg	4.20E+02	mg/kg	R	1.80E-05	mg/kg-day	3.0E-03	mg/kg-day			6.0E-03
	Manganese	2.09E+03	mg/kg	2.09E+03	mg/kg	R	8.97E-05	mg/kg-day	2.3E-02	mg/kg-day			3.9E-03
	Mercury	3.10E-01	mg/kg	3.10E-01	mg/kg	R	1.33E-08	mg/kg-day	3.0E-04	mg/kg-day			4.4E-05
	Vanadium	4.70E+01	mg/kg	4.70E+01	mg/kg	R	2.02E-06	mg/kg-day	7.0E-03	mg/kg-day			2.9E-04
												Total Hazard Index	2.6E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.60.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	8.21E+03	mg/kg	8.21E+03	mg/kg	R	NA	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	9.76E+00	mg/kg	9.76E+00	mg/kg	R	6.77E-09	mg/kg-day	3.00E-04	mg/kg-day			2.3E-05
	Cadmium	1.64E+02	mg/kg	1.64E+02	mg/kg	R	3.78E-09	mg/kg-day	1.25E-05	mg/kg-day			3.0E-04
	Chromium III	3.11E+02	mg/kg	3.11E+02	mg/kg	R	NA	mg/kg-day	1.95E-02	mg/kg-day			NA
	Chromium VI	4.20E+02	mg/kg	4.20E+02	mg/kg	R	NA	mg/kg-day	7.50E-05	mg/kg-day			NA
	Manganese	2.09E+03	mg/kg	2.09E+03	mg/kg	R	NA	mg/kg-day	9.20E-04	mg/kg-day			NA
	Mercury	3.10E-01	mg/kg	3.10E-01	mg/kg	R	NA	mg/kg-day	2.10E-05	mg/kg-day			NA
	Vanadium	4.70E+01	mg/kg	4.70E+01	mg/kg	R	NA	mg/kg-day	1.82E-04	mg/kg-day			NA
												Total Hazard Index	3.3E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.61.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	1.89E-01	mg/kg-day	1.0E+00	mg/kg-day			1.9E-01
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	9.97E-05	mg/kg-day	3.0E-04	mg/kg-day			3.3E-01
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	5.96E-03	mg/kg-day	5.0E-04	mg/kg-day			1.2E+01
	Chromium III	2.82E+02	ug/l	2.82E+02	ug/l	R	1.33E-02	mg/kg-day	1.5E+00	mg/kg-day			8.9E-03
	Chromium VI	4.72E+02	ug/l	4.72E+02	ug/l	R	2.23E-02	mg/kg-day	3.0E-03	mg/kg-day			7.4E+00
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	4.04E-01	mg/kg-day	2.3E-02	mg/kg-day			1.8E+01
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	4.83E-06	mg/kg-day	5.0E-05	mg/kg-day			9.7E-02
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	1.71E-06	mg/kg-day	1.3E-05	mg/kg-day			1.3E-01
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	3.41E-04	mg/kg-day	2.0E-02	mg/kg-day			1.7E-02
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	1.89E-04	mg/kg-day	6.0E-01	mg/kg-day			3.2E-04
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	3.93E-04	mg/kg-day	2.8E-01	mg/kg-day			1.4E-03
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	3.78E-04	mg/kg-day	1.0E-01	mg/kg-day			3.8E-03
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	2.21E-04	mg/kg-day	9.0E-03	mg/kg-day			2.5E-02
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	8.62E-04	mg/kg-day	2.0E-02	mg/kg-day			3.3E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	1.18E-03	mg/kg-day	1.0E-02	mg/kg-day			1.2E-01
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	2.45E-04	mg/kg-day	1.0E-02	mg/kg-day			2.5E-02
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	1.40E-03	mg/kg-day	5.7E-02	mg/kg-day			2.5E-02
	Vinyl Chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	2.00E-03	mg/kg-day	5.0E-03	mg/kg-day			4.0E-01
												Total Hazard Index	3.8E+01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.62.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	6.07E-04	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	3.21E-07	mg/kg-day	3.0E-04	mg/kg-day			1.1E-03
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	1.92E-05	mg/kg-day	1.3E-05	mg/kg-day			1.5E+00
	Chromium III	2.82E+02	ug/l	2.82E+02	ug/l	R	4.29E-05	mg/kg-day	2.0E-02	mg/kg-day			2.2E-03
	Chromium VI	4.72E+02	ug/l	4.72E+02	ug/l	R	1.44E-04	mg/kg-day	7.5E-05	mg/kg-day			1.9E+00
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	1.30E-03	mg/kg-day	9.2E-04	mg/kg-day			1.4E+00
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	4.53E-06	mg/kg-day	5.0E-05	mg/kg-day			9.1E-02
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	1.16E-06	mg/kg-day	1.3E-05	mg/kg-day			8.9E-02
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	4.22E-04	mg/kg-day	2.0E-02	mg/kg-day			2.1E-02
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	9.58E-06	mg/kg-day	6.0E-01	mg/kg-day			1.6E-05
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	7.92E-05	mg/kg-day	2.8E-01	mg/kg-day			2.8E-04
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	3.20E-05	mg/kg-day	1.0E-01	mg/kg-day			3.2E-04
	1,1-Dichloroethene	4.87E+00	ug/l	4.87E+00	ug/l	R	3.31E-05	mg/kg-day	9.0E-03	mg/kg-day			3.7E-03
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	2.82E-04	mg/kg-day	2.0E-02	mg/kg-day			1.4E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	1.11E-04	mg/kg-day	1.0E-02	mg/kg-day			1.1E-02
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	1.72E-04	mg/kg-day	1.0E-02	mg/kg-day			1.7E-02
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	2.62E-04	mg/kg-day	5.7E-02	mg/kg-day			4.6E-03
	Vinyl Chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	1.10E-04	mg/kg-day	5.0E-03	mg/kg-day			2.2E-02
												Total Hazard Index	5.1E+00

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.63.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,1-Trichloroethane	8.30E+00	ug/l	4.10E+00	mg/m^3	R	6.29E-01	mg/kg-day	1.40E+00	mg/kg-day			4.5E-01
	1,1-Dichloroethane	8.00E+00	ug/l	4.88E-03	mg/m^3	R	7.48E-04	mg/kg-day	1.40E-01	mg/kg-day			5.3E-03
	1,1-Dichloroethene	4.67E+00	ug/l	8.18E-02	mg/m^3	R	1.26E-02	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	1.56E-01	mg/m^3	R	2.39E-02	mg/kg-day	1.70E-02	mg/kg-day			1.4E+00
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.10E-01	mg/m^3	R	3.22E-02	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	1.93E-01	mg/m^3	R	2.95E-02	mg/kg-day	1.40E-01	mg/kg-day			2.1E-01
	Trichloroethene	2.97E+01	ug/l	1.55E-04	mg/m^3	R	2.38E-05	mg/kg-day	NA	mg/kg-day			NA
	Vinyl Chloride	4.23E+01	ug/l	2.35E-02	mg/m^3	R	3.61E-03	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	2.1E+00

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.64.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	7.65E-02	mg/kg-day	1.0E+00	mg/kg-day			7.7E-02
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	4.04E-05	mg/kg-day	3.0E-04	mg/kg-day			1.3E-01
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	2.42E-03	mg/kg-day	5.0E-04	mg/kg-day			4.8E+00
	Chromium III	2.82E+02	ug/l	2.82E+02	ug/l	R	5.40E-03	mg/kg-day	1.5E+00	mg/kg-day			3.6E-03
	Chromium VI	4.72E+02	ug/l	4.72E+02	ug/l	R	9.05E-03	mg/kg-day	3.0E-03	mg/kg-day			3.0E+00
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	1.64E-01	mg/kg-day	2.3E-02	mg/kg-day			7.1E+00
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	1.96E-06	mg/kg-day	5.0E-05	mg/kg-day			3.9E-02
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	6.94E-07	mg/kg-day	1.3E-05	mg/kg-day			5.3E-02
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	1.38E-04	mg/kg-day	2.0E-02	mg/kg-day			6.9E-03
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	7.67E-05	mg/kg-day	6.0E-01	mg/kg-day			1.3E-04
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	1.59E-04	mg/kg-day	2.8E-01	mg/kg-day			5.7E-04
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	1.53E-04	mg/kg-day	1.0E-01	mg/kg-day			1.5E-03
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	8.95E-05	mg/kg-day	9.0E-03	mg/kg-day			9.9E-03
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	2.68E-04	mg/kg-day	2.0E-02	mg/kg-day			1.3E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	4.79E-04	mg/kg-day	1.0E-02	mg/kg-day			4.8E-02
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	9.93E-05	mg/kg-day	1.0E-02	mg/kg-day			9.9E-03
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	5.69E-04	mg/kg-day	5.7E-02	mg/kg-day			1.0E-02
	Vinyl Chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	8.11E-04	mg/kg-day	5.0E-03	mg/kg-day			1.6E-01
												Total Hazard Index	1.6E+01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.65.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Velue	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	2.48E-04	mg/kg-day	NA	mg/kg-day			NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	1.31E-07	mg/kg-day	3.00E-04	mg/kg-day			4.4E-04
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	7.83E-06	mg/kg-day	1.25E-05	mg/kg-day			6.3E-01
	Chromium III	2.82E+02	ug/l	2.82E+02	ug/l	R	1.75E-05	mg/kg-day	1.95E-02	mg/kg-day			9.0E-04
	Chromium VI	4.72E+02	ug/l	4.72E+02	ug/l	R	5.86E-05	mg/kg-day	7.50E-05	mg/kg-day			7.8E-01
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	5.30E-04	mg/kg-day	9.20E-04	mg/kg-day			5.8E-01
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	2.12E-06	mg/kg-day	5.00E-05	mg/kg-day			4.2E-02
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	5.45E-07	mg/kg-day	1.30E-05	mg/kg-day			4.2E-02
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	1.98E-04	mg/kg-day	2.00E-02	mg/kg-day			9.9E-03
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	4.50E-06	mg/kg-day	6.00E-01	mg/kg-day			7.5E-06
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	3.72E-05	mg/kg-day	2.80E-01	mg/kg-day			1.3E-04
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	1.50E-05	mg/kg-day	1.00E-01	mg/kg-day			1.5E-04
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	1.55E-05	mg/kg-day	9.00E-03	mg/kg-day			1.7E-03
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	1.33E-04	mg/kg-day	2.00E-02	mg/kg-day			6.6E-03
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	5.21E-05	mg/kg-day	1.00E-02	mg/kg-day			5.2E-03
	Tetrachloroethena	5.18E+00	ug/l	5.18E+00	ug/l	R	8.07E-05	mg/kg-day	1.00E-02	mg/kg-day			8.1E-03
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	1.23E-04	mg/kg-day	5.70E-02	mg/kg-day			2.2E-03
	Vinyl Chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	5.16E-05	mg/kg-day	5.00E-03	mg/kg-day			1.0E-02
												Total Hazard Index	2.1E+00

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.66.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	1,1,1-Trichloroethane	8.30E+00	ug/l	4.10E+00	ug/l	R	1.40E-02	mg/kg-day	1.40E+00	mg/kg-day			1.0E-02
	1,1-Dichloroethane	8.00E+00	ug/l	4.88E-03	ug/l	R	1.67E-05	mg/kg-day	1.40E-01	mg/kg-day			1.2E-04
	1,1-Dichloroethene	4.67E+00	ug/l	8.18E-02	ug/l	R	2.80E-04	mg/kg-day	NA	mg/kg-day			NA
	Chlorobenzene	1.40E+01	ug/l	1.56E-01	ug/l	R	5.33E-04	mg/kg-day	1.70E-02	mg/kg-day			3.1E-02
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.10E-01	ug/l	R	7.20E-04	mg/kg-day	NA	mg/kg-day			NA
	Tetrachloroethene	5.18E+00	ug/l	1.93E-01	ug/l	R	6.59E-04	mg/kg-day	1.40E-01	mg/kg-day			4.7E-03
	Trichloroethene	2.97E+01	ug/l	1.55E-04	ug/l	R	5.31E-07	mg/kg-day	NA	mg/kg-day			NA
	Vinyl Chloride	4.23E+01	ug/l	2.35E-02	ug/l	R	8.05E-05	mg/kg-day	NA	mg/kg-day			NA
												Total Hazard Index	4.6E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.67.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Cyanide	2.72E+02	ug/l	2.72E+02	ug/l	R	2.66E-03	mg/kg-day	2.0E-02	mg/kg-day			1.3E-01
	Aluminum	3.41E+03	ug/l	3.41E+03	ug/l	R	3.34E-02	mg/kg-day	1.0E+00	mg/kg-day			3.3E-02
	Arsenic	1.65E+00	ug/l	1.65E+00	ug/l	R	1.61E-05	mg/kg-day	3.0E-04	mg/kg-day			5.4E-02
	Cadmium	3.84E+02	ug/l	3.84E+02	ug/l	R	3.76E-03	mg/kg-day	5.0E-04	mg/kg-day			7.5E+00
	Chromium III	4.26E+02	ug/l	4.26E+02	ug/l	R	4.16E-03	mg/kg-day	1.5E+00	mg/kg-day			2.8E-03
	Chromium VI	3.90E+02	ug/l	3.90E+02	ug/l	R	3.81E-03	mg/kg-day	3.0E-03	mg/kg-day			1.3E+00
	Copper	1.10E+02	ug/l	1.10E+02	ug/l	R	1.08E-03	mg/kg-day	4.0E-02	mg/kg-day			2.7E-02
	Manganese	2.21E+03	ug/l	2.21E+03	ug/l	R	2.17E-02	mg/kg-day	2.3E-02	mg/kg-day			9.4E-01
	Nickel	1.28E+02	ug/l	1.28E+02	ug/l	R	1.25E-03	mg/kg-day	2.0E-02	mg/kg-day			6.3E-02
	Thallium	7.69E+00	ug/l	7.69E+00	ug/l	R	7.53E-05	mg/kg-day	8.0E-05	mg/kg-day			9.4E-01
	alpha-Chlordane	3.15E-02	ug/l	3.15E-02	ug/l	R	3.08E-07	mg/kg-day	5.0E-04	mg/kg-day			6.2E-04
	dieldrin	3.28E-02	ug/l	3.28E-02	ug/l	R	3.21E-07	mg/kg-day	5.0E-05	mg/kg-day			6.4E-03
	gamma-Chlordane	3.15E-02	ug/l	3.15E-02	ug/l	R	3.08E-07	mg/kg-day	5.0E-04	mg/kg-day			6.2E-04
	bis(2-Ethylhexyl)phthalate	2.03E+02	ug/l	2.03E+02	ug/l	R	1.99E-03	mg/kg-day	2.0E-02	mg/kg-day			9.9E-02
	Chrysene	1.90E+00	ug/l	1.90E+00	ug/l	R	1.86E-05	mg/kg-day	NA	mg/kg-day			NA
	Pentachlorophenol	7.75E+00	ug/l	7.75E+00	ug/l	R	7.58E-05	mg/kg-day	3.0E-02	mg/kg-day			2.5E-03
	1,1,1-Trichloroethane	1.00E+02	ug/l	1.00E+02	ug/l	R	9.78E-04	mg/kg-day	2.8E-01	mg/kg-day			3.5E-03
	1,1-Dichloroethane	2.27E+01	ug/l	2.27E+01	ug/l	R	2.22E-04	mg/kg-day	1.0E-01	mg/kg-day			2.2E-03
	Acetone	1.65E+02	ug/l	1.65E+02	ug/l	R	1.61E-03	mg/kg-day	1.0E-01	mg/kg-day			1.6E-02
	Chloroform	5.00E-01	ug/l	5.00E-01	ug/l	R	4.89E-06	mg/kg-day	1.0E-02	mg/kg-day			4.9E-04
	cis-1,2-Dichloroethene	6.60E+02	ug/l	6.60E+02	ug/l	R	6.46E-03	mg/kg-day	1.0E-02	mg/kg-day			6.5E-01
	Tetrachloroethene	1.12E+01	ug/l	1.12E+01	ug/l	R	1.10E-04	mg/kg-day	1.0E-02	mg/kg-day			1.1E-02
	trans-1,2-Dichloroethene	7.00E+00	ug/l	7.00E+00	ug/l	R	6.85E-05	mg/kg-day	2.0E-02	mg/kg-day			3.4E-03
	Trichloroethene	1.18E+03	ug/l	1.16E+03	ug/l	R	1.14E-02	mg/kg-day	5.7E-02	mg/kg-day			2.0E-01
												Total Hazard Index	1.2E+01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.68.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Velue	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Manganese	8.95E+01	ug/l	8.95E+01	ug/l	R	2.31E-04	mg/kg-day	2.3E-02	mg/kg-day			1.0E-02
												Total Hazard Index	1.0E-02

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.69.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: SubsurfaceSoil
Exposure Point: Ellsworth Allen Park
Receptor Population: Recreational User
Receptor Age: Pre-Adolescent (6-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Chromium III	2.04E+01	mg/kg	2.04E+01	mg/kg	R	2.49E-06	mg/kg-day	1.50E+00	mg/kg-day			1.7E-06
	Chromium VI	6.81E+00	mg/kg	6.81E+00	mg/kg	R	8.29E-07	mg/kg-day	3.00E-03	mg/kg-day			2.8E-04
												Total Hazard Index	2.8E-04

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.70.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: SubsurfaceSoil
Exposure Point: Ellsworth Allen Park
Receptor Population: Recreational User
Receptor Age: Pre-Adolescent (6-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Dermal Contact	Chromium III	2.04E+01	mg/kg	2.04E+01	mg/kg	R	NA	mg/kg-day	1.95E-02	mg/kg-day			NA
	Chromium VI	6.81E+00	mg/kg	6.81E+00	mg/kg	R	NA	mg/kg-day	7.50E-05	mg/kg-day			NA
												Total Hazard Index	NA

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.71.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Particulates
Exposure Point: Ellsworth Allen Park
Receptor Population: Recreational User
Receptor Age: Pre-Adolescent (6-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Inhalation	Chromium III	2.04E+01	mg/kg	2.59E-08	mg/m^3	R	1.51E-10	mg/kg-day	NA	mg/kg-day			NA
	Chromium VI	6.81E+00	mg/kg	8.62E-09	mg/m^3	R	5.04E-11	mg/kg-day	3.00E-05	mg/kg-day			1.7E-06
												Total Hazard Index	1.7E-06

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.72.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Fish
Exposure Medium: Fish Tissue
Exposure Point: Massapequa Preserve
Receptor Population: Fisher
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Cadmium	6.40E-01	mg/kg	6.40E-01	mg/kg	R	1.23E-04	mg/kg-day	5.00E-04	mg/kg-day			2.5E-01
	Chromium VI	9.80E-01	mg/kg	9.80E-01	mg/kg	R	1.88E-04	mg/kg-day	3.00E-03	mg/kg-day			6.3E-02
												Total Hazard Index	3.1E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G7.73.CTE
CALCULATION OF NON-CANCER HAZARDS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Fish
Exposure Medium: Fish Tissue
Exposure Point: Massapequa Preserve
Receptor Population: Fisher
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Hazard Calculation	Intake (Non-Cancer)	Intake (Non-Cancer) Units	Reference Dose	Reference Dose Units	Reference Concentration	Reference Concentration Units	Hazard Quotient
Ingestion	Cadmium	6.40E-01	mg/kg	6.40E-01	mg/kg	R	5.26E-05	mg/kg-day	5.00E-04	mg/kg-day			1.1E-01
	Chromium VI	9.80E-01	mg/kg	9.80E-01	mg/kg	R	8.05E-05	mg/kg-day	3.00E-03	mg/kg-day			2.7E-02
												Total Hazard Index	1.3E-01

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G8.1.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	4.02E+04	mg/kg	4.02E+04	mg/kg	R	8.66E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	4.25E+01	mg/kg	4.25E+01	mg/kg	R	9.17E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.73E+01	mg/kg	1.73E+01	mg/kg	R	3.73E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.6E-07
	Cadmium	2.04E+02	mg/kg	2.04E+02	mg/kg	R	4.39E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	1.61E+03	mg/kg	1.61E+03	mg/kg	R	3.47E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	5.36E+02	mg/kg	5.36E+02	mg/kg	R	1.16E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	3.35E+03	mg/kg	3.35E+03	mg/kg	R	7.21E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	4.02E+04	mg/kg	2.43E+02	mg/kg	R	5.24E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.96E+01	mg/kg	9.96E+01	mg/kg	R	2.15E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Thallium	6.30E-01	mg/kg	6.30E-01	mg/kg	R	1.36E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	7.50E+03	mg/kg	7.50E+03	mg/kg	R	1.62E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1254	9.90E-01	mg/kg	9.90E-01	mg/kg	R	2.13E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-08
	Aroclor-1260	4.40E-01	mg/kg	4.40E-01	mg/kg	R	9.49E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	Tetrachloroethene	1.54E-01	mg/kg	1.54E-01	mg/kg	R	3.32E-09	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-10
										Total Risk	6.2E-07

R = Route EPC

TABLE G8.2.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	4.02E+04	mg/kg	4.02E+04	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Antimony	4.25E+01	mg/kg	4.25E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	1.73E+01	mg/kg	1.73E+01	mg/kg	R	1.46E-07	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	2.2E-07
	Cadmium	2.04E+02	mg/kg	2.04E+02	mg/kg	R	5.74E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	1.61E+03	mg/kg	1.61E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	5.36E+02	mg/kg	5.36E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	3.35E+03	mg/kg	3.35E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cyanide	2.43E+02	mg/kg	2.43E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	9.96E+01	mg/kg	9.96E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Thallium	6.30E-01	mg/kg	6.30E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Zinc	7.50E+03	mg/kg	7.50E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Aroclor-1254	9.90E-01	mg/kg	9.90E-01	mg/kg	R	3.91E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	7.8E-08
	Aroclor-1260	4.40E-01	mg/kg	4.40E-01	mg/kg	R	1.74E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	3.5E-08
	Tetrachloroethene	1.54E-01	mg/kg	1.54E-01	mg/kg	R	NA	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	NA
										Total Risk	3.3E-07

R = Route EPC

TABLE G8.3.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Aluminum	4.02E+04	mg/kg	1.02E-04	mg/m^3	R	5.26E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	4.25E+01	mg/kg	1.08E-07	mg/m^3	R	5.57E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.73E+01	mg/kg	4.38E-08	mg/m^3	R	2.27E-11	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	3.4E-10
	Cadmium	2.04E+02	mg/kg	5.16E-07	mg/m^3	R	2.67E-10	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Chromium III	1.61E+03	mg/kg	4.07E-06	mg/m^3	R	2.11E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	5.36E+02	mg/kg	1.36E-06	mg/m^3	R	7.02E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	2.9E-08
	Copper	3.35E+03	mg/kg	8.47E-06	mg/m^3	R	4.38E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	2.43E+02	mg/kg	1.02E-04	mg/m^3	R	5.26E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.96E+01	mg/kg	2.52E-07	mg/m^3	R	1.30E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Thallium	6.30E-01	mg/kg	1.59E-09	mg/m^3	R	8.25E-13	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	7.50E+03	mg/kg	1.90E-05	mg/m^3	R	9.82E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1254	9.90E-01	mg/kg	2.51E-09	mg/m^3	R	1.30E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-12
	Aroclor-1260	4.40E-01	mg/kg	1.11E-09	mg/m^3	R	5.76E-13	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-12
	Tetrachloroethene	1.54E-01	mg/kg	3.90E-10	mg/m^3	R	2.02E-13	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	4.0E-16
										Total Risk	3.2E-08

R = Route EPC

TABLE G8.4.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	4.37E-04	mg/m^3	R	2.26E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	4.5E-10
	Toluene	3.68E-02	mg/kg	8.15E-04	mg/m^3	R	4.21E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	3.19E-02	mg/kg	7.06E-04	mg/m^3	R	3.65E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.2E-09
										Total Risk	2.6E-09

R = Route EPC

TABLE G8.5.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	1.93E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	1.78E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	3.45E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	3.63E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-12
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	4.19E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	2.13E-09	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	4.3E-12
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	8.04E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	1.48E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	8.9E-10
										Total Risk	8.9E-10

R = Route EPC

TABLE G8.6.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	3.90E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	2.74E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	2.33E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	3.5E-07
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.38E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	2.49E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	7.20E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	3.38E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	3.58E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	8.30E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	4.30E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	6.60E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	6.79E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	8.79E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	9.30E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	2.47E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.9E-08
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	1.10E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	8.0E-08
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	9.11E-10	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	4.7E-11
										Total Risk	6.8E-07

R = Route EPC

TABLE G8.7.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	9.24E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.82E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Iron	0.00E+00	mg/kg	0.00E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Lead	1.45E+02	mg/kg	1.45E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	1.63E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-09
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	1.72E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	4.57E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.1E-09
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	1.88E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	7.4E-08

R = Route EPC

TABLE G8.8.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	1.07E-05	mg/m^3	R	1.19E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	7.51E-09	mg/m^3	R	8.32E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	6.41E-09	mg/m^3	R	7.09E-11	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Cadmium	2.98E+01	mg/kg	3.78E-08	mg/m^3	R	4.18E-10	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-09
	Chromium III	5.40E+02	mg/kg	6.84E-07	mg/m^3	R	7.57E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.97E-07	mg/m^3	R	2.19E-09	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	9.2E-08
	Copper	7.33E+02	mg/kg	9.28E-07	mg/m^3	R	1.03E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	9.83E-08	mg/m^3	R	1.09E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Iron	0.00E+00	mg/kg	0.00E+00	mg/m^3	R	0.00E+00	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Lead	1.45E+02	mg/kg	1.83E-07	mg/m^3	R	2.03E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	2.28E-10	mg/m^3	R	2.52E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	1.18E-07	mg/m^3	R	1.31E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.81E-09	mg/m^3	R	2.00E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.86E-06	mg/m^3	R	2.06E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	2.41E-10	mg/m^3	R	2.67E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.3E-12
	Aroclor-1254	2.02E+00	mg/kg	2.55E-09	mg/m^3	R	2.83E-11	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.7E-11
	Aroclor-1260	5.36E-01	mg/kg	6.78E-10	mg/m^3	R	7.50E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-11
	Benzo(a)pyrene	2.38E-01	mg/kg	3.01E-10	mg/m^3	R	3.34E-12	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-11
	Tetrachloroethene	1.97E-02	mg/kg	2.50E-11	mg/m^3	R	2.77E-13	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	5.5E-16
										Total Risk	9.6E-08

R = Route EPC

TABLE G8.9.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	5.47E-05	mg/m^3	R	6.06E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	Toluene	3.68E-02	mg/kg	6.55E-05	mg/m^3	R	7.25E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	3.19E-02	mg/kg	8.17E-05	mg/m^3	R	9.05E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	5.4E-09
										Total Risk	6.6E-09

R = Route EPC

TABLE G8.10.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	1.57E-04	mg/m^3	R	4.35E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	8.7E-10
	Toluene	3.68E-02	mg/kg	2.93E-04	mg/m^3	R	8.12E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	3.19E-02	mg/kg	2.54E-04	mg/m^3	R	7.03E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.2E-09
										Total Risk	5.1E-09

R = Route EPC

TABLE G8.11.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	5.91E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	4.15E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	3.54E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.3E-08
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	2.08E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	3.78E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	1.09E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	5.13E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	5.43E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	1.26E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	6.52E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	9.99E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	1.03E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	1.33E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.7E-09
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	1.41E-08	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-08
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	3.74E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	7.5E-09
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	1.66E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	1.38E-10	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	7.2E-12
										Total Risk	1.0E-07

R = Route EPC

TABLE G8.12.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	7.00E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.38E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	1.23E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.5E-10
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	1.30E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-09
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	3.46E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	6.9E-10
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	1.43E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	5.6E-09

R = Route EPC

TABLE G8.13.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	2.14E-05	mg/m^3	R	1.80E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	1.50E-08	mg/m^3	R	1.26E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	1.28E-08	mg/m^3	R	1.07E-11	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	1.6E-10
	Cadmium	2.98E+01	mg/kg	7.55E-08	mg/m^3	R	6.33E-11	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-10
	Chromium III	5.40E+02	mg/kg	1.37E-06	mg/m^3	R	1.15E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	3.95E-07	mg/m^3	R	3.31E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Copper	7.33E+02	mg/kg	1.86E-06	mg/m^3	R	1.56E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	1.97E-07	mg/m^3	R	1.65E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	4.56E-10	mg/m^3	R	3.82E-13	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	2.36E-07	mg/m^3	R	1.98E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	3.62E-09	mg/m^3	R	3.04E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	3.72E-06	mg/m^3	R	3.12E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	4.83E-10	mg/m^3	R	4.05E-13	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.1E-13
	Aroclor-1254	2.02E+00	mg/kg	5.11E-09	mg/m^3	R	4.28E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	8.6E-12
	Aroclor-1260	5.36E-01	mg/kg	1.36E-09	mg/m^3	R	1.14E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.3E-12
	Benzo(a)pyrene	2.38E-01	mg/kg	6.03E-10	mg/m^3	R	5.05E-13	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	1.6E-12
	Tetrachloroethene	1.97E-02	mg/kg	5.00E-11	mg/m^3	R	4.19E-14	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	8.4E-17
										Total Risk	1.4E-08

R = Route EPC

TABLE G8.14.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	3.93E-03	mg/m^3	R	3.30E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	6.6E-09
	Toluene	3.68E-02	mg/kg	7.33E-03	mg/m^3	R	6.15E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	3.19E-02	mg/kg	6.35E-03	mg/m^3	R	5.33E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.2E-08
										Total Risk	3.9E-08

R = Route EPC

TABLE G8.15.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	3.11E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	2.18E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	1.86E-07	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	2.8E-07
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	1.10E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	1.99E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	5.73E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	2.69E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	2.85E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	6.61E-09	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	3.43E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	5.25E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	5.41E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	7.01E-09	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.4E-08
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	7.41E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.5E-07
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	1.97E-08	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	3.9E-08
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	8.75E-09	mg/kg-day	7.30E+00	$(mg/kg-day)^{-1}$	6.4E-08
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	7.25E-10	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	3.8E-11
										Total Risk	5.4E-07

R = Route EPC

TABLE G8.16.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	8.46E+03	mg/kg	8.46E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	5.94E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	5.06E+00	mg/kg	R	4.42E-09	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	6.6E-09
	Cadmium	2.98E+01	mg/kg	2.98E+01	mg/kg	R	8.67E-10	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	5.40E+02	mg/kg	5.40E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.56E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	7.33E+02	mg/kg	7.33E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	7.77E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	1.80E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	9.32E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.43E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.47E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	1.91E-01	mg/kg	R	7.76E-10	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.6E-09
	Aroclor-1254	2.02E+00	mg/kg	2.02E+00	mg/kg	R	8.21E-09	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	1.6E-08
	Aroclor-1260	5.36E-01	mg/kg	5.36E-01	mg/kg	R	2.18E-09	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	4.4E-09
	Benzo(a)pyrene	2.38E-01	mg/kg	2.38E-01	mg/kg	R	9.00E-10	mg/kg-day	7.30E+00	$(mg/kg-day)^{-1}$	6.6E-09
	Tetrachloroethene	1.97E-02	mg/kg	1.97E-02	mg/kg	R	NA	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	NA
										Total Risk	3.6E-08

R = Route EPC

TABLE G8.17.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Western Parcel
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Aluminum	8.46E+03	mg/kg	1.07E-05	mg/m^3	R	1.16E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	5.94E+00	mg/kg	7.51E-09	mg/m^3	R	8.16E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	5.06E+00	mg/kg	6.41E-09	mg/m^3	R	6.95E-12	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	1.0E-10
	Cadmium	2.98E+01	mg/kg	3.78E-08	mg/m^3	R	4.10E-11	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	2.6E-10
	Chromium III	5.40E+02	mg/kg	6.84E-07	mg/m^3	R	7.43E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	1.56E+02	mg/kg	1.97E-07	mg/m^3	R	2.14E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	9.0E-09
	Copper	7.33E+02	mg/kg	9.28E-07	mg/m^3	R	1.01E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	7.77E+01	mg/kg	9.83E-08	mg/m^3	R	1.07E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.80E-01	mg/kg	2.28E-10	mg/m^3	R	2.47E-13	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	9.32E+01	mg/kg	1.18E-07	mg/m^3	R	1.28E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Silver	1.43E+00	mg/kg	1.81E-09	mg/m^3	R	1.96E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.47E+03	mg/kg	1.86E-06	mg/m^3	R	2.02E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Aroclor-1248	1.91E-01	mg/kg	2.41E-10	mg/m^3	R	2.62E-13	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.2E-13
	Aroclor-1254	2.02E+00	mg/kg	2.55E-09	mg/m^3	R	2.77E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	5.5E-12
	Aroclor-1260	5.36E-01	mg/kg	6.78E-10	mg/m^3	R	7.36E-13	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.5E-12
	Benzo(a)pyrene	2.38E-01	mg/kg	3.01E-10	mg/m^3	R	3.27E-13	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-12
	Tetrachloroethene	1.97E-02	mg/kg	2.50E-11	mg/m^3	R	2.71E-14	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	5.4E-17
										Total Risk	9.4E-09

R = Route EPC

TABLE G8.18.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	Tetrachloroethene	1.97E-02	mg/kg	3.03E-04	mg/m^3	R	3.28E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	6.6E-10
	Toluene	3.68E-02	mg/kg	5.64E-04	mg/m^3	R	6.12E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	3.19E-02	mg/kg	4.89E-04	mg/m^3	R	5.30E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.2E-09
										Total Risk	3.8E-09

R = Route EPC

TABLE G8.19.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	9.46E-04	mg/m^3	R	1.05E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	6.98E-05	mg/m^3	R	7.73E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	5.81E-06	mg/m^3	R	6.43E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	1.30E-06	mg/m^3	R	1.44E-08	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	cis-1,2-Dichloroethene	6.60E+02	ug/l	1.43E-03	mg/m^3	R	1.58E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	9.24E-05	mg/m^3	R	1.02E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.0E-09
	trans-1,2-Dichloroethene	7.00E+00	ug/l	3.55E-05	mg/m^3	R	3.93E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	6.28E-03	mg/m^3	R	6.95E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.2E-07
										Total Risk	4.2E-07

R = Route EPC

TABLE G8.20.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	1.03E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	9.53E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	1.84E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	1.94E-10	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-11
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	2.24E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	1.14E-08	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.3E-11
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	4.30E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	7.91E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.7E-09
										Total Risk	4.8E-09

R = Route EPC

TABLE G8.21.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	3.13E-08	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-20
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	2.89E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	5.59E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	5.89E-11	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	8.1E-20
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	6.78E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	3.45E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	1.30E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	2.40E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.4E-21
										Total Risk	1.0E-19

R = Route EPC

TABLE G8.22.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Western Parcel (Outdoors)
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent/Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	1.00E+02	ug/l	3.74E-05	mg/m^3	R	4.06E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	3.44E-06	mg/m^3	R	3.74E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	6.66E-07	mg/m^3	R	7.23E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	7.02E-08	mg/m^3	R	7.62E-11	mg/kg-day	8.10E-02	$(mg/kg\text{-}day)^{-1}$	6.2E-12
	cis-1,2-Dichloroethene	6.60E+02	ug/l	8.09E-05	mg/m^3	R	8.78E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	4.11E-06	mg/m^3	R	4.46E-09	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	8.9E-12
	trans-1,2-Dichloroethene	7.00E+00	ug/l	1.55E-06	mg/m^3	R	1.69E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	2.86E-04	mg/m^3	R	3.10E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.9E-09
										Total Risk	1.9E-09

R = Route EPC

TABLE G8.23.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC. Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.23E-05	mg/m^3	R	6.34E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Anthracene	6.70E+01	mg/kg	2.83E-05	mg/m^3	R	1.47E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.90E+02	mg/kg	2.07E-04	mg/m^3	R	1.07E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE G8.24.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	2-Methylnaphthalene	5.50E+00	mg/kg	5.78E-07	mg/m^3	R	6.40E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Anthracene	6.70E+01	mg/kg	7.04E-06	mg/m^3	R	7.79E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.90E+02	mg/kg	5.15E-05	mg/m^3	R	5.70E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE G8.25.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Trespasser
Receptor Age: Adolescent (10-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	5.64E-16	mg/m^3	R	3.59E-19	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	7.9E-21
	Naphthalene	4.00E+00	ug/l	1.69E-15	mg/m^3	R	1.08E-18	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	6.00E+00	ug/l	1.19E-14	mg/m^3	R	7.57E-18	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	4.22E+01	ug/l	8.96E-15	mg/m^3	R	5.70E-18	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzene	3.18E+01	ug/l	3.00E-15	mg/m^3	R	1.91E-18	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	5.2E-20
	Chloroethane	1.06E+01	ug/l	4.36E-15	mg/m^3	R	2.78E-18	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Ethylbenzene	1.55E+01	ug/l	6.61E-15	mg/m^3	R	4.21E-18	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Methylene chloride	2.35E+01	ug/l	2.16E-15	mg/m^3	R	1.37E-18	mg/kg-day	1.65E-03	$(mg/kg\text{-}day)^{-1}$	2.3E-21
	Toluene	7.65E+00	ug/l	1.17E-14	mg/m^3	R	7.45E-18	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	4.15E+01	ug/l	5.64E-16	mg/m^3	R	3.59E-19	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.2E-21
	Vinyl chloride	2.00E+00	ug/l	2.25E-16	mg/m^3	R	1.44E-19	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	4.3E-20
	Xylenes (total)	8.00E-01	ug/l	2.45E-14	mg/m^3	R	1.56E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	1.1E-19

R = Route EPC

TABLE G8.26.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	1.40E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	8.92E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-07
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	6.18E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	3.03E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	9.99E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	2.78E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	7.60E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	6.46E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	6.81E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	4.03E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	5.18E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	3.00E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.2E-07
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	3.28E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-08
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	4.61E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.4E-08
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	1.04E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.08E-01	mg/kg	1.08E-01	mg/kg	R	4.90E-09	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	5.4E-11
										Total Risk	4.1E-07

R = Route EPC

TABLE G8.27.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	3.53E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	5.3E-09
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	8.16E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	5.15E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.8E-08
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	5.62E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-09
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	7.92E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.8E-09
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	NA	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	5.3E-08

R = Route EPC

TABLE G8.28.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Antimony	3.03E+00	mg/kg	3.84E-09	mg/m^3	R	4.25E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	2.45E-09	mg/m^3	R	2.71E-11	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	4.1E-10
	Cadmium	1.34E+01	mg/kg	1.70E-08	mg/m^3	R	1.88E-10	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-09
	Chromium III	6.57E+01	mg/kg	8.32E-08	mg/m^3	R	9.21E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	2.74E-08	mg/m^3	R	3.03E-10	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Copper	6.03E+01	mg/kg	7.63E-08	mg/m^3	R	8.45E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	2.08E-08	mg/m^3	R	2.31E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	1.77E-10	mg/m^3	R	1.96E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	1.87E-08	mg/m^3	R	2.07E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	1.11E-08	mg/m^3	R	1.22E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	1.42E-07	mg/m^3	R	1.57E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	8.23E-10	mg/m^3	R	9.11E-12	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-11
	Benzo(b)fluoranthene	7.10E-01	mg/kg	8.99E-10	mg/m^3	R	9.95E-12	mg/kg-day	3.10E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-12
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.27E-10	mg/m^3	R	1.40E-12	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-12
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.86E-11	mg/m^3	R	3.16E-13	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.34E-10	mg/m^3	R	1.49E-12	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	8.9E-15
										Total Risk	1.4E-08

R = Route EPC

TABLE G8.29.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	4.04E-05	mg/m^3	R	4.47E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.89E-04	mg/m^3	R	2.10E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-08
										Total Risk	1.3E-08

R = Route EPC

TABLE G8.30.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	1.20E-04	mg/m^3	R	3.32E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	5.64E-04	mg/m^3	R	1.56E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	9.4E-09
										Total Risk	9.4E-09

R = Route EPC

TABLE G8.31.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	2.12E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	1.35E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	9.37E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	4.59E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	1.51E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	4.21E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	1.15E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	9.78E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	1.03E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	6.10E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	7.86E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	4.55E-09	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	3.3E-08
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	4.96E-09	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.6E-09
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	6.99E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	5.1E-09
	1,2-Dichloroethene (total)	2.26E-02	mg/kg	2.26E-02	mg/kg	R	1.58E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	7.42E-10	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	8.2E-12
										Total Risk	6.2E-08

R = Route EPC
* Total hazard index is broken down by target organ in other tables.

TABLE G8.32.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Soil
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Antimony	3.03E+00	mg/kg	3.03E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	1.93E+00	mg/kg	R	2.68E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.0E-10
	Cadmium	1.34E+01	mg/kg	1.34E+01	mg/kg	R	6.18E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	6.57E+01	mg/kg	6.57E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	2.16E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	6.03E+01	mg/kg	6.03E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	1.65E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	1.40E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	1.48E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	8.73E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	1.12E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	6.50E-01	mg/kg	R	3.90E-10	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-09
	Benzo(b)fluoranthene	7.10E-01	mg/kg	7.10E-01	mg/kg	R	4.26E-10	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	3.1E-10
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	1.00E-01	mg/kg	R	6.00E-11	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-10
	1,2-Dichloroethene (tot	2.26E-02	mg/kg	2.26E-02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.06E-01	mg/kg	R	NA	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	4.0E-09

R = Route EPC

TABLE G8.33.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Antimony	3.03E+00	mg/kg	7.67E-09	mg/m^3	R	6.43E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	1.93E+00	mg/kg	4.90E-09	mg/m^3	R	4.11E-12	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	6.2E-11
	Cadmium	1.34E+01	mg/kg	3.39E-08	mg/m^3	R	2.85E-11	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	1.8E-10
	Chromium III	6.57E+01	mg/kg	1.66E-07	mg/m^3	R	1.40E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	2.16E+01	mg/kg	5.48E-08	mg/m^3	R	4.60E-11	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	1.9E-09
	Copper	6.03E+01	mg/kg	1.53E-07	mg/m^3	R	1.28E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cyanide	1.65E+01	mg/kg	4.17E-08	mg/m^3	R	3.50E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.40E-01	mg/kg	3.54E-10	mg/m^3	R	2.97E-13	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.48E+01	mg/kg	3.74E-08	mg/m^3	R	3.13E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	8.73E+00	mg/kg	2.21E-08	mg/m^3	R	1.85E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	1.12E+02	mg/kg	2.85E-07	mg/m^3	R	2.39E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzo(a)pyrene	6.50E-01	mg/kg	1.65E-09	mg/m^3	R	1.38E-12	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-12
	Benzo(b)fluoranthene	7.10E-01	mg/kg	1.80E-09	mg/m^3	R	1.51E-12	mg/kg-day	3.10E-01	$(mg/kg\text{-}day)^{-1}$	4.7E-13
	Dibenz(a,h)anthracene	1.00E-01	mg/kg	2.53E-10	mg/m^3	R	2.12E-13	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	6.6E-13
	1,2-Dichloroethene (tot	2.26E-02	mg/kg	5.72E-11	mg/m^3	R	4.79E-14	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	2.69E-10	mg/m^3	R	2.25E-13	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-15
										Total Risk	2.2E-09

R = Route EPC

TABLE G8.34.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Surface/Subsurface Soil
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,2-Dichloroethene (total)	2.26E-02	mg/kg	3.00E-03	mg/m^3	R	2.52E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	1.06E-01	mg/kg	1.41E-02	mg/m^3	R	1.18E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	7.1E-08
										Total Risk	7.1E-08

R = Route EPC

TABLE G8.35.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC. Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.97E-03	mg/m^3	R	2.18E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Anthracene	6.70E+01	mg/kg	4.55E-03	mg/m^3	R	5.04E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.90E+02	mg/kg	3.33E-02	mg/m^3	R	3.69E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE G8.36.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	4.41E-06	mg/m^3	R	1.22E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Anthracene	6.70E+01	mg/kg	1.02E-05	mg/m^3	R	2.82E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.90E+02	mg/kg	7.46E-05	mg/m^3	R	2.06E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE G8.37.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	1.14E+05	mg/kg	1.14E+05	mg/kg	R	7.98E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	1.53E+01	mg/kg	1.53E+01	mg/kg	R	1.07E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	2.25E+01	mg/kg	2.25E+01	mg/kg	R	1.57E-07	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-07
	Barium	4.88E+02	mg/kg	4.88E+02	mg/kg	R	3.41E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cadmium	2.88E+01	mg/kg	2.88E+01	mg/kg	R	2.01E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	8.46E+02	mg/kg	8.46E+02	mg/kg	R	5.91E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	8.46E+02	mg/kg	8.46E+02	mg/kg	R	5.91E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	1.19E+04	mg/kg	1.19E+04	mg/kg	R	8.34E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.92E+00	mg/kg	1.92E+00	mg/kg	R	1.34E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.73E+02	mg/kg	1.73E+02	mg/kg	R	1.21E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Thallium	6.80E-01	mg/kg	6.80E-01	mg/kg	R	4.75E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	1.31E+02	mg/kg	1.31E+02	mg/kg	R	9.18E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	3.83E+03	mg/kg	3.83E+03	mg/kg	R	2.68E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	4,4'-DDD	1.93E+01	mg/kg	1.93E+01	mg/kg	R	1.35E-07	mg/kg-day	2.40E-01	$(mg/kg\text{-}day)^{-1}$	3.2E-08
	4,4'-DDE	4.17E+00	mg/kg	4.17E+00	mg/kg	R	2.91E-08	mg/kg-day	3.40E-01	$(mg/kg\text{-}day)^{-1}$	9.9E-09
	4,4'-DDT	5.00E+00	mg/kg	5.00E+00	mg/kg	R	3.49E-08	mg/kg-day	3.40E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Aroclor-1248	2.17E-01	mg/kg	2.17E-01	mg/kg	R	1.52E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	3.0E-09
	Aroclor-1254	1.03E+00	mg/kg	1.03E+00	mg/kg	R	7.18E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Aroclor-1260	1.02E+00	mg/kg	1.02E+00	mg/kg	R	7.11E-09	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Dieldrin	3.46E-02	mg/kg	3.46E-02	mg/kg	R	2.42E-10	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	3.9E-09
	Benz(a)anthracene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.75E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Benzo(a)pyrene	1.60E+02	mg/kg	1.60E+02	mg/kg	R	1.12E-06	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	8.2E-06
	Benzo(b)fluoranthene	2.70E+02	mg/kg	2.70E+02	mg/kg	R	1.89E-06	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-06
	Benzo(k)fluoranthene	1.00E+02	mg/kg	1.00E+02	mg/kg	R	6.99E-07	mg/kg-day	7.30E-02	$(mg/kg\text{-}day)^{-1}$	5.1E-08
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	1.79E+03	mg/kg	R	1.25E-05	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.7E-07
	Carbazole	5.20E+01	mg/kg	5.20E+01	mg/kg	R	3.63E-07	mg/kg-day	2.00E-02	$(mg/kg\text{-}day)^{-1}$	7.3E-09
	Chrysene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.75E-06	mg/kg-day	7.30E-03	$(mg/kg\text{-}day)^{-1}$	1.3E-08
	Di-n-octyl phthalate	4.43E+02	mg/kg	4.43E+02	mg/kg	R	3.10E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	2.60E+01	mg/kg	R	1.82E-07	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-06
	Fluoranthene	6.50E+02	mg/kg	6.50E+02	mg/kg	R	4.54E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA

TABLE G8.37.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	9.40E+01	mg/kg	R	6.57E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.8E-07
	Phenanthrene	4.90E+02	mg/kg	4.90E+02	mg/kg	R	3.42E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Pyrene	5.00E+02	mg/kg	5.00E+02	mg/kg	R	3.49E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	1.3E-05

R = Route EPC

TABLE G8.38.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	1.14E+05	mg/kg	1.14E+05	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	1.53E+01	mg/kg	1.53E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	2.25E+01	mg/kg	2.25E+01	mg/kg	R	3.11E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	4.7E-09
	Barium	4.88E+02	mg/kg	4.88E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cadmium	2.88E+01	mg/kg	2.88E+01	mg/kg	R	1.33E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	8.46E+02	mg/kg	8.46E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	8.46E+02	mg/kg	8.46E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Copper	1.19E+04	mg/kg	1.19E+04	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.92E+00	mg/kg	1.92E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.73E+02	mg/kg	1.73E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Thallium	6.80E-01	mg/kg	6.80E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	1.31E+02	mg/kg	1.31E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	3.83E+03	mg/kg	3.83E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	4,4'-DDD	1.93E+01	mg/kg	1.93E+01	mg/kg	R	2.68E-09	mg/kg-day	2.40E-01	$(mg/kg\text{-}day)^{-1}$	6.4E-10
	4,4'-DDE	4.17E+00	mg/kg	4.17E+00	mg/kg	R	5.77E-10	mg/kg-day	3.40E-01	$(mg/kg\text{-}day)^{-1}$	2.0E-10
	4,4'-DDT	5.00E+00	mg/kg	5.00E+00	mg/kg	R	6.92E-10	mg/kg-day	3.40E-01	$(mg/kg\text{-}day)^{-1}$	2.4E-10
	Aroclor-1248	2.17E-01	mg/kg	2.17E-01	mg/kg	R	1.40E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	2.8E-10
	Aroclor-1254	1.03E+00	mg/kg	1.03E+00	mg/kg	R	6.63E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	Aroclor-1260	1.02E+00	mg/kg	1.02E+00	mg/kg	R	6.57E-10	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	1.3E-09
	Dieldrin	3.46E-02	mg/kg	3.46E-02	mg/kg	R	1.59E-11	mg/kg-day	1.60E+01	$(mg/kg\text{-}day)^{-1}$	2.6E-10
	Benz(a)anthracene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.50E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Benzo(a)pyrene	1.60E+02	mg/kg	1.60E+02	mg/kg	R	9.59E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	7.0E-07
	Benzo(b)fluoranthene	2.70E+02	mg/kg	2.70E+02	mg/kg	R	1.62E-07	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-07
	Benzo(k)fluoranthene	1.00E+02	mg/kg	1.00E+02	mg/kg	R	6.00E-08	mg/kg-day	7.30E-02	$(mg/kg\text{-}day)^{-1}$	4.4E-09
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	1.79E+03	mg/kg	R	8.24E-07	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Carbazole	5.20E+01	mg/kg	5.20E+01	mg/kg	R	2.40E-08	mg/kg-day	2.00E-02	$(mg/kg\text{-}day)^{-1}$	4.8E-10
	Chrysene	2.50E+02	mg/kg	2.50E+02	mg/kg	R	1.50E-07	mg/kg-day	7.30E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Di-n-octyl phthalate	4.43E+02	mg/kg	4.43E+02	mg/kg	R	2.04E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	2.60E+01	mg/kg	R	1.56E-08	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-07
	Fluoranthene	6.50E+02	mg/kg	6.50E+02	mg/kg	R	3.90E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA

TABLE G8.38.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Solid waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	9.40E+01	mg/kg	R	5.64E-08	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	4.1E-08
	Phenanthrene	4.90E+02	mg/kg	4.90E+02	mg/kg	R	2.94E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Pyrene	5.00E+02	mg/kg	5.00E+02	mg/kg	R	3.00E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	1.1E-06

R = Route EPC

TABLE G8.39.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Aluminum	1.14E+05	mg/kg	2.89E-04	mg/m^3	R	2.42E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Antimony	1.53E+01	mg/kg	3.88E-08	mg/m^3	R	3.25E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	2.25E+01	mg/kg	5.70E-08	mg/m^3	R	4.78E-11	mg/kg-day	1.51E+01	$(mg/kg\text{-}day)^{-1}$	7.2E-10
	Barium	4.88E+02	mg/kg	1.23E-06	mg/m^3	R	1.04E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Cadmium	2.88E+01	mg/kg	7.29E-08	mg/m^3	R	6.12E-11	mg/kg-day	6.30E+00	$(mg/kg\text{-}day)^{-1}$	3.9E-10
	Chromium III	8.46E+02	mg/kg	2.14E-06	mg/m^3	R	1.80E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	8.46E+02	mg/kg	2.14E-06	mg/m^3	R	1.80E-09	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	7.5E-08
	Copper	1.19E+04	mg/kg	3.02E-05	mg/m^3	R	2.53E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	1.92E+00	mg/kg	4.86E-09	mg/m^3	R	4.08E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Nickel	1.73E+02	mg/kg	4.39E-07	mg/m^3	R	3.68E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Thallium	6.80E-01	mg/kg	1.72E-09	mg/m^3	R	1.44E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	1.31E+02	mg/kg	3.33E-07	mg/m^3	R	2.79E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Zinc	3.83E+03	mg/kg	9.69E-06	mg/m^3	R	8.13E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	4,4'-DDD	1.93E+01	mg/kg	4.90E-08	mg/m^3	R	4.11E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	4,4'-DDE	4.17E+00	mg/kg	1.06E-08	mg/m^3	R	8.85E-12	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	4,4'-DDT	5.00E+00	mg/kg	1.27E-08	mg/m^3	R	1.06E-11	mg/kg-day	3.40E-01	$(mg/kg\text{-}day)^{-1}$	3.6E-12
	Aroclor-1248	2.17E-01	mg/kg	5.49E-10	mg/m^3	R	4.61E-13	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	9.2E-13
	Aroclor-1254	1.03E+00	mg/kg	2.60E-09	mg/m^3	R	2.18E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.4E-12
	Aroclor-1260	1.02E+00	mg/kg	2.57E-09	mg/m^3	R	2.16E-12	mg/kg-day	2.00E+00	$(mg/kg\text{-}day)^{-1}$	4.3E-12
	Dieldrin	3.46E-02	mg/kg	8.75E-11	mg/m^3	R	7.34E-14	mg/kg-day	1.61E+01	$(mg/kg\text{-}day)^{-1}$	1.2E-12
	Benz(a)anthracene	2.50E+02	mg/kg	6.33E-07	mg/m^3	R	5.31E-10	mg/kg-day	3.10E-01	$(mg/kg\text{-}day)^{-1}$	1.6E-10
	Benzo(a)pyrene	1.60E+02	mg/kg	4.05E-07	mg/m^3	R	3.40E-10	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Benzo(b)fluoranthene	2.70E+02	mg/kg	6.84E-07	mg/m^3	R	5.73E-10	mg/kg-day	3.10E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-10
	Benzo(k)fluoranthene	1.00E+02	mg/kg	2.53E-07	mg/m^3	R	2.12E-10	mg/kg-day	3.10E-02	$(mg/kg\text{-}day)^{-1}$	6.6E-12
	bis(2-Ethylhexyl)phthalate	1.79E+03	mg/kg	4.52E-06	mg/m^3	R	3.79E-09	mg/kg-day	1.40E-02	$(mg/kg\text{-}day)^{-1}$	5.3E-11
	Carbazole	5.20E+01	mg/kg	1.32E-07	mg/m^3	R	1.10E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chrysene	2.50E+02	mg/kg	6.33E-07	mg/m^3	R	5.31E-10	mg/kg-day	3.10E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-12
	Di-n-octyl phthalate	4.43E+02	mg/kg	1.12E-06	mg/m^3	R	9.41E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Dibenz(a,h)anthracene	2.60E+01	mg/kg	6.58E-08	mg/m^3	R	5.52E-11	mg/kg-day	3.10E+00	$(mg/kg\text{-}day)^{-1}$	1.7E-10

TABLE G8.39.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Particulates
Exposure Point: Eastern Parcel
Receptor Population: Construction Workers
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Fluoranthene	6.50E+02	mg/kg	1.65E-06	mg/m^3	R	1.38E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Indeno(1,2,3-cd)pyrene	9.40E+01	mg/kg	2.38E-07	mg/m^3	R	2.00E-10	mg/kg-day	3.10E-01	$(mg/kg\text{-}day)^{-1}$	6.2E-11
	Phenanthrene	4.90E+02	mg/kg	1.24E-06	mg/m^3	R	1.04E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Pyrene	5.00E+02	mg/kg	1.27E-06	mg/m^3	R	1.06E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	7.8E-08

R = Route EPC

TABLE G8.40.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Solid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC. Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	2-Methylnaphthalene	2.90E+01	mg/kg	1.10E-04	mg/m^3	R	9.25E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Anthracene	6.70E+01	mg/kg	2.55E-04	mg/m^3	R	2.14E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	4.90E+02	mg/kg	1.86E-03	mg/m^3	R	1.56E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE G8.41.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Indoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	9.06E-14	mg/m^3	R	1.00E-15	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-17
	Naphthalene	4.00E+00	ug/l	2.72E-13	mg/m^3	R	3.01E-15	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	6.00E+00	ug/l	1.91E-12	mg/m^3	R	2.11E-14	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	4.22E+01	ug/l	1.44E-12	mg/m^3	R	1.59E-14	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzene	3.18E+01	ug/l	4.82E-13	mg/m^3	R	5.33E-15	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	1.4E-16
	Chloroethane	1.06E+01	ug/l	7.01E-13	mg/m^3	R	7.76E-15	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Ethylbenzene	1.55E+01	ug/l	1.06E-12	mg/m^3	R	1.18E-14	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Methylene chloride	2.35E+01	ug/l	3.47E-13	mg/m^3	R	3.84E-15	mg/kg-day	1.65E-03	$(mg/kg\text{-}day)^{-1}$	6.3E-18
	Toluene	7.65E+00	ug/l	1.88E-12	mg/m^3	R	2.08E-14	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	4.15E+01	ug/l	9.06E-14	mg/m^3	R	1.00E-15	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	6.0E-18
	Vinyl chloride	2.00E+00	ug/l	3.62E-14	mg/m^3	R	4.01E-16	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.2E-16
	Xylenes (total)	8.00E-01	ug/l	3.95E-12	mg/m^3	R	4.37E-14	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	3.0E-16

R = Route EPC

TABLE G8.42.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	2.03E-16	mg/m^3	R	5.62E-19	mg/kg-day	2.20E-02	$(mg/kg-day)^{-1}$	1.2E-20
	Naphthalene	4.00E+00	ug/l	6.09E-16	mg/m^3	R	1.69E-18	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Phenanthrene	6.00E+00	ug/l	4.28E-15	mg/m^3	R	1.18E-17	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Acetone	4.22E+01	ug/l	3.22E-15	mg/m^3	R	8.93E-18	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Benzene	3.18E+01	ug/l	1.08E-15	mg/m^3	R	2.99E-18	mg/kg-day	2.70E-02	$(mg/kg-day)^{-1}$	8.1E-20
	Chloroethane	1.06E+01	ug/l	1.57E-15	mg/m^3	R	4.35E-18	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Ethylbenzene	1.55E+01	ug/l	2.38E-15	mg/m^3	R	6.59E-18	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Methylene chloride	2.35E+01	ug/l	7.76E-16	mg/m^3	R	2.15E-18	mg/kg-day	1.65E-03	$(mg/kg-day)^{-1}$	3.5E-21
	Toluene	7.65E+00	ug/l	4.21E-15	mg/m^3	R	1.16E-17	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	4.15E+01	ug/l	2.03E-16	mg/m^3	R	5.62E-19	mg/kg-day	6.00E-03	$(mg/kg-day)^{-1}$	3.4E-21
	Vinyl chloride	2.00E+00	ug/l	8.12E-17	mg/m^3	R	2.25E-19	mg/kg-day	3.00E-01	$(mg/kg-day)^{-1}$	6.7E-20
	Xylenes (total)	8.00E-01	ug/l	8.84E-15	mg/m^3	R	2.45E-17	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
										Total Risk	1.7E-19

R = Route EPC

TABLE G8.43.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Liquid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	2.80E+04	ug/l	2.80E+04	ug/l	R	1.29E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Antimony	4.67E+01	ug/l	4.67E+01	ug/l	R	2.16E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	1.65E+01	ug/l	1.65E+01	ug/l	R	7.59E-09	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	1.1E-08
	Barium	8.24E+02	ug/l	8.24E+02	ug/l	R	3.80E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Cadmium	1.36E+02	ug/l	1.36E+02	ug/l	R	6.27E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	1.14E+04	ug/l	1.14E+04	ug/l	R	5.26E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	1.14E+04	ug/l	1.14E+04	ug/l	R	1.05E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	4.47E+03	ug/l	4.47E+03	ug/l	R	2.06E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Lead	3.42E+02	ug/l	3.42E+02	ug/l	R	6.31E-10	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	4.54E+02	ug/l	4.54E+02	ug/l	R	2.09E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Mercury	7.80E-01	ug/l	7.80E-01	ug/l	R	3.60E-10	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	1.20E+02	ug/l	1.20E+02	ug/l	R	5.54E-09	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Thallium	2.66E+00	ug/l	2.66E+00	ug/l	R	1.23E-09	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Vanadium	5.09E+02	ug/l	5.09E+02	ug/l	R	2.35E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Zinc	5.50E+03	ug/l	5.50E+03	ug/l	R	1.52E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	4,4'-DDD	4.49E+00	ug/l	4.49E+00	ug/l	R	2.90E-06	mg/kg-day	2.40E-01	$(mg/kg-day)^{-1}$	6.9E-07
	4,4'-DDE	2.96E+00	ug/l	2.96E+00	ug/l	R	1.61E-06	mg/kg-day	3.40E-01	$(mg/kg-day)^{-1}$	5.5E-07
	4,4'-DDT	3.38E+00	ug/l	3.38E+00	ug/l	R	4.20E-06	mg/kg-day	3.40E-01	$(mg/kg-day)^{-1}$	1.4E-06
	Aroclor-1260	9.49E+00	ug/l	9.49E+00	ug/l	R	2.14E-05	mg/kg-day	2.00E+00	$(mg/kg-day)^{-1}$	4.3E-05
	Endrin aldehyde	6.90E-01	ug/l	6.90E-01	ug/l	R	3.76E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Heptachlor epoxide	3.44E-02	ug/l	3.44E-02	ug/l	R	1.36E-09	mg/kg-day	9.10E+00	$(mg/kg-day)^{-1}$	1.2E-08
	1,4-Dichlorobenzene	2.00E+00	ug/l	2.00E+00	ug/l	R	9.55E-08	mg/kg-day	2.40E-02	$(mg/kg-day)^{-1}$	2.3E-09
	4-Methylphenol	4.80E+01	ug/l	4.80E+01	ug/l	R	2.49E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Benz(a)anthracene	4.50E+01	ug/l	4.50E+01	ug/l	R	4.64E-05	mg/kg-day	7.30E-01	$(mg/kg-day)^{-1}$	3.4E-05
	Benzo(a)pyrene	4.10E+01	ug/l	4.10E+01	ug/l	R	7.32E-05	mg/kg-day	7.30E+00	$(mg/kg-day)^{-1}$	5.3E-04
	Benzo(b)fluoranthene	6.60E+01	ug/l	6.60E+01	ug/l	R	1.18E-04	mg/kg-day	7.30E-01	$(mg/kg-day)^{-1}$	8.6E-05
	Benzo(k)fluoranthene	2.80E+01	ug/l	2.80E+01	ug/l	R	5.00E-05	mg/kg-day	7.30E-02	$(mg/kg-day)^{-1}$	3.6E-06
	bis(2-Ethylhexyl)phthalate	3.00E+02	ug/l	3.00E+02	ug/l	R	2.16E-05	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	3.0E-07
	Carbazole	1.10E+01	ug/l	1.10E+01	ug/l	R	4.42E-07	mg/kg-day	2.00E-02	$(mg/kg-day)^{-1}$	8.8E-09

TABLE G8.43.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Liquid Waste
Exposure Point: Eastern Parcel
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
	Chrysene	5.40E+01	ug/l	5.40E+01	ug/l	R	5.57E-05	mg/kg-day	7.30E-03	$(mg/kg\text{-}day)^{-1}$	4.1E-07
	Dibenz(a,h)anthracene	7.00E+00	ug/l	7.00E+00	ug/l	R	3.32E-05	mg/kg-day	7.30E+00	$(mg/kg\text{-}day)^{-1}$	2.4E-04
	Dibenzofuran	4.00E+00	ug/l	4.00E+00	ug/l	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Indeno(1,2,3-cd)pyrene	2.40E+01	ug/l	2.40E+01	ug/l	R	7.92E-05	mg/kg-day	7.30E-01	$(mg/kg\text{-}day)^{-1}$	5.8E-05
	Naphthalene	6.00E+00	ug/l	6.00E+00	ug/l	R	2.82E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Pentachlorophenol	1.30E+01	ug/l	1.30E+01	ug/l	R	1.38E-05	mg/kg-day	1.20E-01	$(mg/kg\text{-}day)^{-1}$	1.7E-06
	Phenanthrene	4.22E+01	ug/l	4.22E+01	ug/l	R	8.94E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Pyrene	8.00E+01	ug/l	8.00E+01	ug/l	R	2.67E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	3.18E+01	ug/l	3.18E+01	ug/l	R	9.31E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzene	1.06E+01	ug/l	1.06E+01	ug/l	R	1.29E-07	mg/kg-day	5.50E-02	$(mg/kg\text{-}day)^{-1}$	7.1E-09
	Chloroethane	1.55E+01	ug/l	1.55E+01	ug/l	R	7.02E-08	mg/kg-day	2.90E-03	$(mg/kg\text{-}day)^{-1}$	2.0E-10
	Ethylbenzene	2.35E+01	ug/l	2.35E+01	ug/l	R	7.46E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Methylene chloride	7.65E+00	ug/l	7.65E+00	ug/l	R	2.07E-08	mg/kg-day	7.50E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-10
	Toluene	4.15E+01	ug/l	4.15E+01	ug/l	R	1.10E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	2.00E+00	ug/l	2.00E+00	ug/l	R	2.29E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.5E-10
	Vinyl chloride	8.00E-01	ug/l	8.00E-01	ug/l	R	3.30E-09	mg/kg-day	1.90E+00		6.3E-09
	Xylenes (total)	8.71E+01	ug/l	8.71E+01	ug/l	R	4.16E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	1.0E-03

R = Route EPC

TABLE G8.44.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Liquid Waste
Exposure Medium: Vapors
Exposure Point: Eastern Parcel (Outdoors)
Receptor Population: Construction Worker
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,4-Dichlorobenzene	2.00E+00	ug/l	5.07E-15	mg/m^3	R	4.26E-18	mg/kg-day	2.20E-02	$(mg/kg\text{-}day)^{-1}$	9.4E-20
	Naphthalene	4.00E+00	ug/l	1.52E-14	mg/m^3	R	1.28E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Phenanthrene	6.00E+00	ug/l	1.07E-13	mg/m^3	R	8.97E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Acetone	4.22E+01	ug/l	8.06E-14	mg/m^3	R	6.76E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Benzene	3.18E+01	ug/l	2.70E-14	mg/m^3	R	2.26E-17	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	6.1E-19
	Chloroethane	1.06E+01	ug/l	3.93E-14	mg/m^3	R	3.29E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Ethylbenzene	1.55E+01	ug/l	5.95E-14	mg/m^3	R	4.99E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Methylene chloride	2.35E+01	ug/l	1.94E-14	mg/m^3	R	1.63E-17	mg/kg-day	1.65E-03	$(mg/kg\text{-}day)^{-1}$	2.7E-20
	Toluene	7.65E+00	ug/l	1.05E-13	mg/m^3	R	8.83E-17	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	4.15E+01	ug/l	5.07E-15	mg/m^3	R	4.26E-18	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	2.6E-20
	Vinyl chloride	2.00E+00	ug/l	2.03E-15	mg/m^3	R	1.70E-18	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-19
	Xylenes (total)	8.00E-01	ug/l	2.21E-13	mg/m^3	R	1.85E-16	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	1.3E-18

R = Route EPC

TABLE G8.45.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Indoors)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	6.50E-04	mg/m^3	R	8.55E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	2.08E-04	mg/m^3	R	2.73E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	6.69E-04	mg/m^3	R	8.80E-05	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.5E-05
	Chlorobenzene	1.40E+01	ug/l	1.97E-04	mg/m^3	R	2.59E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	4.59E-04	mg/m^3	R	6.04E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	3.64E-04	mg/m^3	R	4.79E-05	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	9.6E-08
	Trichloroethene	2.97E+01	ug/l	1.33E-03	mg/m^3	R	1.75E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.0E-06
	Vinyl chloride	4.23E+01	ug/l	7.55E-03	mg/m^3	R	9.93E-04	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.0E-04
										Total Risk	3.1E-04

R = Route EPC

TABLE G8.46.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Indoors)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	6.50E-04	mg/m^3	R	7.95E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	2.08E-04	mg/m^3	R	2.54E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	6.69E-04	mg/m^3	R	8.18E-08	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
	Chlorobenzene	1.40E+01	ug/l	1.97E-04	mg/m^3	R	2.40E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	4.59E-04	mg/m^3	R	5.61E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	3.64E-04	mg/m^3	R	4.45E-08	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	8.9E-11
	Trichloroethene	2.97E+01	ug/l	1.33E-03	mg/m^3	R	1.62E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	9.7E-10
	Vinyl chloride	4.23E+01	ug/l	7.55E-03	mg/m^3	R	9.23E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	2.8E-07
										Total Risk	2.9E-07

R = Route EPC

TABLE G8.47.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Outdoors)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	3.65E-06	mg/m^3	R	4.80E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	1.51E-06	mg/m^3	R	1.99E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	3.41E-06	mg/m^3	R	4.49E-08	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	7.9E-09
	Chlorobenzene	1.40E+01	ug/l	1.87E-06	mg/m^3	R	2.46E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.93E-06	mg/m^3	R	5.17E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	2.23E-06	mg/m^3	R	2.93E-08	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	5.9E-11
	Trichloroethene	2.97E+01	ug/l	8.73E-06	mg/m^3	R	1.15E-07	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	6.9E-10
	Vinyl chloride	4.23E+01	ug/l	3.39E-05	mg/m^3	R	4.46E-07	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.3E-07
										Total Risk	1.4E-07

R = Route EPC

TABLE G8.48.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Outdoors)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	3.65E-06	mg/m^3	R	5.14E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	1.51E-06	mg/m^3	R	2.13E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	3.41E-06	mg/m^3	R	4.81E-09	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	8.4E-10
	Chlorobenzene	1.40E+01	ug/l	1.87E-06	mg/m^3	R	2.64E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	3.93E-06	mg/m^3	R	5.54E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	2.23E-06	mg/m^3	R	3.14E-09	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	6.3E-12
	Trichloroethene	2.97E+01	ug/l	8.73E-06	mg/m^3	R	1.23E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	7.4E-11
	Vinyl chloride	4.23E+01	ug/l	3.39E-05	mg/m^3	R	4.78E-08	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-08
										Total Risk	1.5E-08

R = Route EPC

TABLE G8.49.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Woodward Parkway School)
Receptor Population: School Child
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	2.01E-04	mg/m^3	R	9.93E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	6.44E-05	mg/m^3	R	3.18E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	2.05E-04	mg/m^3	R	1.01E-06	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-07
	Chlorobenzene	1.40E+01	ug/l	6.10E-05	mg/m^3	R	3.01E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.42E-04	mg/m^3	R	7.03E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	1.13E-04	mg/m^3	R	5.59E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.1E-09
	Trichloroethene	2.97E+01	ug/l	4.10E-04	mg/m^3	R	2.02E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Vinyl chloride	4.23E+01	ug/l	2.29E-03	mg/m^3	R	1.13E-05	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	3.4E-06
										Total Risk	3.6E-06

R = Route EPC

TABLE G8.50.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Woodward Parkway School)
Receptor Population: School Employee
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1,1-Trichloroethane	8.30E+00	ug/l	2.01E-04	mg/m^3	R	1.48E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	6.44E-05	mg/m^3	R	4.75E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	2.05E-04	mg/m^3	R	1.52E-06	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	2.7E-07
	Chlorobenzene	1.40E+01	ug/l	6.10E-05	mg/m^3	R	4.50E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	1.42E-04	mg/m^3	R	1.05E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	1.13E-04	mg/m^3	R	8.35E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.7E-09
	Trichloroethene	2.97E+01	ug/l	4.10E-04	mg/m^3	R	3.03E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.8E-08
	Vinyl chloride	4.23E+01	ug/l	2.29E-03	mg/m^3	R	1.69E-05	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	5.1E-06
										Total Risk	5.4E-06

R = Route EPC

TABLE G8.51.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	7.59E-06	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	1.1E-05
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	3.30E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	1.32E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	2.19E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	4.92E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	4.51E-05	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	2.7E-05
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	3.50E-05	mg/kg-day	9.10E-02	$(mg/kg-day)^{-1}$	3.2E-06
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	3.23E-05	mg/kg-day	5.50E-02	$(mg/kg-day)^{-1}$	1.8E-06
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	4.05E-06	mg/kg-day	1.30E-01	$(mg/kg-day)^{-1}$	5.3E-07
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	9.33E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	4.42E-05	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	2.3E-06
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	6.08E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	trans-1,2-Dichloroethene	2.85E+01	ug/l	2.85E+01	ug/l	R	1.16E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	3.00E-03	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	3.3E-05
										Total Risk	7.9E-05

R = Route EPC

TABLE G8.52.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	2.23E-08	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	3.4E-08
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	9.72E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	7.75E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	6.43E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	3.81E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	6.19E-06	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	3.7E-06
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	1.61E-06	mg/kg-day	9.10E-02	$(mg/kg-day)^{-1}$	1.5E-07
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	5.16E-06	mg/kg-day	5.50E-02	$(mg/kg-day)^{-1}$	2.8E-07
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	1.11E-06	mg/kg-day	1.30E-01	$(mg/kg-day)^{-1}$	1.4E-07
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	8.00E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	2.84E-05	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	1.5E-06
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	2.27E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	trans-1,2-Dichloroethen	2.85E+01	ug/l	2.85E+01	ug/l	R	9.92E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	5.13E-04	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	5.6E-06
										Total Risk	1.1E-05

R = Route EPC

TABLE G8.53.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	1.54E-06	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	2.3E-06
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	6.70E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	2.67E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	4.43E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	9.97E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	9.14E-06	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	5.5E-06
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	7.09E-06	mg/kg-day	9.10E-02	$(mg/kg-day)^{-1}$	6.4E-07
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	6.55E-06	mg/kg-day	5.50E-02	$(mg/kg-day)^{-1}$	3.6E-07
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	8.22E-07	mg/kg-day	1.30E-01	$(mg/kg-day)^{-1}$	1.1E-07
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	1.89E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	8.96E-06	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	4.7E-07
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	1.23E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	trans-1,2-Dichloroethen	2.85E+01	ug/l	2.85E+01	ug/l	R	2.34E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	6.08E-04	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	6.7E-06
										Total Risk	1.6E-05

R = Route EPC

TABLE G8.54.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Arsenic	1.87E+00	ug/l	1.87E+00	ug/l	R	4.95E-09	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	7.4E-09
	Chromium III	8.15E+00	ug/l	8.15E+00	ug/l	R	2.15E-08	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	3.25E+01	ug/l	3.25E+01	ug/l	R	1.71E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	5.39E+02	ug/l	5.39E+02	ug/l	R	1.42E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	1.21E+01	ug/l	1.21E+01	ug/l	R	9.68E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	1.11E+01	ug/l	R	1.58E-06	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	9.5E-07
	1,2-Dichloroethane	8.62E+00	ug/l	8.62E+00	ug/l	R	4.10E-07	mg/kg-day	9.10E-02	$(mg/kg-day)^{-1}$	3.7E-08
	Benzene	7.97E+00	ug/l	7.97E+00	ug/l	R	1.31E-06	mg/kg-day	5.50E-02	$(mg/kg-day)^{-1}$	7.2E-08
	Carbon tetrachloride	1.00E+00	ug/l	1.00E+00	ug/l	R	2.81E-07	mg/kg-day	1.30E-01	$(mg/kg-day)^{-1}$	3.7E-08
	cis-1,2-Dichloroethene	2.30E+01	ug/l	2.30E+01	ug/l	R	2.04E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	1.09E+01	ug/l	R	7.22E-06	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	3.8E-07
	Toluene	1.50E+01	ug/l	1.50E+01	ug/l	R	5.78E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	trans-1,2-Dichloroethen	2.85E+01	ug/l	2.85E+01	ug/l	R	2.52E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	7.40E+02	ug/l	R	1.30E-04	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	1.4E-06
										Total Risk	2.9E-06

R = Route EPC

TABLE G8.55.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1-Dichloroethane	1.21E+01	ug/l	6.07E-03	mg/m^3	R	1.10E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	5.56E-03	mg/m^3	R	1.01E-05	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.8E-06
	1,2-Dichloroethane	8.62E+00	ug/l	4.31E-03	mg/m^3	R	7.79E-06	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	7.1E-07
	Benzene	7.97E+00	ug/l	3.98E-03	mg/m^3	R	7.20E-06	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-07
	Carbon tetrachloride	1.00E+00	ug/l	5.00E-04	mg/m^3	R	9.04E-07	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	4.8E-08
	cis-1,2-Dichloroethene	2.30E+01	ug/l	1.15E-02	mg/m^3	R	2.08E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	5.45E-03	mg/m^3	R	9.85E-06	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	2.0E-08
	Toluene	1.50E+01	ug/l	7.50E-03	mg/m^3	R	1.36E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	trans-1,2-Dichloroethene	2.85E+01	ug/l	1.43E-02	mg/m^3	R	2.58E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	3.70E-01	mg/m^3	R	6.69E-04	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	4.0E-06
										Total Risk	6.7E-06

R = Route EPC

TABLE G8.56.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (vapors)	1,1-Dichloroethane	1.21E+01	ug/l	6.07E-03	mg/m^3	R	8.90E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	1.11E+01	ug/l	5.56E-03	mg/m^3	R	8.16E-07	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.4E-07
	1,2-Dichloroethane	8.62E+00	ug/l	4.31E-03	mg/m^3	R	6.33E-07	mg/kg-day	9.10E-02	$(mg/kg\text{-}day)^{-1}$	5.8E-08
	Benzene	7.97E+00	ug/l	3.98E-03	mg/m^3	R	5.85E-07	mg/kg-day	2.70E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-08
	Carbon tetrachloride	1.00E+00	ug/l	5.00E-04	mg/m^3	R	7.34E-08	mg/kg-day	5.30E-02	$(mg/kg\text{-}day)^{-1}$	3.9E-09
	cis-1,2-Dichloroethene	2.30E+01	ug/l	1.15E-02	mg/m^3	R	1.69E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	1.09E+01	ug/l	5.45E-03	mg/m^3	R	8.00E-07	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	1.6E-09
	Toluene	1.50E+01	ug/l	7.50E-03	mg/m^3	R	1.10E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	trans-1,2-Dichloroethene	2.85E+01	ug/l	1.43E-02	mg/m^3	R	2.09E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Trichloroethene	7.40E+02	ug/l	3.70E-01	mg/m^3	R	5.43E-05	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	3.3E-07
										Total Risk	5.5E-07

R = Route EPC

TABLE G8.57.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Arsenic	2.89E+00	ug/l	2.89E+00	ug/l	R	1.24E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.9E-08
	Cadmium	1.15E+01	ug/l	1.15E+01	ug/l	R	4.92E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	2.55E+01	ug/l	2.55E+01	ug/l	R	1.10E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	4.94E+01	ug/l	4.94E+01	ug/l	R	2.12E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	3.00E-01	ug/l	3.00E-01	ug/l	R	1.29E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	7.9E-12
	Dibromochloromethane	8.00E-01	ug/l	8.00E-01	ug/l	R	3.43E-09	mg/kg-day	8.40E-02	$(mg/kg\text{-}day)^{-1}$	2.9E-10
	Tetrachloroethene	2.00E+00	ug/l	2.00E+00	ug/l	R	8.58E-09	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	4.5E-10
	Trichloroethene	4.00E+00	ug/l	4.00E+00	ug/l	R	1.72E-08	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	1.9E-10
										Total Risk	2.0E-08

R = Route EPC

TABLE G8.58.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Surface Water
Exposure Medium: Surface Water
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Arsenic	2.89E+00	ug/l	2.89E+00	ug/l	R	7.79E-09	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Cadmium	1.15E+01	ug/l	1.15E+01	ug/l	R	3.09E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	2.55E+01	ug/l	2.55E+01	ug/l	R	6.90E-08	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	4.94E+01	ug/l	4.94E+01	ug/l	R	2.67E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chloroform	3.00E-01	ug/l	3.00E-01	ug/l	R	9.39E-09	mg/kg-day	6.10E-03	$(mg/kg\text{-}day)^{-1}$	5.7E-11
	Dibromochloromethane	8.00E-01	ug/l	8.00E-01	ug/l	R	1.19E-08	mg/kg-day	8.40E-02	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	Tetrachloroethene	2.00E+00	ug/l	2.00E+00	ug/l	R	4.01E-07	mg/kg-day	5.20E-02	$(mg/kg\text{-}day)^{-1}$	2.1E-08
	Trichloroethene	4.00E+00	ug/l	4.00E+00	ug/l	R	2.33E-07	mg/kg-day	1.10E-02	$(mg/kg\text{-}day)^{-1}$	2.6E-09
										Total Risk	3.6E-08

R = Route EPC

TABLE G8.59.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	8.21E+03	mg/kg	8.21E+03	mg/kg	R	3.52E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	9.76E+00	mg/kg	9.76E+00	mg/kg	R	4.19E-08	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	6.3E-08
	Cadmium	1.64E+02	mg/kg	1.64E+02	mg/kg	R	7.02E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	3.11E+02	mg/kg	3.11E+02	mg/kg	R	1.34E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	4.20E+02	mg/kg	4.20E+02	mg/kg	R	1.80E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Manganese	2.09E+03	mg/kg	2.09E+03	mg/kg	R	8.97E-06	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	3.10E-01	mg/kg	3.10E-01	mg/kg	R	1.33E-09	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	4.70E+01	mg/kg	4.70E+01	mg/kg	R	2.02E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	6.3E-08

R = Route EPC

TABLE G8.60.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Sediment
Exposure Medium: Sediment
Exposure Point: Massapequa Preserve
Receptor Population: Swimmer
Receptor Age: Pre-Adolescent (6-12 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	8.21E+03	mg/kg	8.21E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Arsenic	9.76E+00	mg/kg	9.76E+00	mg/kg	R	6.77E-10	mg/kg-day	1.50E+00	$(mg/kg\text{-}day)^{-1}$	1.0E-09
	Cadmium	1.64E+02	mg/kg	1.64E+02	mg/kg	R	3.78E-10	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium III	3.11E+02	mg/kg	3.11E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	4.20E+02	mg/kg	4.20E+02	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Manganese	2.09E+03	mg/kg	2.09E+03	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Mercury	3.10E-01	mg/kg	3.10E-01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Vanadium	4.70E+01	mg/kg	4.70E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	1.0E-09

R = Route EPC

TABLE G8.61.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	1.62E-02	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	8.54E-06	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	1.3E-05
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	5.11E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	4.72E+02	ug/l	2.82E+02	ug/l	R	1.14E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	2.82E+02	ug/l	4.72E+02	ug/l	R	1.91E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	3.46E-02	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	4.14E-07	mg/kg-day	1.60E+01	$(mg/kg-day)^{-1}$	6.6E-06
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	1.47E-07	mg/kg-day	9.10E+00	$(mg/kg-day)^{-1}$	1.3E-06
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	2.92E-05	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	4.1E-07
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	1.62E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	3.37E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	3.24E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	1.89E-05	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	1.1E-05
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	5.68E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	1.01E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	2.10E-05	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	1.1E-06
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	1.20E-04	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	1.3E-06
	Vinyl Chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	1.72E-04	mg/kg-day	1.90E+00	$(mg/kg-day)^{-1}$	3.3E-04
										Total Risk	3.6E-04

R = Route EPC

TABLE G8.62.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	5.20E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	2.75E-08	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	4.1E-08
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	1.64E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	4.72E+02	ug/l	2.82E+02	ug/l	R	3.67E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	2.82E+02	ug/l	4.72E+02	ug/l	R	1.23E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	1.11E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	3.88E-07	mg/kg-day	1.60E+01	$(mg/kg-day)^{-1}$	6.2E-06
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	9.94E-08	mg/kg-day	9.10E+00	$(mg/kg-day)^{-1}$	9.0E-07
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	3.61E-05	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	5.1E-07
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	8.21E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	6.79E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	2.74E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	2.84E-06	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	1.7E-06
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	2.42E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	9.51E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	1.47E-05	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	7.7E-07
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	2.25E-05	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	2.5E-07
	Vinyl Chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	9.43E-06	mg/kg-day	1.90E+00	$(mg/kg-day)^{-1}$	1.8E-05
										Total Risk	2.8E-05

R = Route EPC

TABLE G8.63.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Child (1-6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,1-Trichloroethane	8.30E+00	ug/l	4.10E+00	ug/l	R	5.40E-02	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	6.00E+00	ug/l	4.88E-03	ug/l	R	6.41E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	8.18E-02	ug/l	R	1.08E-03	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	1.9E-04
	Chlorobenzene	1.40E+01	ug/l	1.56E-01	ug/l	R	2.05E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.10E-01	ug/l	R	2.76E-03	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	1.93E-01	ug/l	R	2.53E-03	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	5.1E-06
	Trichloroethene	2.97E+01	ug/l	1.55E-04	ug/l	R	2.04E-06	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.2E-08
	Vinyl Chloride	4.23E+01	ug/l	2.35E-02	ug/l	R	3.09E-04	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	9.3E-05
										Total Risk	2.9E-04

R = Route EPC

TABLE G8.64.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	3.28E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	1.73E-06	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	2.6E-06
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	1.04E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	4.72E+02	ug/l	2.82E+02	ug/l	R	2.31E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	2.82E+02	ug/l	4.72E+02	ug/l	R	3.88E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	7.01E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	8.40E-08	mg/kg-day	1.60E+01	$(mg/kg-day)^{-1}$	1.3E-06
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	2.97E-08	mg/kg-day	9.10E+00	$(mg/kg-day)^{-1}$	2.7E-07
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	5.92E-06	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	8.3E-08
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	3.29E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	6.82E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	6.58E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	3.84E-06	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	2.3E-06
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	1.15E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	2.05E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	4.26E-06	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	2.2E-07
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	2.44E-05	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	2.7E-07
	Vinyl Chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	3.48E-05	mg/kg-day	1.90E+00	$(mg/kg-day)^{-1}$	6.6E-05
										Total Risk	7.3E-05

R = Route EPC

TABLE G8.65.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Aluminum	3.99E+03	ug/l	3.99E+03	ug/l	R	1.06E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	2.11E+00	ug/l	2.11E+00	ug/l	R	5.61E-09	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	8.4E-09
	Cadmium	1.26E+02	ug/l	1.26E+02	ug/l	R	3.36E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	4.72E+02	ug/l	2.82E+02	ug/l	R	7.50E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	2.82E+02	ug/l	4.72E+02	ug/l	R	2.51E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	8.53E+03	ug/l	8.53E+03	ug/l	R	2.27E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Dieldrin	1.02E-01	ug/l	1.02E-01	ug/l	R	9.11E-08	mg/kg-day	1.60E+01	$(mg/kg-day)^{-1}$	1.5E-06
	Heptachlor epoxide	3.62E-02	ug/l	3.62E-02	ug/l	R	2.33E-08	mg/kg-day	9.10E+00	$(mg/kg-day)^{-1}$	2.1E-07
	bis(2-Ethylhexyl)phthalate	7.20E+00	ug/l	7.20E+00	ug/l	R	8.48E-06	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	1.2E-07
	Phenol	4.00E+00	ug/l	4.00E+00	ug/l	R	1.93E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1,1-Trichloroethane	8.30E+00	ug/l	8.30E+00	ug/l	R	1.59E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	8.00E+00	ug/l	R	6.44E-07	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	4.67E+00	ug/l	R	6.66E-07	mg/kg-day	6.00E-01	$(mg/kg-day)^{-1}$	4.0E-07
	Chlorobenzene	1.40E+01	ug/l	1.40E+01	ug/l	R	5.68E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.50E+01	ug/l	R	2.23E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	5.18E+00	ug/l	R	3.46E-06	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	1.8E-07
	Trichloroethene	2.97E+01	ug/l	2.97E+01	ug/l	R	5.27E-06	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	5.8E-08
	Vinyl Chloride	4.23E+01	ug/l	4.23E+01	ug/l	R	2.21E-06	mg/kg-day	1.90E+00	$(mg/kg-day)^{-1}$	4.2E-06
										Total Risk	6.6E-06

R = Route EPC

TABLE G8.66.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Vapors
Exposure Point: Offsite Residential Areas (Tap)
Receptor Population: Resident
Receptor Age: Adult (>6 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation	1,1,1-Trichloroethane	8.30E+00	ug/l	4.10E+00	ug/l	R	6.02E-04	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethane	8.00E+00	ug/l	4.88E-03	ug/l	R	7.16E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	1,1-Dichloroethene	4.67E+00	ug/l	8.18E-02	ug/l	R	1.20E-05	mg/kg-day	1.75E-01	$(mg/kg\text{-}day)^{-1}$	2.1E-06
	Chlorobenzene	1.40E+01	ug/l	1.56E-01	ug/l	R	2.28E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	cis-1,2-Dichloroethene	2.50E+01	ug/l	2.10E-01	ug/l	R	3.08E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Tetrachloroethene	5.18E+00	ug/l	1.93E-01	ug/l	R	2.83E-05	mg/kg-day	2.00E-03	$(mg/kg\text{-}day)^{-1}$	5.7E-08
	Trichloroethene	2.97E+01	ug/l	1.55E-04	ug/l	R	2.27E-08	mg/kg-day	6.00E-03	$(mg/kg\text{-}day)^{-1}$	1.4E-10
	Vinyl Chloride	4.23E+01	ug/l	2.35E-02	ug/l	R	3.45E-06	mg/kg-day	3.00E-01	$(mg/kg\text{-}day)^{-1}$	1.0E-06
										Total Risk	3.2E-06

R = Route EPC

TABLE G8.67.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Upper Glacial)
Exposure Medium: Groundwater
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker (Outdoors)
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Cyanide	2.72E+02	ug/l	2.72E+02	ug/l	R	2.51E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Aluminum	3.41E+03	ug/l	3.41E+03	ug/l	R	3.15E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Arsenic	1.65E+00	ug/l	1.65E+00	ug/l	R	1.52E-06	mg/kg-day	1.50E+00	$(mg/kg-day)^{-1}$	2.3E-06
	Cadmium	3.84E+02	ug/l	3.84E+02	ug/l	R	3.55E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium III	4.26E+02	ug/l	4.26E+02	ug/l	R	3.93E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chromium VI	3.90E+02	ug/l	3.90E+02	ug/l	R	3.60E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Copper	1.10E+02	ug/l	1.10E+02	ug/l	R	1.02E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Manganese	2.21E+03	ug/l	2.21E+03	ug/l	R	2.04E-03	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Nickel	1.28E+02	ug/l	1.28E+02	ug/l	R	1.18E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Thallium	7.69E+00	ug/l	7.69E+00	ug/l	R	7.10E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	alpha-Chlordane	3.15E-02	ug/l	3.15E-02	ug/l	R	2.90E-08	mg/kg-day	3.50E-01	$(mg/kg-day)^{-1}$	1.0E-08
	dieldrin	3.28E-02	ug/l	3.28E-02	ug/l	R	3.03E-08	mg/kg-day	1.60E+01	$(mg/kg-day)^{-1}$	4.8E-07
	gamma-Chlordane	3.15E-02	ug/l	3.15E-02	ug/l	R	2.90E-08	mg/kg-day	3.50E-01	$(mg/kg-day)^{-1}$	1.0E-08
	bis(2-Ethylhexyl)phthalate	2.03E+02	ug/l	2.03E+02	ug/l	R	1.87E-04	mg/kg-day	1.40E-02	$(mg/kg-day)^{-1}$	2.6E-06
	Chrysene	1.90E+00	ug/l	1.90E+00	ug/l	R	1.75E-06	mg/kg-day	7.30E-03	$(mg/kg-day)^{-1}$	1.3E-08
	Pentachlorophenol	7.75E+00	ug/l	7.75E+00	ug/l	R	7.15E-06	mg/kg-day	1.20E-01	$(mg/kg-day)^{-1}$	8.6E-07
	1,1,1-Trichloroethane	1.00E+02	ug/l	1.00E+02	ug/l	R	9.23E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	1,1-Dichloroethane	2.27E+01	ug/l	2.27E+01	ug/l	R	2.09E-05	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Acetone	1.65E+02	ug/l	1.65E+02	ug/l	R	1.52E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Chloroform	5.00E-01	ug/l	5.00E-01	ug/l	R	4.61E-07	mg/kg-day	6.10E-03	$(mg/kg-day)^{-1}$	2.8E-09
	cis-1,2-Dichloroethene	6.60E+02	ug/l	6.60E+02	ug/l	R	6.09E-04	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Tetrachloroethene	1.12E+01	ug/l	1.12E+01	ug/l	R	1.04E-05	mg/kg-day	5.20E-02	$(mg/kg-day)^{-1}$	5.4E-07
	trans-1,2-Dichloroethene	7.00E+00	ug/l	7.00E+00	ug/l	R	6.46E-06	mg/kg-day	NA	$(mg/kg-day)^{-1}$	NA
	Trichloroethene	1.16E+03	ug/l	1.16E+03	ug/l	R	1.07E-03	mg/kg-day	1.10E-02	$(mg/kg-day)^{-1}$	1.2E-05
										Total Risk	6.3E-06

R = Route EPC

TABLE G8.68.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Groundwater (Magothy)
Exposure Medium: Groundwater
Exposure Point: Western Parcel
Receptor Population: Commercial/Industrial Worker (Outdoors)
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Manganese	8.95E+01	ug/l	8.95E+01	ug/l	R	8.26E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLEG8.69.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Ellsworth Allen Park
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Chromium III	2.04E+01	mg/kg	2.04E+01	mg/kg	R	4.62E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	6.81E+00	mg/kg	6.81E+00	mg/kg	R	1.54E-07	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE G8.70.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Subsurface Soil
Exposure Point: Ellsworth Allen Park
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years old)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC . Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Dermal Contact	Chromium III	2.04E+01	mg/kg	2.04E+01	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	6.81E+00	mg/kg	6.81E+00	mg/kg	R	NA	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE G8.71.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Particulates
Exposure Point: Ellsworth Allen Park
Receptor Population: Other Recreational User
Receptor Age: Pre-Adolescent (6-18 years)

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Inhalation (particulates)	Chromium III	2.04E+01	mg/kg	2.59E-08	mg/m^3	R	2.81E-11	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	6.81E+00	mg/kg	8.62E-09	mg/m^3	R	9.36E-12	mg/kg-day	4.20E+01	$(mg/kg\text{-}day)^{-1}$	3.9E-10
										Total Risk	3.9E-10

R = Route EPC

TABLE G8.72.RME
CALCULATION OF CANCER RISKS
REASONABLE MAXIMUM EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Fish
Exposure Medium: Fish Tissue
Exposure Point: Massapequa Preserve
Receptor Population: Fisher
Receptor Age: Child

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Cadmium	6.40E-01	mg/kg	6.40E-01	mg/kg	R	1.05E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	9.80E-01	mg/kg	9.80E-01	mg/kg	R	1.61E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

TABLE G8.73.CTE
CALCULATION OF CANCER RISKS
CENTRAL TENDENCY EXPOSURE
LIBERTY INDUSTRIAL FINISHING SITE

Scenario Timeframe: Current
Medium: Fish
Exposure Medium: Fish Tissue
Exposure Point: Massapequa Preserve
Receptor Population: Fisher
Receptor Age: Adult

Exposure Route	Chemical of Potential Concern	Medium EPC Value	Medium EPC Units	Route EPC Value	Route EPC Units	EPC Selected for Risk Calculation	Intake (Cancer)	Intake (Cancer) Units	Cancer Slope Factor	Cancer Slope Factor Units	Cancer Risk
Ingestion	Cadmium	6.40E-01	mg/kg	6.40E-01	mg/kg	R	1.80E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
	Chromium VI	9.80E-01	mg/kg	9.80E-01	mg/kg	R	2.76E-05	mg/kg-day	NA	$(mg/kg\text{-}day)^{-1}$	NA
										Total Risk	NA

R = Route EPC

APPENDIX H

APPENDIX H

LEAD ANALYSES

(Electronic copy available on Final BHHRA CD-ROM submittal and upon request)

Calculations of Preliminary Remediation Goals (PRGs)

SITE-SPECIFIC CONSTRUCTION WORKER AT LIBERTY INDUSTRIAL SITE - NONPREGNANT WORKER

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Exposure Variable	PRG Equation[1] 1*	2**	Description of Exposure Variable	Units	Values for ConstructionScenario Using Equation 1 GSDi = 2.0	GSDi = 2.0
$PbB_{adult,central}$	X	X	Central estimate of blood lead concentration in adults	ug/dL	10	10
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
PbB_0	X	X	Baseline PbB	ug/dL	2.6	2.6
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100	0.100
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--
K_{SD}		X	Mass fraction of soil in dust	--	--	--
$AF_{S,D}$	X	X	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,D}$[2]	X	X	Exposure frequency (same for soil and dust)	days/yr	125	125
PRG	**Preliminary Remediation Goal**			**ppm**	**2,245**	**2,245**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same PRG.

[2] The averaging time (AT) is a fixed value of 182 days/yr.

***Equation 1, based on Eq. 4 in USEPA (1996).**

$$PRG = \frac{(PbB_{adult,central,goal} - PbB_0)*AT}{BKSF*(IR_S*AF_S*EF_S)}$$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

DEFAULT COMMERCIAL/INDUSTRIAL WORKER AT LIBERTY INDUSTRIAL SITE

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Exposure Variable	PRG Equation[1] 1*	2**	Description of Exposure Variable	Units	Values for Industrial Exposure Scenario				Values for Commercial Exposure Scenario			
					Using Equation 1		Using Equation 2		Using Equation 1		Using Equation 2	
					GSDi = 1.8	GSDi = 2.1	GSDi = 1.8	GSDi = 2.1	GSDi = 1.8	GSDi = 2.1	GSDi = 1.8	GSDi = 2.1
$PbB_{fetal,\ 0.95}$	X	X	95th percentile PbB in fetus	ug/dL	10	10	10	10	10	10	10	10
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
GSD_i	X	X	Geometric standard deviation PbB	--	1.8	2.1	1.8	2.1	1.8	2.1	1.8	2.1
PbB_0	X	X	Baseline PbB	ug/dL	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050	--	--	0.050	0.050	--	--
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	0.050	0.050	--	--	0.050	0.050
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	1.000	1.000	--	--	1.000	1.000
K_{SD}		X	Mass fraction of soil in dust	--	--	--	0.700	0.700	--	--	0.700	0.700
$AF_{S,D}$	X	X	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
$EF_{S,D}$[2]	X	X	Exposure frequency (same for soil and dust)	days/yr	250	250	250	250	250	250	250	250
PRG			**Preliminary Remediation Goal**	ppm	**1,354**	**778**	**1,354**	**778**	**1,354**	**778**	**1,354**	**778**

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same PRG.

[2] The averaging time (AT) is a fixed value of 365 days/yr.

***Equation 1, based on Eq. 4 in USEPA (1996).**

$$PRG = \frac{([PbB_{95}fetal/(R*(GSD_i^{1.645})])-PbB_0)*AT}{BKSF*(IR_S*AF_S*EF_S)}$$

****Equation 2, alternate approach based on Eq. 4 and Eq. A-19 in USEPA (1996).**

$$PRG = \frac{([PbB_{fetal,0.95}/(R*(GSD_i^{1.645})])-PbB_0)*AT}{BKSF*([(IR_{S+D})*AF_S*EF_S*W_S]+[K_{SD}*(IR_{S+D})*(1-W_S)*AF_D*EF_D])}$$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

SITE-SPECIFIC CONSTRUCTION WORKER AT LIBERTY INDUSTRIAL SITE - PREGNANT WORKER

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Exposure Variable	PRG Equation[1] 1*	2**	Description of Exposure Variable	Units	Values for Construction Worker Scenario				Values for Commercial Exposure Scenario			
					Using Equation 1		Using Equation 2		Using Equation 1		Using Equation 2	
					GSDi = 2.0	GSDi = 2.0	GSDi = 2.0	GSDi = 2.0	GSDi = 2.0	GSDi = 2.0	GSDi = 2.0	GSDi = 2.0
$PbB_{fetal,0.95}$	X	X	95th percentile PbB in fetus	ug/dL	10	10	10	10	10	10	10	10
$R_{fetal/maternal}$	X	X	Fetal/maternal PbB ratio	--	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
BKSF	X	X	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
GSD_i	X	X	Geometric standard deviation PbB	--	2	2	2	2	2	2	2	2
PbB_0	X	X	Baseline PbB	ug/dL	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
IR_S	X		Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100	0.100	--	--	0.100	0.100	--	--
IR_{S+D}		X	Total ingestion rate of outdoor soil and indoor dust	g/day	--	--	0.100	0.100	--	--	0.100	0.100
W_S		X	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--	--	1.000	1.000	--	--	1.000	1.000
K_{SD}		X	Mass fraction of soil in dust	--	--	--	0.700	0.700	--	--	0.700	0.700
$AF_{S,D}$	X	X	Absorption fraction (same for soil and dust)	--	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
$EF_{S,D}$[2]	X	X	Exposure frequency (same for soil and dust)	days/yr	125	125	125	125	125	125	125	125
PRG			Preliminary Remediation Goal	ppm	471	471	471	471	471	471	471	471

[1] Equation 1 does not apportion exposure between soil and dust ingestion (excludes W_S, K_{SD}).
When $IR_S = IR_{S+D}$ and $W_S = 1.0$, the equations yield the same PRG.

[2] The averaging time (AT) is a fixed value of 182 days/yr.

***Equation 1, based on Eq. 4 in USEPA (1996).**

$$PRG = \frac{([PbB_{95}fetal/(R*(GSD_i^{1.645})])-PbB_0)*AT}{BKSF*(IR_S*AF_S*EF_S)}$$

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

ALL DEFAULT INPUTS

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

Diet: alternate diet selected by user as follows:

Home-grown Fruit:	0.000 ug Pb/g	0.0 %
Home-grown Vegetables:	0.000 ug Pb/g	0.0 %
Recreational Fish:	0.000 ug Pb/g	0.0 %
Wild Game:	0.000 ug Pb/g	0.0 %

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	200.0	200.0
1-2	200.0	200.0
2-3	200.0	200.0
3-4	200.0	200.0
4-5	200.0	200.0
5-6	200.0	200.0
6-7	200.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	4.2	7.74	4.67
1-2:	4.6	10.98	7.35
2-3:	4.3	11.56	7.43
3-4:	4.1	11.63	7.52
4-5:	3.5	9.81	5.69
5-6:	3.0	9.58	5.16
6-7:	2.8	9.69	4.89

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.69	0.37	0.00	0.02
1-2:	2.69	0.91	0.00	0.03
2-3:	3.12	0.95	0.00	0.06
3-4:	3.05	0.98	0.00	0.07

4-5:	3.01	1.04	0.00
	0.07		
5-6:	3.22	1.11	0.00
	0.09		
6-7:	3.58	1.13	0.00
	0.09		

WITH FISH INGESTION

LEAD MODEL Version 0.99d

AIR CONCENTRATION: 0.100 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

Diet: alternate diet selected by user as follows:

Home-grown Fruit:	0.000 ug Pb/g	0.0 %
Home-grown Vegetables:	0.000 ug Pb/g	0.0 %
Recreational Fish:	0.800 ug Pb/g	10.0 %
Wild Game:	0.000 ug Pb/g	0.0 %

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:

Soil: constant conc.
Dust: constant conc.

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	200.0	200.0
1-2	200.0	200.0
2-3	200.0	200.0
3-4	200.0	200.0
4-5	200.0	200.0
5-6	200.0	200.0
6-7	200.0	200.0

Additional Dust Sources: None DEFAULT

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 2.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	4.7	8.72	4.62
1-2:	5.6	13.78	7.17
2-3:	5.4	14.68	7.26
3-4:	5.2	15.03	7.36
4-5:	4.6	13.56	5.57
5-6:	4.2	13.54	5.06
6-7:	3.9	14.00	4.79

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake

)	(ug/day)		
0.5-1:	3.72	0.36	0.00
	0.02		
1-2:	5.69	0.89	0.00
	0.03		
2-3:	6.44	0.93	0.00
	0.06		
3-4:	6.64	0.96	0.00
	0.07		
4-5:	6.90	1.02	0.00
	0.07		
5-6:	7.31	1.09	0.00
	0.09		
6-7:	8.01	1.11	0.00
	0.09		