36751

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ARCS II

Contract No. 68-W9-0051

LI TUNGSTEN
Glen Cove, New York
Work Assignment No. 025-2L4L

Draft Final
Remedial Investigation (RI) Report
Volume IV of IV

Remedial Planning Activities at Selected
Uncontrolled Hazardous Substance Disposal Sites
USEPA Region II (NY, NJ, PR, VI)

Malcolm Pirnie, Inc.
104 Corporate Park Drive
White Plains, NY 10602

May 1998

MALCOLM PIRNIE

302156

CONTRACT NO. 68-W9-0051

LI TUNGSTEN
GLEN COVE, NEW YORK
Work Assignment No. 025-2L4L

DRAFT FINAL REMEDIAL INVESTIGATION (RI) REPORT
VOLUME IV OF IV

Remedial Planning Activities at Selected Uncontrolled Hazardous Substance Disposal Sites USEPA Region II (NY, NJ, PR, VI)

Malcolm Pirnie, Inc.
104 Corporate Park Drive
White Plains, NY 10602

May 1998

302157

LIST OF APPENDICES

Volume III

A Geophysical Survey Data
B Test Pit Logs
C Existing Monitoring Well Evaluation Slug Test Data
D Monitoring Well Development Logs
E Field Measurements During Well Purging
F Downhole Gamma Logging Data
G Wetlands Delineation Report
H Stage 1a Cultural Resources Survey Report
I (1) Sub-Surface Archaeological Investigation of a Portion of Parcel A Li Tungsten Project Area
(2) Archaeological Monitoring of Remedial Investigation Test Trenches - Parcel B, Li Tungsten Superfund Site
J Architectural Assessment Report
K Boring Logs
Monitoring Well Borings
Soil Borings
Radiological Borings

Volume IV

L Physical Property Test Results
M Slug Test Data
N Laboratory Summary Data Tables
O Risk Assessment Tables
O-1 Radiological Risk - RAGS Exposure and Risk Summaries
O-2 Radiological Risk - RES-RAD Exposure and Risk Summaries
O-3 Chemical Risk - Exposure and Risk Summaries
O-4 Toxicological Profiles
P Ecological Risk Assessment Tables (MISSING)
P-1 Toxicity Data Used in the Ecological Assessment
P-2 Toxicity Profiles for COPC: Ecological Assessment
P-3 Exposure Calculations for the Ecological Risk Assessment
Q Glen Cove Creek Sampling Data

APPENDIX L

Appendix L

Physical Property Test Results

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

PHYSICAL PARAMETERS Sample ID No. Lab Number Matrix	LT-SB-01 961846-0006 SOIL		LT-SB-02 962337-2 SOIL	LT-SB-02B 962337-3 SOIL	LT-SB-03 SOIL		LT-SB-13 962336-14 SOIL
Atterberg Limits (%) Corrected Liquid Limit % Moisture: Plastic Limit % Moisture Plasticity Index	NP		NA	NA	NP		NA
Moisture Content (%)	6.4	E	20	10.6	12.1	E	11.6
Grain Size Distribution (% retained):			NA	NA			NA
Grain Size 3"	0	E			0	E	
Grain Size 1.0"	13.7	E			0	E	
Grain Size 0.75"	2.2	E			0	E	
Grain Size 3/8"	12.1	E			2	E	
Grain Size No. 4	13	E			4.4	E	
Grain Size No. 8	7.1	E			6.9	E	
Grain Size No. 16	5.7	E			7.3	E	
Grain Size No. 30	7.5	E			10.6	E	
Grain Size No. 50	10.7	E			18.2	E	
Grain Size No. 100	7.9	E			13.6	E	
Grain Size No. 200	4.8	E			7.9	E	
Grain Size - 200 (pan)	15.3	E			29.1	E	
Bulk Density (g/cc)	1.5		NA	NA	1.6		NA

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

PHYSICAL PARAMETERS Sample ID No. Lab Number Matrix	LT-SB-13B 962416-7 SOIL		LT-SB-14 SOIL		LT-SB-15 962388-16 SOIL		LT-SB-16 962336-11 SOIL	LT-SB-16B 962336-12 SOIL
Atterberg Limits (%) Corrected Liquid Limit % Moisture: Plastic Limit % Moisture Plasticity Index	NP		NP		NP		NA	NA
Moisture Content (%)	6.4	E			4.8	E	14	8.6
Grain Size Distribution (% retained):							NA	NA
Grain Size 3"	0	E	0	E	0	E		
Grain Size 1.0"	0	E	0	E	0	E		
Grain Size 0.75"	0	E	0	E	0.9	E		
Grain Size 3/8"	0	E	0	E	7.3	E		
Grain Size No. 4	0.7	E	1.1	E	11.5	E		
Grain Size No. 8	0.7	E	4	E	11.7	E		
Grain Size No. 16	0.6	E	5.9	E	8.9	E		
Grain Size No. 30	1.1	E	10	E	11.1	E		
Grain Size No. 50	5	E	20.2	E	21.8	E		
Grain Size No. 100	38.4	E	14.3	E	14.9	E		
Grain Size No. 200	31.6	E	9.4	E	5.4	E		
Grain Size - 200 (pan)	21.9	E	35	E	6.5	E		
Bulk Density (g/cc)	1.1				1.4		NA	NA

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required

302162

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

PHYSICAL PARAMETERS Sample ID No. Lab Number Matrix	LT-SB-17B 962416-8 SOIL		LT-SB-18 962336-6 SOIL	LT-SB-19 962336-7 SOIL	LT-SB-19B 962336-8 SOIL	LT-SB-20 962336-9 SOIL	LT-SB-20B 962336-10 SOIL
Atterberg Limits (%)							
Corrected Liquid Limit % Moisture:	17.8						
Plastic Limit % Moisture	15.2						
Plasticity Index	3		NA	NA	NA	NA	NA
Moisture Content (%)	12.5	E	4.3	15.2	12.9	29.5	15.4
Grain Size Distribution (% retained):			NA	NA	NA	NA	NA
Grain Size 3"	0	E					
Grain Size 1.0"	0	E					
Grain Size 0.75"	0	E					
Grain Size 3/8"	4.3	E					
Grain Size No. 4	5.9	E					
Grain Size No. 8	6.8	E					
Grain Size No. 16	7.3	E					
Grain Size No. 30	8.8	E					
Grain Size No. 50	13.5	E					
Grain Size No. 100	11	E					
Grain Size No. 200	7.3	E					
Grain Size - 200 (pan)	35	E					
Bulk Density (g/cc)	1.1		NA	NA	NA	NA	NA

302163

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

PHYSICAL PARAMETERS Sample ID No. Lab Number Matrix	LT-SB-25 961901-0003 SOIL		LT-SB-27 SOIL		LT-SB-47 962839-3 SOIL		LT-SB-MP-8D 962023-0002 SOIL		LT-SB-MP-11D 962703-2 SOIL	
Atterberg Limits (%) Corrected Liquid Limit % Moisture: Plastic Limit % Moisture Plasticity Index	NP		NP		NP		NP		NP	
Moisture Content (%)	14.5	E	13.3	E	11.9	E	9	E	9.6	
Grain Size Distribution (% retained):										
Grain Size 3"	0	E	0	E	0	E	0	E	0	E
Grain Size 1.0"	2.9	E	0	E	0	E	17.3	E	7.9	E
Grain Size 0.75"	1.3	E	0	E	0	E	6	E	1.5	E
Grain Size 3/8"	7.3	E	3.1	E	0.9	E	17	E	4.6	E
Grain Size No. 4	7.2	E	4.7	E	10.7	E	12.7	E	2.3	E
Grain Size No. 8	9	E	4.3	E	15.1	E	9	E	2.1	E
Grain Size No. 16	9.4	E	4.7	E	11.9	E	4.8	E	2.6	E
Grain Size No. 30	9.9	E	7.7	E	15.5	E	4.6	E	4	E
Grain Size No. 50	12.8	E	27.5	E	30	E	7.3	E	9.4	E
Grain Size No. 100	16.2	E	26.6	E	9.2	E	6.2	E	26.6	E
Grain Size No. 200	8.3	E	9.4	E	1.6	E	4.5	E	27.4	E
Grain Size - 200 (pan)	15.7	E	12	E	5.1	E	10.6	E	11.6	E
Bulk Density (g/cc)	1.5	E	1.5		1.6		1.5		1.2	

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required

302164

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

PHYSICAL PARAMETERS Sample ID No. Lab Number Matrix	LT-SB-MP-16D 962839-4 SOIL		LT-SB-MP-17 961843-0003 SOIL		LT-SB-MP-18 961901-0008 SOIL		LT-SB-MP-22 962336-3 SOIL		LT-SB-MP-22DB 961747-0005 SOIL	
Atterberg Limits (%)										
Corrected Liquid Limit % Moisture:	14.8		25.2		16					
Plastic Limit % Moisture	13.6		18.6		13.5					
Plasticity Index	1		7	E	2	E	NP		NP	
Moisture Content (%)	15.1	E	25.7		10.7	E	13.7/29.5			
Grain Size Distribution (% retained):										
Grain Size 3"	0	E	0	E	0	E	0	E	0	E
Grain Size 1.0"	0	E	0	E	3.3	E	0	E	3.4	E
Grain Size 0.75"	1.5	E	0	E	9.5	E	4.3	E	1.3	E
Grain Size 3/8"	3.5	E	0	E	6.9	E	9.5	E	7	E
Grain Size No. 4	5.4	E	0.1	E	7.2	E	10.6	E	10.6	E
Grain Size No. 8	5	E	0.2	E	6.1	E	9.3	E	9.1	E
Grain Size No. 16	4.6	E	0.1	E	5.4	E	7.1	E	7.3	E
Grain Size No. 30	8.2	E	0.2	E	6.9	E	10.5	E	11	E
Grain Size No. 50	21.2	E	0.6	E	12.6	E	18.3	E	20	E
Grain Size No. 100	20.4	E	0.8	E	9.9	E	11.1	E	9.4	E
Grain Size No. 200	7.1	E	1.4	E	6.4	E	5.7	E	4.5	E
Grain Size - 200 (pan)	23.2	E	96.6	E	25.7	E	13.5	E	16.4	E
Bulk Density (g/cc)	1.1		1.3		1.2	E	1.1			

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

PHYSICAL PARAMETERS Sample ID No. Lab Number Matrix	LT-SED-02 962268-0005 SOIL		LT-SED-03 962268-0006 SOIL		LT-SED-04 962268-0007 SOIL		LT-SED-05 962272-0001 SOIL		LT-SED-08 962268-0001 SOIL		LT-SED-09 962268-0002 SOIL	
Atterberg Limits (%) Corrected Liquid Limit % Moisture: Plastic Limit % Moisture Plasticity Index	NA		NA		NA		NA		NA		NA	
Moisture Content (%)	NA		NA		NA		NA		NA		NA	
Grain Size Distribution (% retained):												
Grain Size 3"	0	E	0	E	0	E	0	E	0	E	0	E
Grain Size 1.0"	0	E	0	E	0	E	0	E	0	E	0	E
Grain Size 0.75"	1	E	0	E	0	E	0	E	2.6	E	0	E
Grain Size 3/8"	5.9	E	0.2	E	0	E	0	E	7.1	E	8.6	E
Grain Size No. 4	5	E	0.6	E	0.4	E	0.1	E	7.1	E	11.4	E
Grain Size No. 8	4.8	E	1.7	E	1	E	0.1	E	6.1	E	10.4	E
Grain Size No. 16	5	E	2.5	E	3.4	E	1.1	E	6.2	E	8.3	E
Grain Size No. 30	7.6	E	6	E	7.8	E	5.1	E	8	E	10.4	E
Grain Size No. 50	13.3	E	15.2	E	17.4	E	6.7	E	14.9	E	16.8	E
Grain Size No. 100	9.6	E	13.5	E	22.2	E	9.2	E	12.3	E	12.3	E
Grain Size No. 200	6.4	E	8.5	E	17.2	E	13.3	E	7.2	E	6.7	E
Grain Size - 200 (pan)	41.5	E	51.7	E	30.6	E	64.3	E	28.6	E	15.3	E
Bulk Density (g/cc)	NA		NA		NA		NA		NA		NA	

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required

302166

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

PHYSICAL PARAMETERS Sample ID No. Lab Number Matrix	LT-SED-10 962268-0003 SOIL		LT-SED-11 962268-0004 SOIL		LT-SB-TP-02 962250-1 SOIL	LT-SB-TP-06 962250-2 SOIL	LT-SB-TP-08 962336-2 SOIL
Atterberg Limits (%) **Corrected Liquid Limit % Moisture:** **Plastic Limit % Moisture** **Plasticity Index**	NA		NA		NA	NA	NA
Moisture Content (%)	NA		NA		12.2	10.9	13.8
Grain Size Distribution (% retained):					NA	NA	NA
Grain Size 3"	0	E	0	E			
Grain Size 1.0"	0	E	0	E			
Grain Size 0.75"	0	E	0	E			
Grain Size 3/8"	1.4	E	0	E			
Grain Size No. 4	7.4	E	0.2	E			
Grain Size No. 8	10.3	E	1.6	E			
Grain Size No. 16	10.1	E	3.6	E			
Grain Size No. 30	12	E	6.7	E			
Grain Size No. 50	30.9	E	22.5	E			
Grain Size No. 100	17.3	E	20.2	E			
Grain Size No. 200	4.4	E	9.5	E			
Grain Size - 200 (pan)	6.1	E	35.7	E			
Bulk Density (g/cc)	NA		NA		NA	NA	NA

302167

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required

302168

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CORE LABORATORIES

LABORATORY TESTS RESULTS
10/24/96

JOB NUMBER: 961769 CUSTOMER: MALCOLM PIRNIE, INC. ATTN: VALERIE SMITH

CLIENT I.D.....: LI TUNGSTEN
DATE SAMPLED.....: 08/15/96
TIME SAMPLED.....: 10:03
WORK DESCRIPTION...: LT-SB-MP-22D-27-29

LABORATORY I.D...: 961769-0001
DATE RECEIVED....: 08/17/96
TIME RECEIVED....: 11:41
REMARKS.....: SOIL

Hydraulic Conductivity DATE ANALYZED: 10/07/96 TIME ANALYZED: 08:00 METHOD: ASTM D-2216/D-5084 DILUTION: 1

TEST DESCRIPTION	CAS NUMBER	FINAL TEST RESULT	UNITS OF MEASURE	DETECTION LIMIT
Hydraulic Conductivity		1.52E-09	m/s	0
Hydraulic Conductivity		1.52E-07	cm/s	0
Effective Consolidation Stress Min		5	psi	0
Effecticw Consolidation Stress Max		7	psi	0
Saturation B Coefficient		1.00		0
Average Hydraulic Gradient		14.12		0
Total Back Pressure		45	psi	0
Initial Lenght		11.22	cm	0
Initial Diameter		7.2	cm	0
Final Length		10.98	cm	0
Final Diameter		7.24	cm	0
' ial Sample Weight		991.20	g	0
Sample Weight		999.90	g	0
...cial Dry Unit Weight		119.04	lb/ft3	0
Final Dry Unit Weight		113.43	lb/ft3	0

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(307) 235-5741

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302169

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LABORATORY TESTS RESULTS
10/24/96

JOB NUMBER: 961845 CUSTOMER: MALCOLM PIRNIE, INC. ATTN: VALERIE SMITH

CLIENT I.D.....: L1 TUNGSTEN
DATE SAMPLED.....: 08/22/96
TIME SAMPLED.....: 16:30
WORK DESCRIPTION...: LT-SB-MP-17

LABORATORY I.D...: 961845-0001
DATE RECEIVED....: 08/24/96
TIME RECEIVED....: 10:30
REMARKS.....: SOIL

Hydraulic Conductivity DATE ANALYZED: 10/07/96 TIME ANALYZED: 08:00 METHOD: ASTM D-2216/D-5084 DILUTION: 1

TEST DESCRIPTION	CAS NUMBER	FINAL TEST RESULT	UNITS OF MEASURE	DETECTION LIMIT
Hydraulic Conductivity		5.48E-09	m/s	0
Hydraulic Conductivity		5.48E-07	cm/s	0
Effective Consolidation Stress Min		5	psi	0
Effecticw Consolidation Stress Max		7	psi	0
Saturation B Coefficient		1.00		0
Average Hydraulic Gradient		12.92		0
Total Back Pressure		45.0	psi	0
Initial Lenght		11.83	cm	0
Initial Diameter		7.01	cm	0
Final Length		11.77	cm	0
Final Diameter		7.14	cm	0
' 'ial Sample Weight		902.7	g	0
l Sample Weight		914.8	g	0
...tial Dry Unit Weight		92.74	lb/ft3	0
Final Dry Unit Weight		88.13	lb/ft3	0

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LABORATORY TESTS RESULTS
10/24/96

JOB NUMBER: 961797 CUSTOMER: MALCOLM PIRNIE, INC. ATTN: VALERIE SMITH

CLIENT I.D.....: LI TUNGSTEN
DATE SAMPLED.....: 08/19/96
TIME SAMPLED.....: 13:45
WORK DESCRIPTION...: LT-SB-MP-22D

LABORATORY I.D...: 961797-0001
DATE RECEIVED....: 08/21/96
TIME RECEIVED....: 09:00
REMARKS.....: SOIL

Hydraulic Conductivity DATE ANALYZED: 10/07/96 TIME ANALYZED: 08:00 METHOD: ASTM D-2216/D-5084 DILUTION: 1

TEST DESCRIPTION	CAS NUMBER	FINAL TEST RESULT	UNITS OF MEASURE	DETECTION LIMIT
Hydraulic Conductivity		4.81E-09	m/s	0
Hydraulic Conductivity		4.81E-07	cm/s	0
Effective Consolidation Stress Min		5	psi	0
Effectiw Consolidation Stress Max		7	psi	0
Saturation B Coefficient		1.00		0
Average Hydraulic Gradient		13.62		0
Total Back Pressure		45.0	psi	0
Initial Lenght		10.96	cm	0
Initial Diameter		7.16	cm	0
Final Length		10.68	cm	0
Final Diameter		7.15	cm	0
[illegible]ial Sample Weight		919.9	g	0
Sample Weight		923.6	g	0
[illegible]ial Dry Unit Weight		107.83	lb/ft3	0
Final Dry Unit Weight		110.89	lb/ft3	0

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CORE LABORATORIES

LABORATORY TESTS RESULTS
11/22/96

JOB NUMBER: 962219 CUSTOMER: MALCOLM PIRNIE, INC. ATTN: VALERIE SMITH

CLIENT I.D.....: LI TUNGSTEN
DATE SAMPLED.....: 10/09/96
TIME SAMPLED.....: 09:30
WORK DESCRIPTION...: LT-SB-46

LABORATORY I.D...: 962219-0001
DATE RECEIVED....: 10/11/96
TIME RECEIVED....: 08:55
REMARKS.....: SOIL

Hydraulic Conductivity DATE ANALYZED: 10/28/96 TIME ANALYZED: 09:50 METHOD: ASTM D-2216/D-5084 DILUTION: 1

TEST DESCRIPTION	CAS NUMBER	FINAL TEST RESULT	UNITS OF MEASURE	DETECTION LIMIT
Hydraulic Conductivity		5.42E-08	m/s	0
Hydraulic Conductivity		5.42E-06	cm/s	0
Effective Consolidation Stress Min		5	psi	0
Effective Consolidation Stress Max		7	psi	0
Saturation B Coefficient		1.00		0
Average Hydraulic Gradient		14.23		0
Total Back Pressure		45.0	psi	0
Initial Length		11.50	cm	0
Initial Diameter		7.10	cm	0
Final Length		11.23	cm	0
Final Diameter		7.33	cm	0
Initial Sample Weight		899.80	g	0
[illegible]l Sample Weight		903.60	g	0
[illegible]ial Dry Unit Weight		92.78	lb/ft3	0
[illegible]nal Dry Unit Weight		88.45	lb/ft3	0

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302172

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CORE LABORATORIES

LABORATORY TESTS RESULTS
11/22/96

JOB NUMBER: 962134 CUSTOMER: MALCOLM PIRNIE, INC. ATTN: VALERIE SMITH

CLIENT I.D.....: LI TUNGSTEN
DATE SAMPLED.....: 09/27/96
TIME SAMPLED.....: 10:00
WORK DESCRIPTION...: LT-SB-MP-2D

LABORATORY I.D...: 962134-0001
DATE RECEIVED....: 10/02/96
TIME RECEIVED....: 08:55
REMARKS.....: SOIL

Hydraulic Conductivity DATE ANALYZED: 10/28/96 TIME ANALYZED: 09:50 METHOD: ASTM D-2216/D-5084 DILUTION: 1

TEST DESCRIPTION	CAS NUMBER	FINAL TEST RESULT	UNITS OF MEASURE	DETECTION LIMIT
Hydraulic Conductivity		2.75E-09	m/s	0
Hydraulic Conductivity		2.75E-07	cm/s	0
Effective Consolidation Stress Min		5	psi	0
Effective Consolidation Stress Max		7	psi	0
Saturation B Coefficient		1.00		0
Average Hydraulic Gradient		13.47		0
Total Back Pressure		45.0	psi	0
Initial Length		11.60	cm	0
Initial Diameter		7.10	cm	0
Final Length		11.63	cm	0
Final Diameter		7.12	cm	0
Initial Sample Weight		843.10	g	0
[illegible]l Sample Weight		849.30	g	0
[illegible]ial Dry Unit Weight		76.98	lb/ft3	0
[illegible]al Dry Unit Weight		77.04	lb/ft3	0

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Casper, WY 82601
(307) 235-5741

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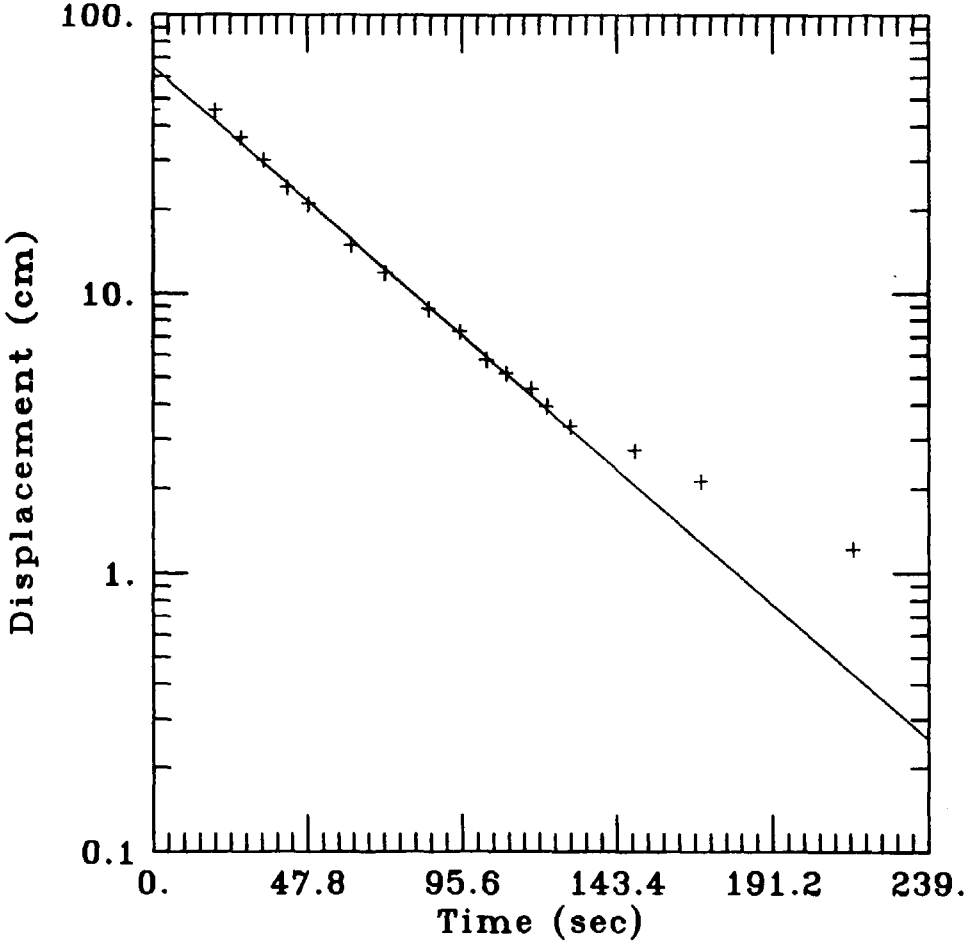
APPENDIX VI

Appendix M

Slug Test Data

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

GM-1 Rising Head Test



DATA SET:
rgm1rh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1996
TEST WELL:
GM-1

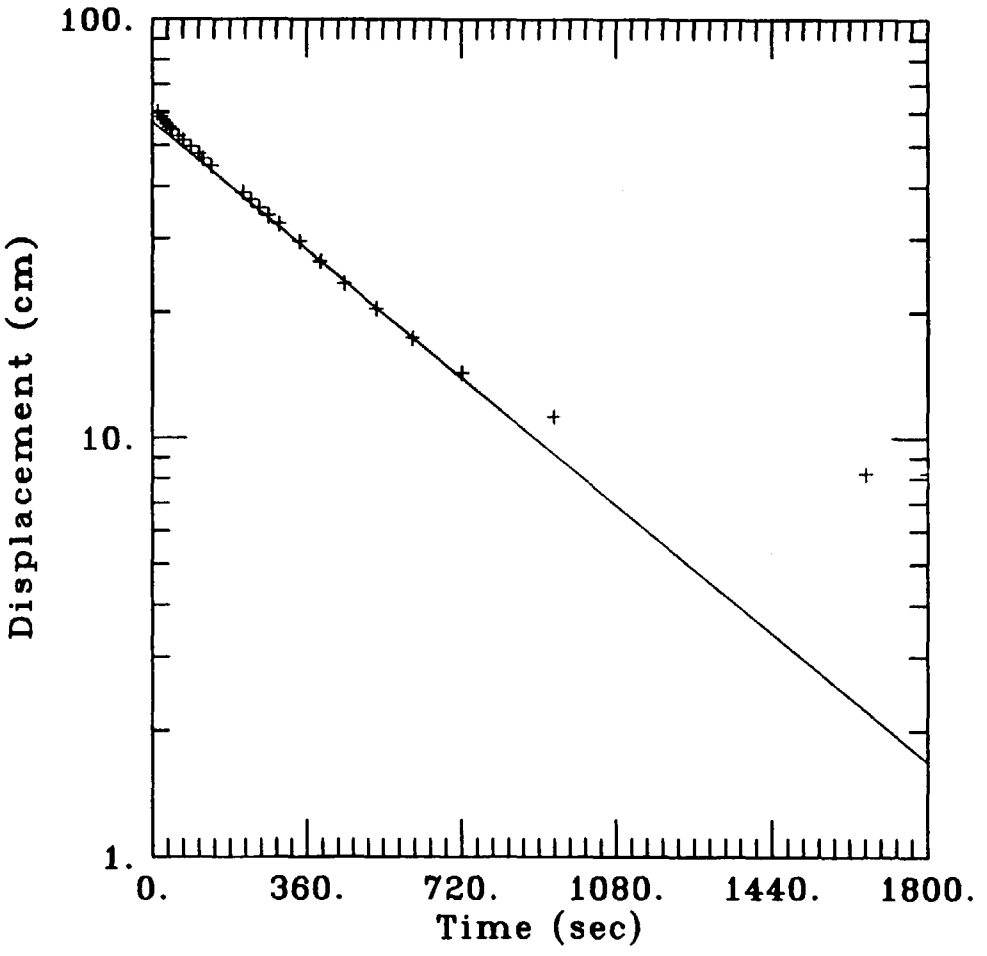
ESTIMATED PARAMETERS:
K = 0.0007 cm/sec
y0 = 65. cm

TEST DATA:
H0 = 45.42 cm
rc = 2.53 cm
rw = 10.15 cm
L = 257.3 cm
b = 257.3 cm
H = 257.3 cm

302175

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

GM-2 Rising Head Test



DATA SET:
rgm2rh.dat
03/12/97

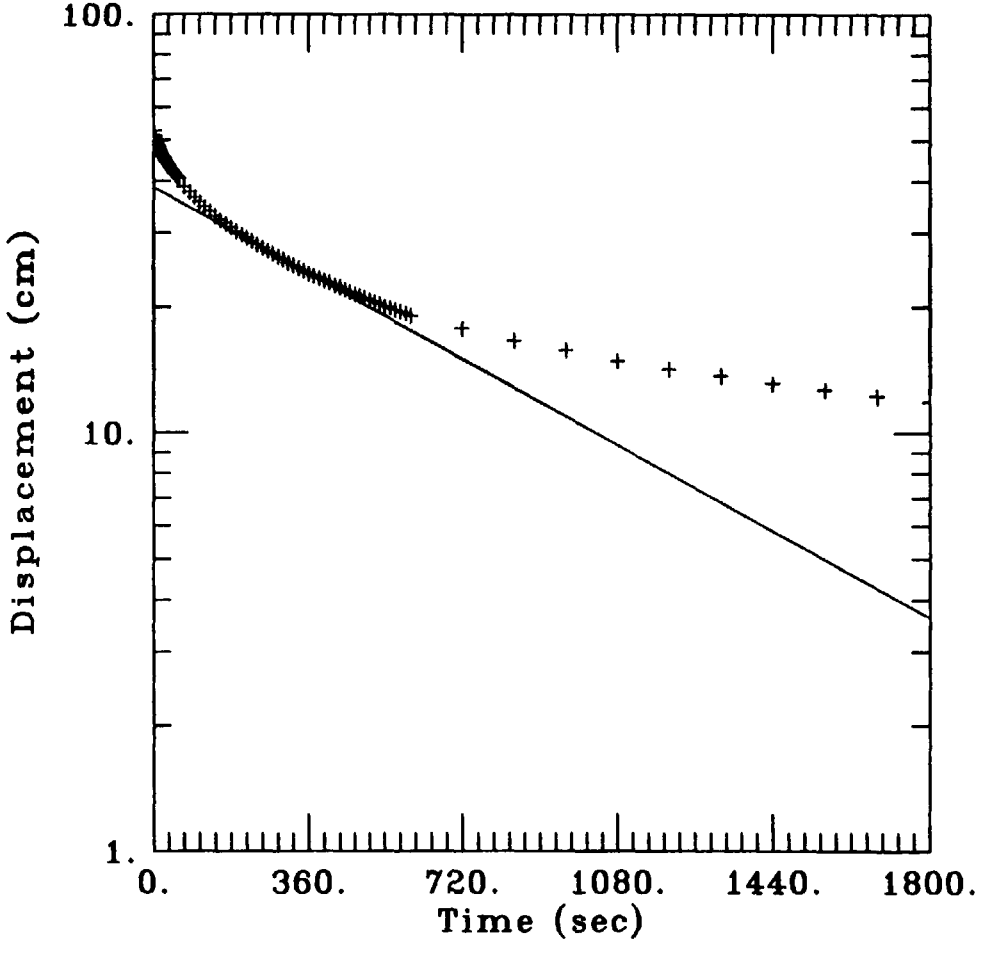
AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1996
TEST WELL:
GM-2

ESTIMATED PARAMETERS:
K = 5.5E-05 cm/sec
y0 = 57. cm

TEST DATA:
H0 = 60.35 cm
rc = 2.53 cm
rw = 10.15 cm
L = 304.8 cm
b = 363.3 cm
H = 363.3 cm

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-4 Rising Head Test



DATA SET:
rmp4rh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-4

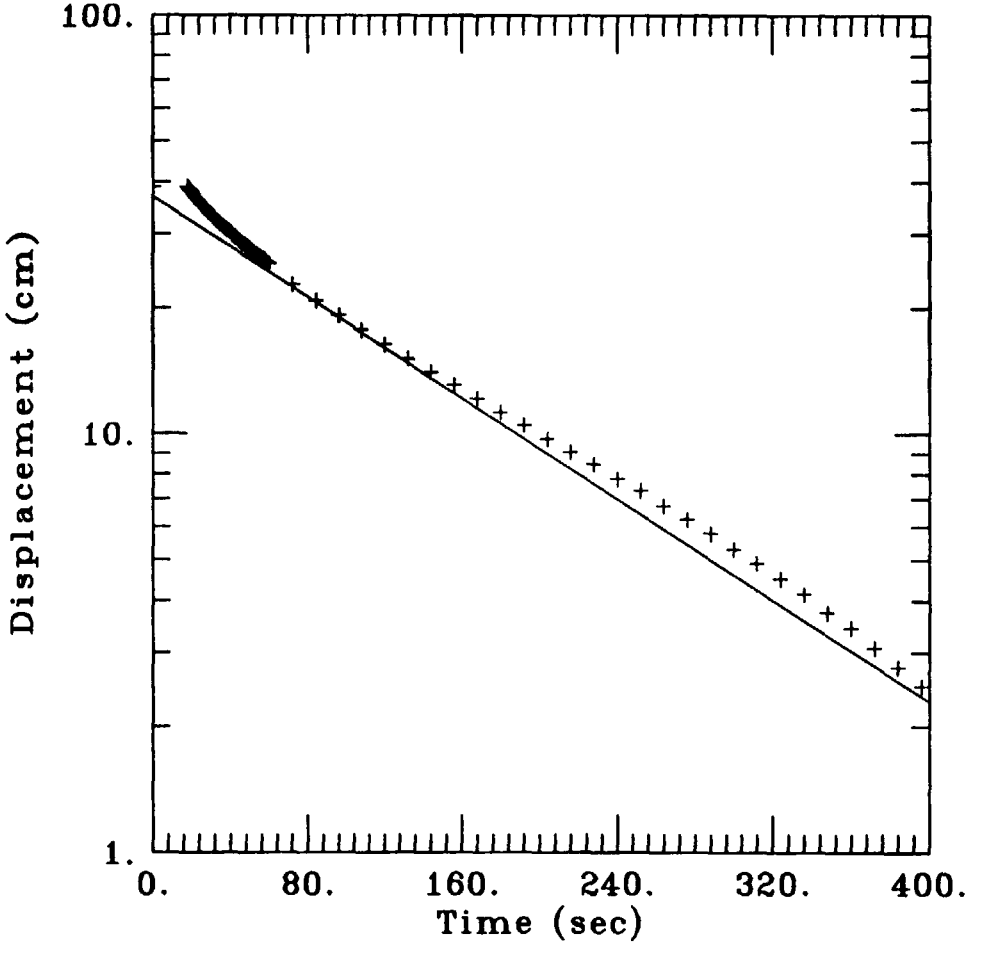
ESTIMATED PARAMETERS:
K = 0.00015 cm/sec
y0 = 38.6 cm

TEST DATA:
H0 = 52.76 cm
rc = 5.09 cm
rw = 10.15 cm
L = 304.8 cm
b = 367.6 cm
H = 367.6 cm

302177

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-5 Falling Head Test



DATA SET:
rmp5fh.dat
03/12/97

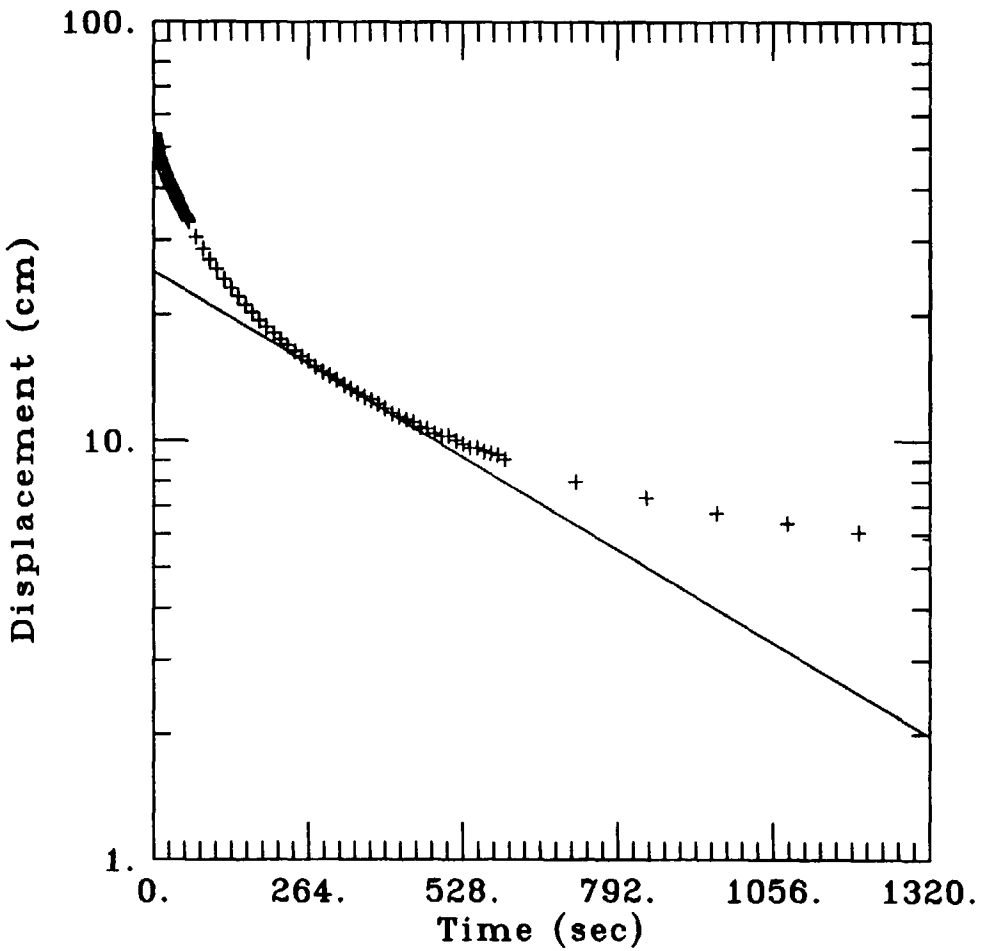
AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-5

ESTIMATED PARAMETERS:
K = 0.000791 cm/sec
y0 = 37. cm

TEST DATA:
H0 = 38.98 cm
rc = 5.09 cm
rw = 10.15 cm
L = 304.8 cm
b = 361.5 cm
H = 361.5 cm

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-5 Rising Head Test



DATA SET:
rmp5rh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-5

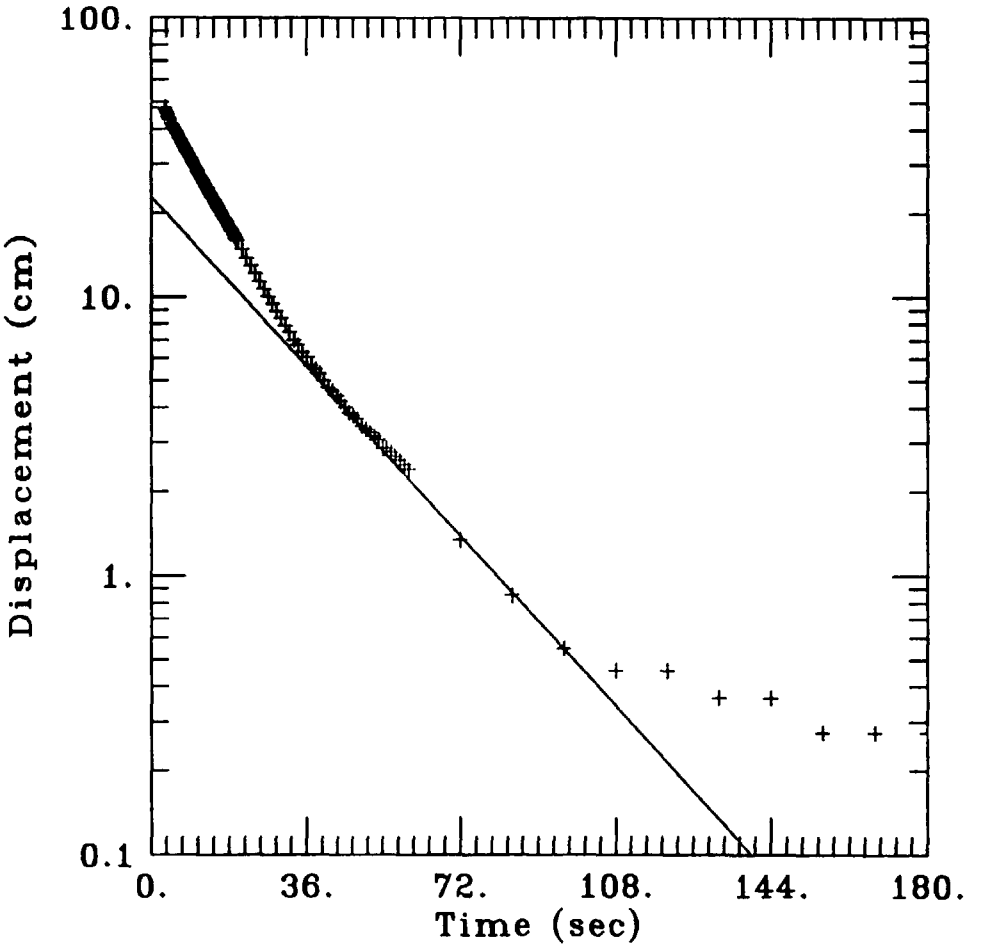
ESTIMATED PARAMETERS:
K = 0.00022 cm/sec
y0 = 25.4 cm

TEST DATA:
H0 = 54.22 cm
rc = 5.09 cm
rw = 10.15 cm
L = 304.8 cm
b = 361.5 cm
H = 361.5 cm

302179

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-6 Rising Head Test



DATA SET:
rmp6rh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-6

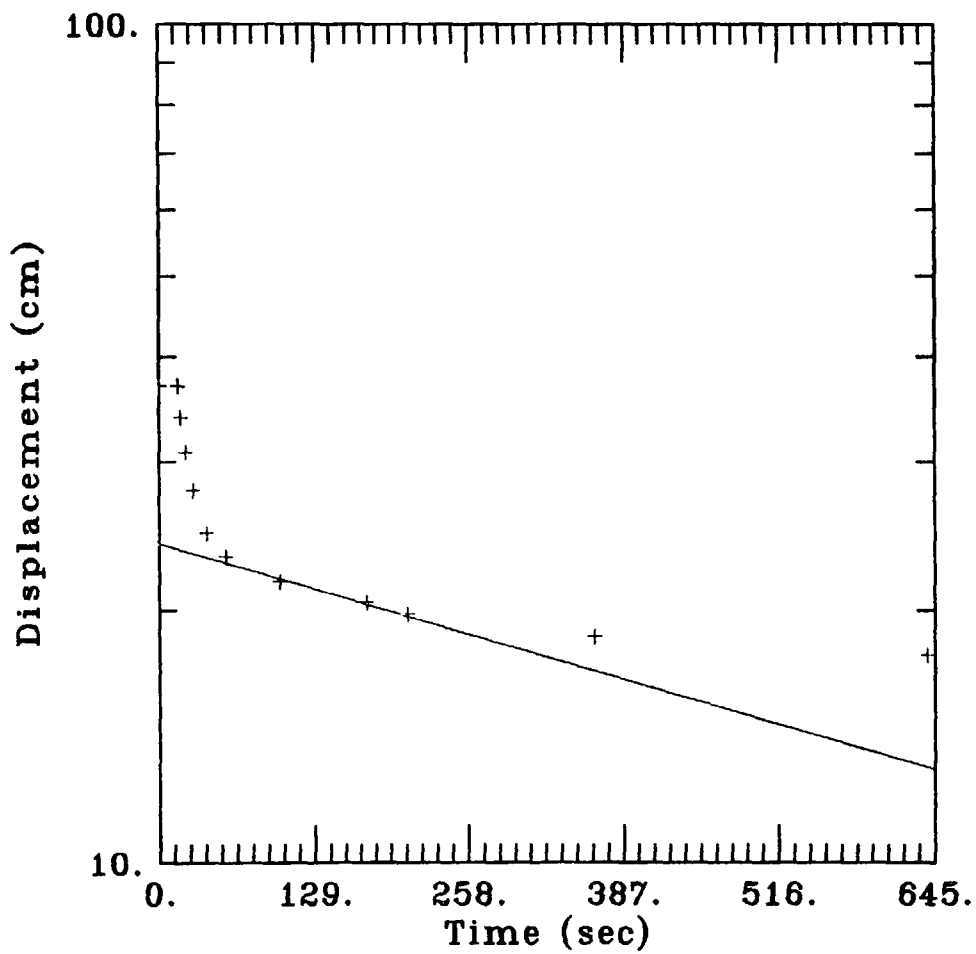
ESTIMATED PARAMETERS:
K = 0.006 cm/sec
y0 = 23. cm

TEST DATA:
H0 = 47.73 cm
rc = 5.09 cm
rw = 10.15 cm
L = 176.2 cm
b = 176.2 cm
H = 176.2 cm

302180

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

GM-7 Rising Head Test



DATA SET:
rgm7rh.dat
03/25/97

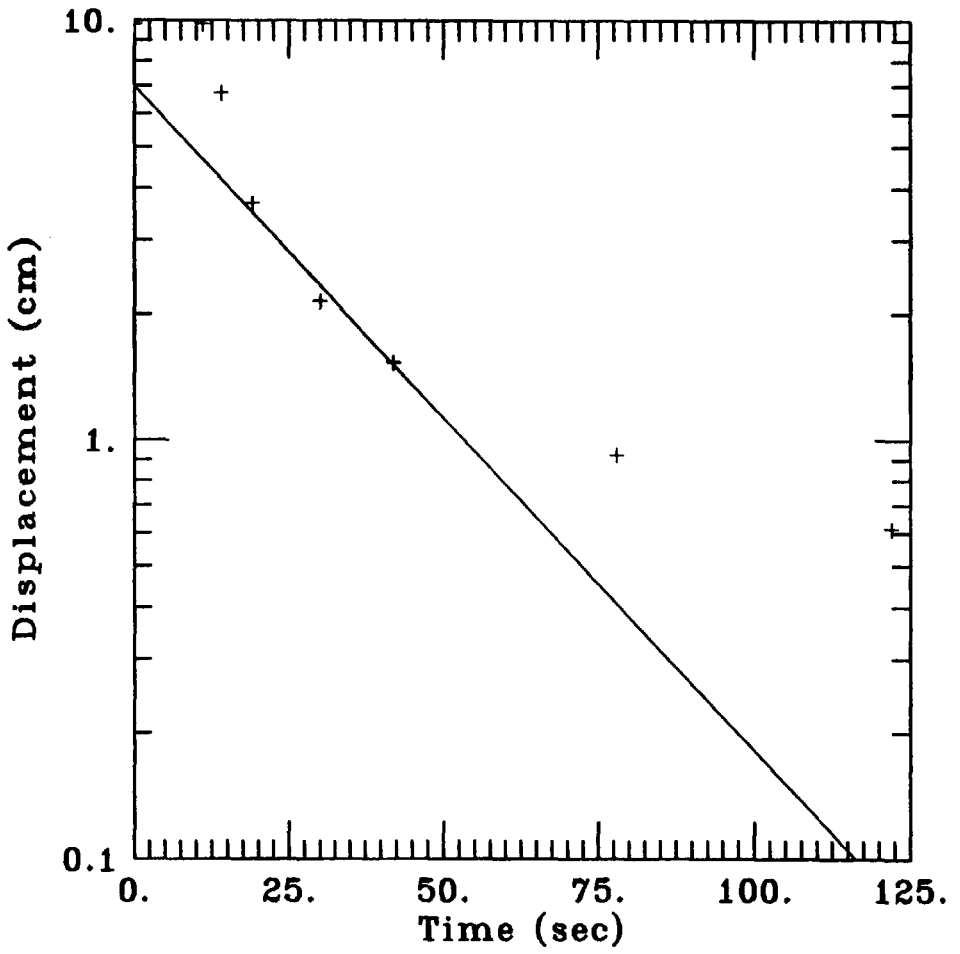
AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
March 1997
TEST WELL:
GM-7

ESTIMATED PARAMETERS:
K = 3.3E-05 cm/sec
y0 = 24. cm

TEST DATA:
H0 = 36.88 cm
rc = 2.539 cm
rw = 7.62 cm
L = 247.2 cm
b = 247.2 cm
H = 247.2 cm

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

GM-9 Rising Head Test



DATA SET:
rgm9rh.dat
03/25/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
March 1997
TEST WELL:
GM-9

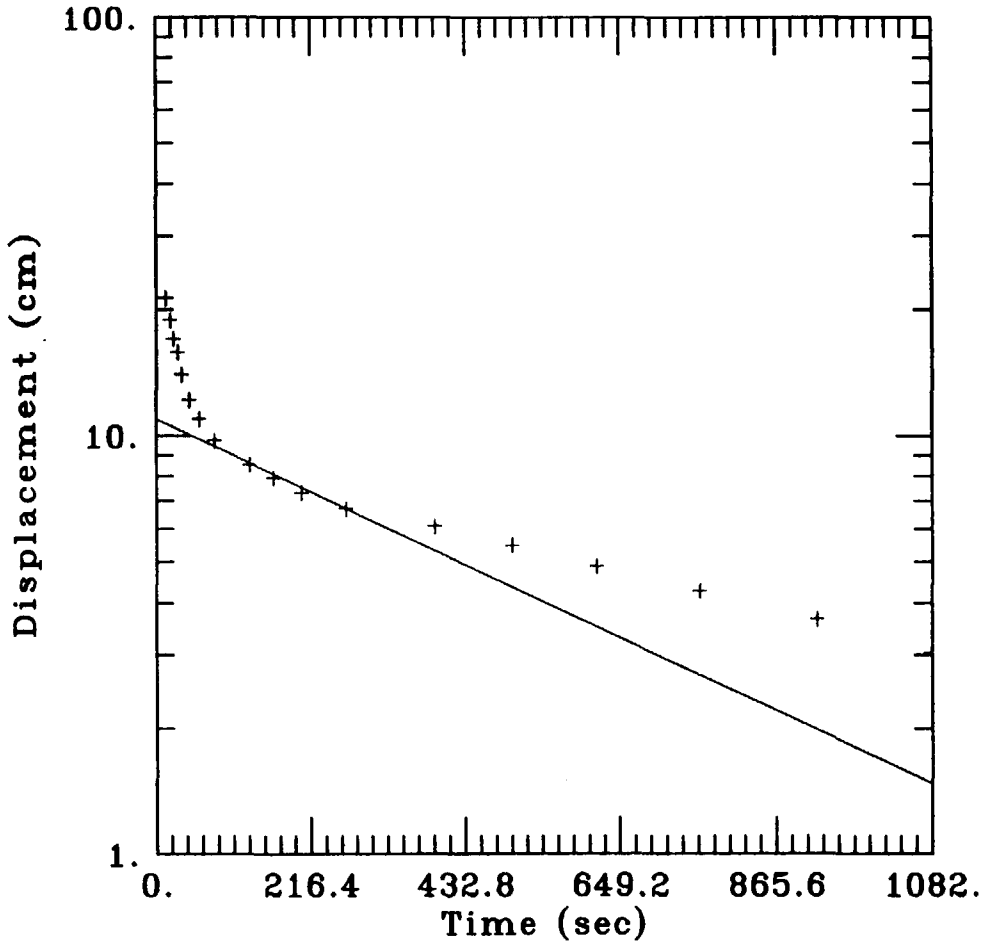
ESTIMATED PARAMETERS:
K = 0.0011 cm/sec
y0 = 7. cm

TEST DATA:
H0 = 9.754 cm
rc = 2.539 cm
rw = 7.62 cm
L = 304.8 cm
b = 323.7 cm
H = 323.7 cm

302182

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

GM-12 Rising Head Test



DATA SET:
rgm12rh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1996
TEST WELL:
GM-12

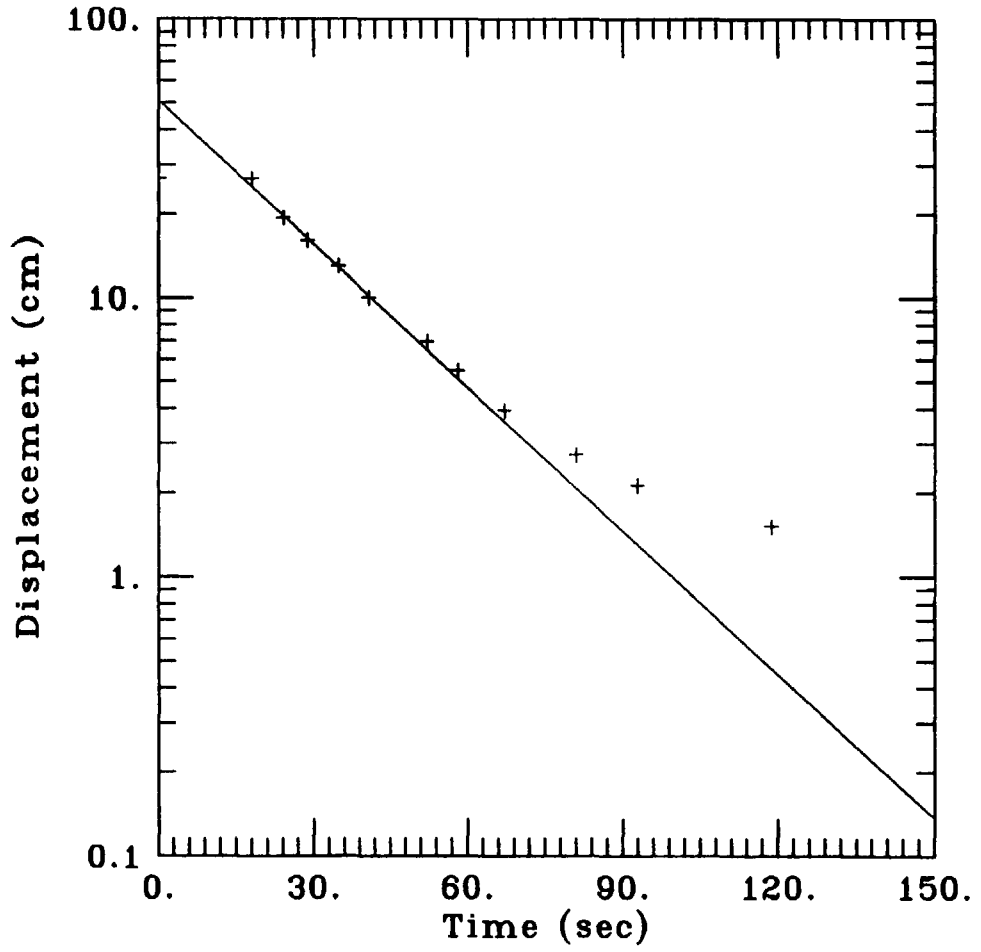
ESTIMATED PARAMETERS:
K = 5.4E-05 cm/sec
y0 = 11. cm

TEST DATA:
H0 = 21.34 cm
rc = 2.53 cm
rw = 10.15 cm
L = 271.3 cm
b = 271.3 cm
H = 271.3 cm

302183

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

GM--14A Rising Head Test



DATA SET:
rgm14arh.dat
03/12/97

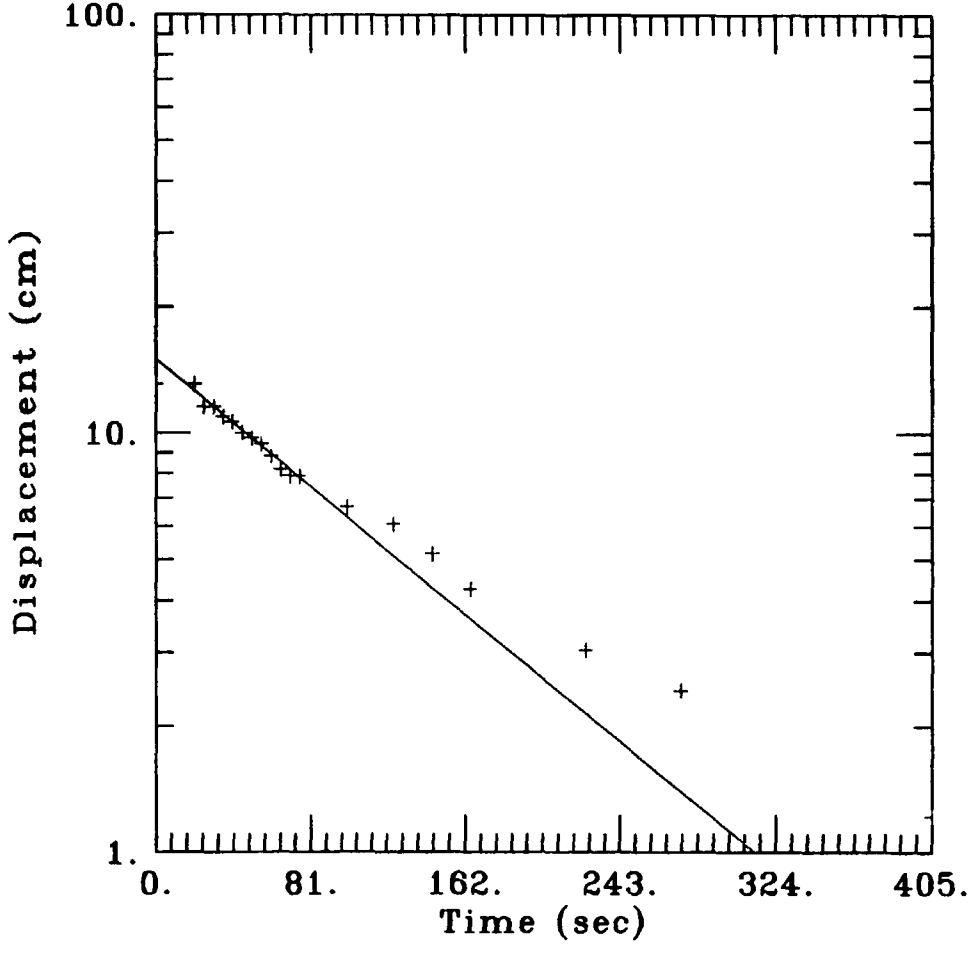
AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1996
TEST WELL:
GM-14A

ESTIMATED PARAMETERS:
K = 0.0012 cm/sec
y0 = 51. cm

TEST DATA:
H0 = 26.82 cm
rc = 2.53 cm
rw = 10.15 cm
L = 304.8 cm
b = 518.2 cm
H = 518.2 cm

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

GM-15 Rising Head Test



DATA SET:
rgm15rh.dat
03/12/97

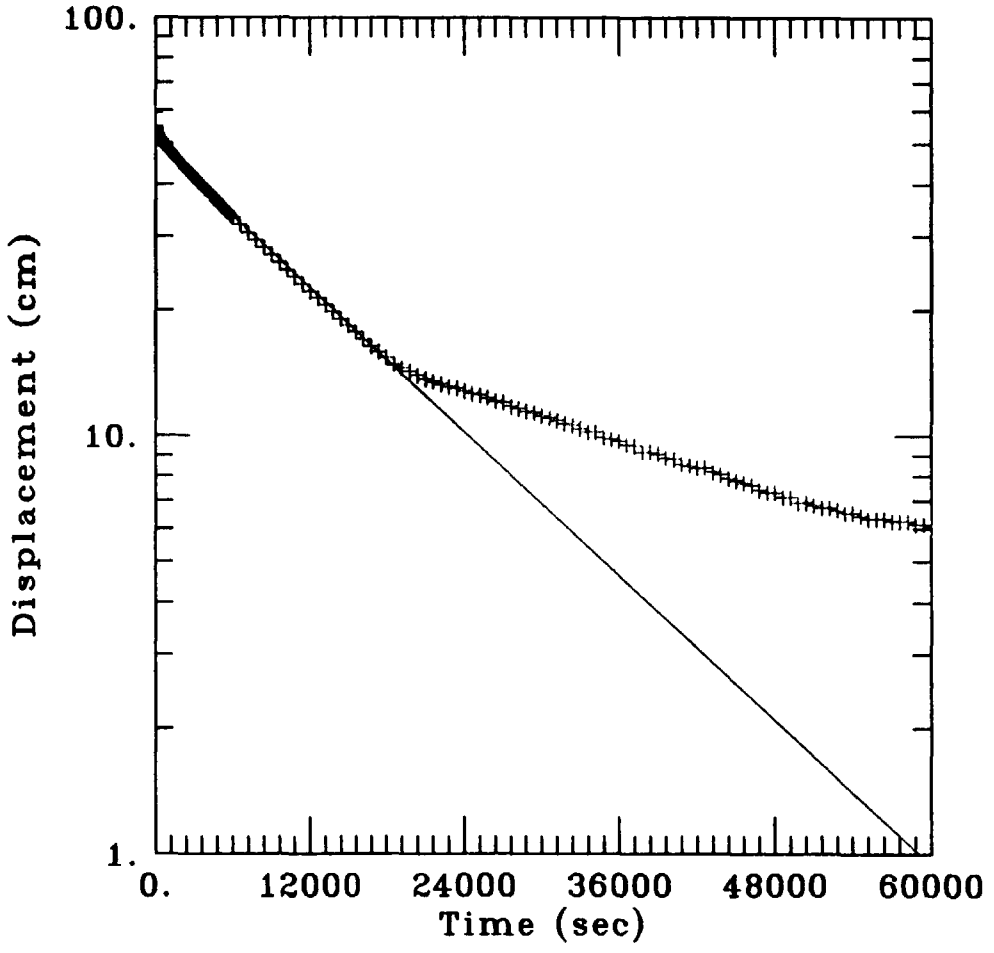
AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1996
TEST WELL:
GM-15

ESTIMATED PARAMETERS:
K = 0.00026 cm/sec
y0 = 15. cm

TEST DATA:
H0 = 13.11 cm
rc = 2.53 cm
rw = 10.15 cm
L = 258.5 cm
b = 258.5 cm
H = 258.5 cm

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-16D Falling Head Test



DATA SET:
rmp16dfh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-16D

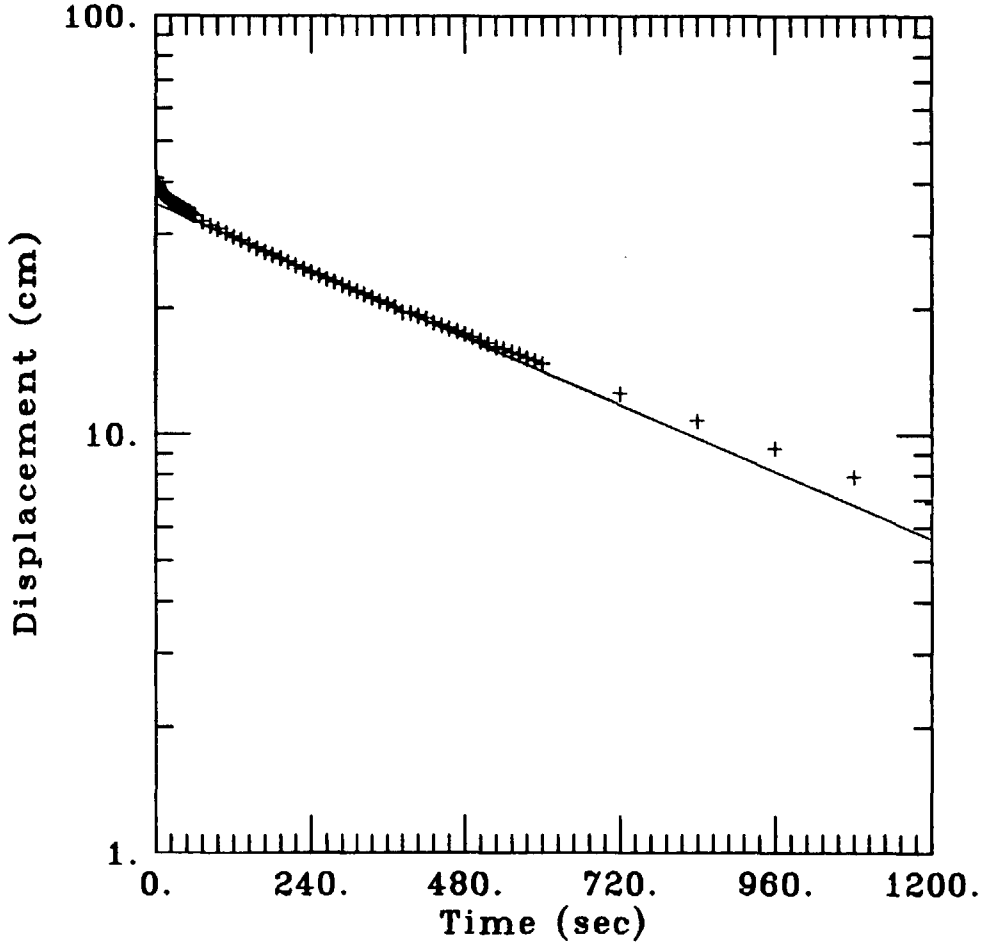
ESTIMATED PARAMETERS:
K = 9.9E-06 cm/sec
y0 = 50. cm

TEST DATA:
H0 = 59.13 cm
rc = 5.09 cm
rw = 10.15 cm
L = 304.8 cm
b = 1571.5 cm
H = 1571.5 cm

302186

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-18S Rising Head Test



DATA SET:
rmp18srh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-18S

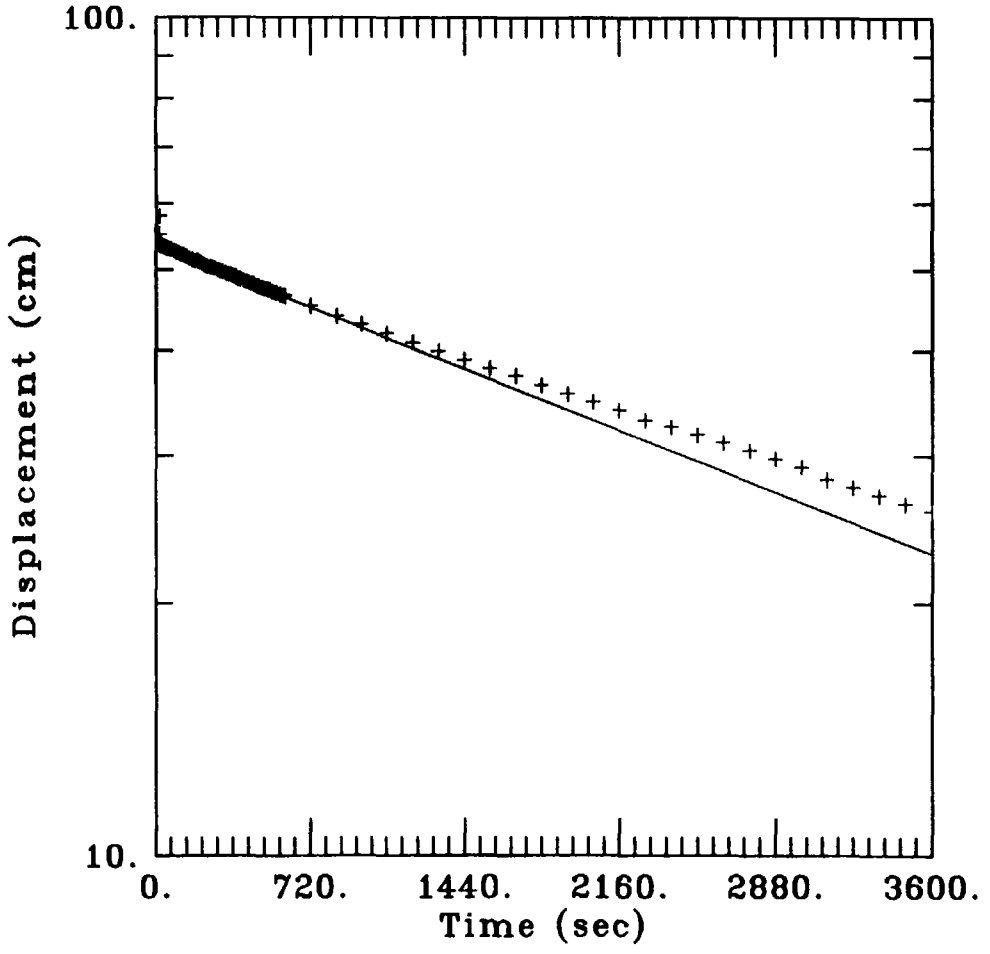
ESTIMATED PARAMETERS:
K = 0.00018 cm/sec
y0 = 35.5 cm

TEST DATA:
H0 = 41.09 cm
rc = 5.09 cm
rw = 10.15 cm
L = 273.1 cm
b = 273.1 cm
H = 273.1 cm

302187

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-18D Falling Head Test



DATA SET:
rmp18dfh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-18D

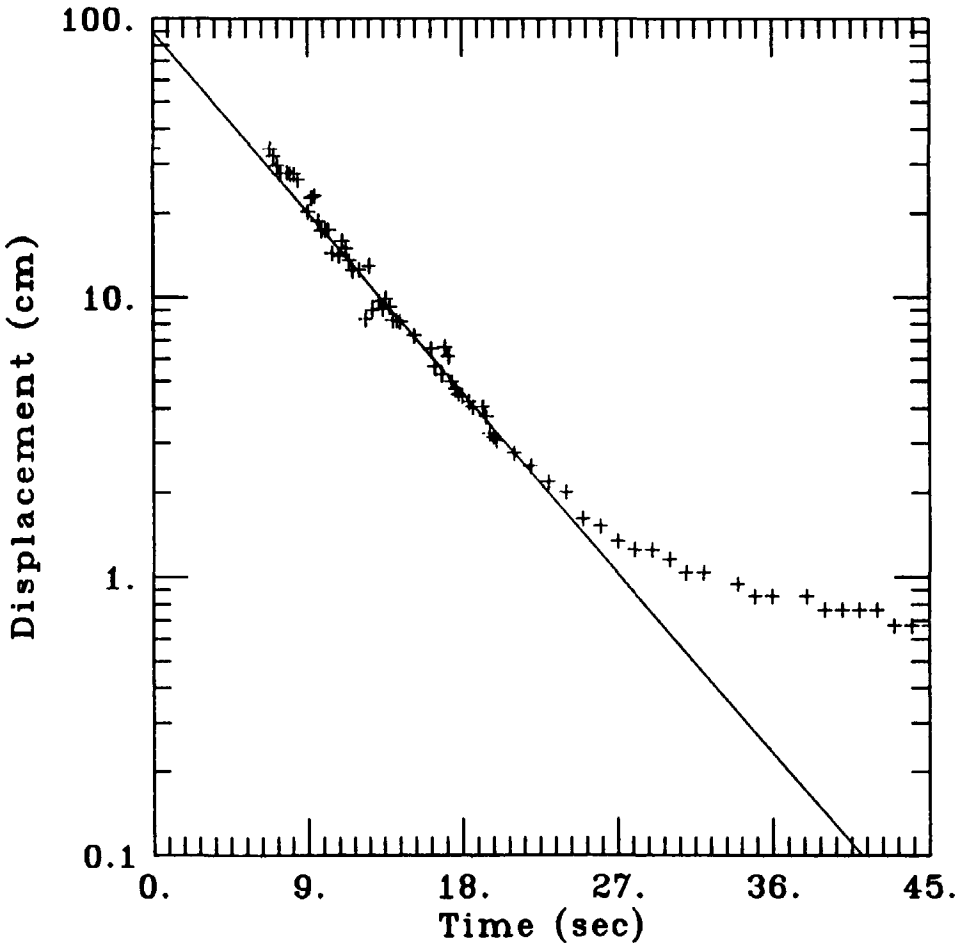
ESTIMATED PARAMETERS:
K = 3.4E-05 cm/sec
y0 = 53.5 cm

TEST DATA:
H0 = 58. cm
rc = 5.09 cm
rw = 10.15 cm
L = 304.8 cm
b = 1245.4 cm
H = 1245.4 cm

302188

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-19D Falling Head Test



DATA SET:
rmp19dfh.dat
03/12/97

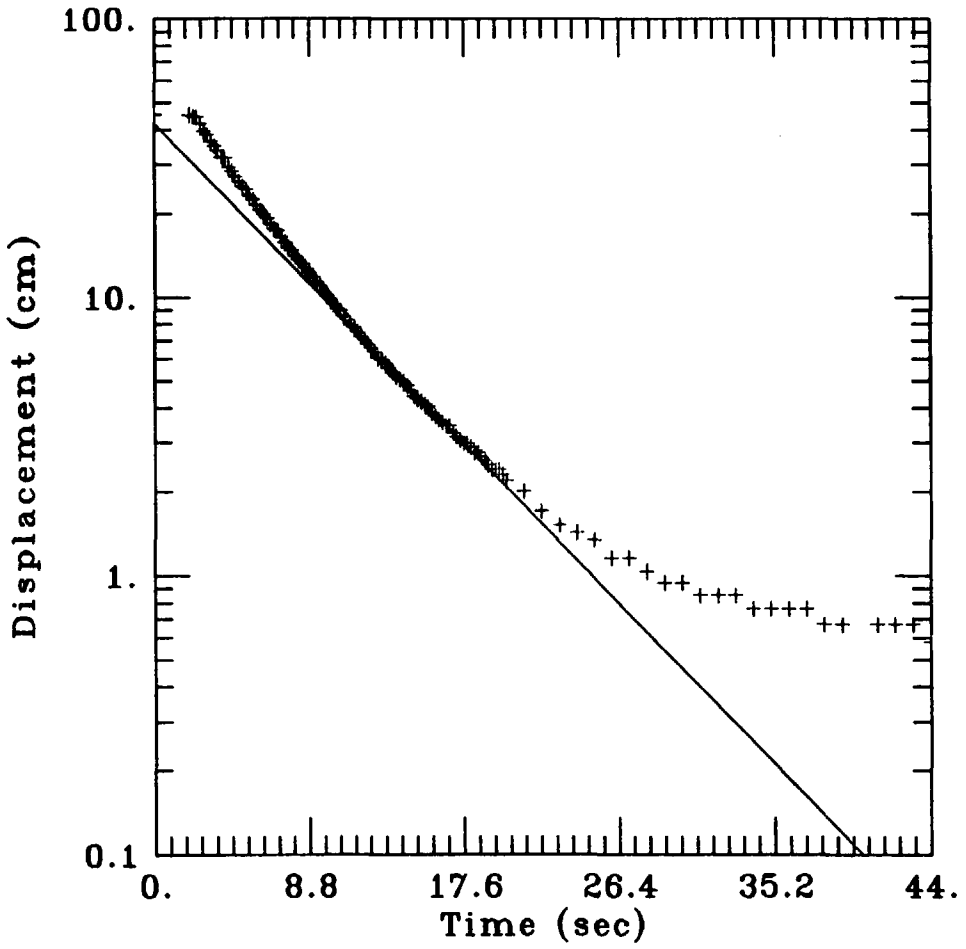
AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-19D

ESTIMATED PARAMETERS:
K = 0.022 cm/sec
y0 = 90. cm

TEST DATA:
H0 = 34.17 cm
rc = 5.09 cm
rw = 10.15 cm
L = 304.8 cm
b = 773.9 cm
H = 773.9 cm

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-19D Rising Head Test



DATA SET:
rmp19drh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-19D

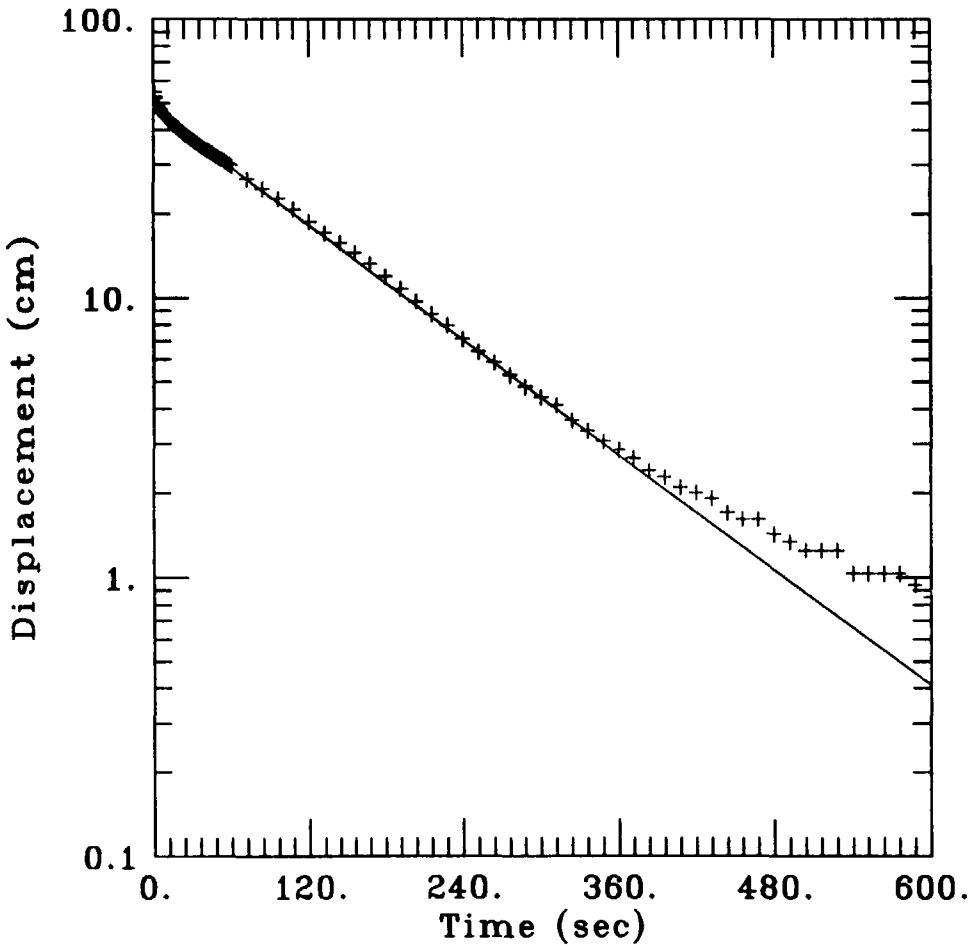
ESTIMATED PARAMETERS:
K = 0.02 cm/sec
y0 = 42.3 cm

TEST DATA:
H0 = 45.26 cm
rc = 5.09 cm
rw = 10.15 cm
L = 304.8 cm
b = 773.9 cm
H = 773.9 cm

302190

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-20 Rising Head Test



DATA SET:
rmp20rh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-20

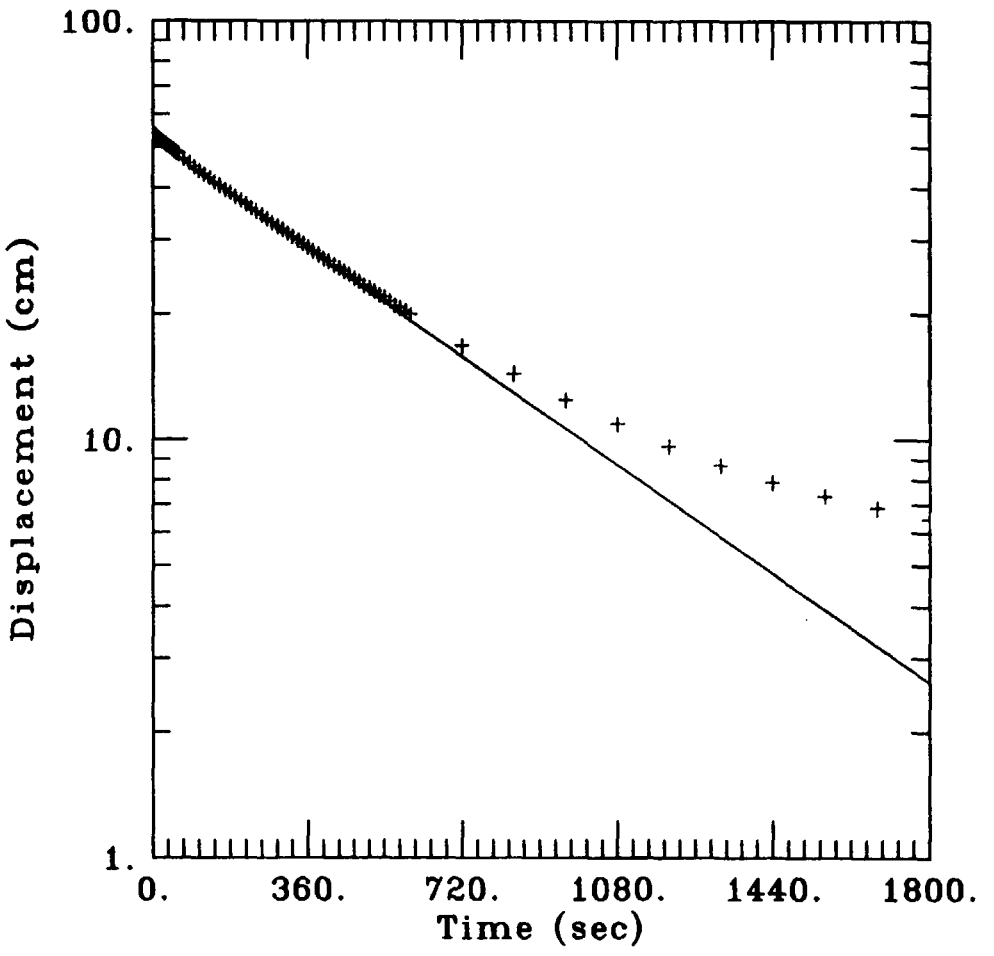
ESTIMATED PARAMETERS:
K = 0.00095 cm/sec
y0 = 46.93 cm

TEST DATA:
H0 = 54.96 cm
rc = 5.09 cm
rw = 10.15 cm
L = 262.7 cm
b = 262.7 cm
H = 262.7 cm

302191

MALCOLM PIRNIE, INC.	Client: U.S.E.P.A.
Project No.: 8001202	Location: Glen Cove, New York

MP-21D Rising Head Test



DATA SET:
rmp21drh.dat
03/12/97

AQUIFER TYPE:
Unconfined
SOLUTION METHOD:
Bouwer-Rice
TEST DATE:
February 1997
TEST WELL:
MP-21D

ESTIMATED PARAMETERS:
K = 0.00025 cm/sec
y0 = 52.21 cm

TEST DATA:
H0 = 54.13 cm
rc = 5.09 cm
rw = 10.15 cm
L = 304.8 cm
b = 1631.3 cm
H = 1631.3 cm

302192

APPENDIX N

302193

Appendix N

Laboratory Summary Data Tables

VOLATILE ORGANIC COMPOUNDS DATA

SITE N. LITUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM

VOLATILE ORGANIC DATA
SOIL BORINGS

VOLATILES											
Sample ID No.	LT-SB-01	LT-SB-02	LT-SB-02B	LT-SB-03	LT-SB-03B	LT-SB-04	LT-SB-04B	LT-SB-5	LT-SB-5B	LT-SB-06	LT-SB-07
Traffic Report No.	SB0113	SB0213	SB0235	SB0313	B03B3S	SB0413	B04B3S	SB0502	B05B24	LTSB06	SB0702
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1	1	1
Percent Moisture	13	10	11	9	10	9	10	17	23	24	13
Sample Date	08/27/96	08/23/96	08/23/96	08/26/96	08/26/96	08/26/96	08/26/96	09/04/96	09/04/96	10/21/96	08/27/96
Sample Time	1255	1305	1310	1140	1145	1410	1415	1050	1055	1530	0823
Beginning Depth	1	1	3	1	3	1	3	0	2	0	0
Ending Depth	3	3	5	3	5	3	5	2	4	1	2
Site ID	SB01	SB02	SB02B	SB03	SB03B	SB04	SB04B	SB05	SB05B	SB06	SB07
Parcel	A	A	A	A	A	A	A	A	A	A	A
Chloromethane										R	
Bromomethane										R	
Vinyl Chloride										R	
Chloroethane										R	
Methylene Chloride	3 J							22			
Acetone											
Carbon Disulfide										R	
1,1-Dichloroethene										R	
1,1-Dichloroethane										R	
1,2-Dichloroethene (total)			14 E							R	
Chloroform								3 J		R	
1,2-Dichloroethane										R	
2-Butanone		11 J							4 J	R	
1,1,1-Trichloroethane								8 J	5 J	R	
Carbon Tetrachloride										R	
Bromodichloromethane										R	
1,2-Dichloropropane										R	
cis-1,3-Dichloropropene										R	
Trichloroethene										R	
Dibromochloromethane										R	
1,1,2-Trichloroethane										R	
Benzene										R	
trans-1,3-Dichloropropene										R	
Bromoform										R	
4-Methyl-2-Pentanone										R	
2-Hexanone								7 J	8 J	R	
Tetrachloroethene	1 J									R	
1,1,2,2-Tetrachloroethane										R	
Toluene								5 J		R	
Chlorobenzene										R	
Ethylbenzene										R	
Styrene										R	
Xylenes (total)										R	

K:\8001202\RIREPT\DATA\VOA[SB XLS]soil borings

302196

SITE N[illegible] LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM

VOLATILE ORGANIC DATA
SOIL BORINGS

VOLATILES											
Sample ID No.	LT-SB-07B	LT-SB-08	LT-SB-09	LT-SB-09B	LT-SB-10	LT-SB-10B	LT-SB-11	LT-SB-11B	LT-SB-12	LT-SB-12B	LT-SB-13
Traffic Report No.	B07B24	SB0802	SB0902	B09B68	SB1002	B10B24	SB1102	11B810	SB1202	B12B24	SB1304
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1	1	1
Percent Moisture	7	10	9	17	16	30	9	7	29	19	11
Sample Date	08/27/96	08/27/96	08/28/96	08/28/96	08/28/96	08/28/96	08/26/96	08/26/96	08/28/96	08/28/96	08/22/96
Sample Time	0830	0910	1039	1131	1415	1419	1234	1455	0900	0915	1534
Beginning Depth	2	0	0	6	0	2	0	8	0	2	0
Ending Depth	4	2	2	8	2	4	2	10	2	4	4
Site ID	SB07B	SB08	SB09	SB09B	SB10	SB10B	SB11	SB11B	SB12	SB12B	SB13
Parcel	A	A	B	B	B	B	B	B	B	B	B
Chloromethane											
Bromomethane											
Vinyl Chloride											
Chloroethane											
Methylene Chloride											
Acetone			11 J	19 E		27 E			B	B	
Carbon Disulfide											
1,1-Dichloroethene											
1,1-Dichloroethane											
1,2-Dichloroethene (total)											
Chloroform											
1,2-Dichloroethane											
2-Butanone											
1,1,1-Trichloroethane											
Carbon Tetrachloride											
Bromodichloromethane											
1,2-Dichloropropane											
cis-1,3-Dichloropropene											
Trichloroethene											
Dibromochloromethane											
1,1,2-Trichloroethane											
Benzene											
trans-1,3-Dichloropropene											
Bromoform											
4-Methyl-2-Pentanone											
2-Hexanone									1 J		
Tetrachloroethene											
1,1,2,2-Tetrachloroethane											
Toluene											
Chlorobenzene											
Ethylbenzene											
Styrene											
Xylenes (total)											

K:\8001202\REPT\DATA\VOA\[SB XLS]soil borings

302197

SITE N. . . LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM

VOLATILE ORGANIC DATA
SOIL BORINGS

VOLATILES												
Sample ID No.	LT-SB-DUP-01	LT-SB-13B	LT-SB-14	LT-SB-14B	LT-SB-15	LT-SB-15B	LT-SB-16	LT-SB-16B	LT-SB-17	LT-SB-17B	LT-SB-18
Traffic Report No.	BDUP01	3B1416	SB1402	B14B68	SBIS02	B1SB46	SB1602	16B810	SB1702	B17B46	SB1802
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1	1	1
Percent Moisture	12	11	17	6	32	12	11	9	15	11	4
Sample Date	8/22/96	08/29/96	08/30/96	08/30/96	08/28/96	08/28/96	08/22/96	08/22/96	08/29/96	08/29/96	08/21/96
Sample Time	1534	1602	1010	1045	1457	1516	0912	1004	0910	0911	1026
Beginning Depth	0	14	0	6	0	4	0	8	0	4	0
Ending Depth	4	16	2	8	2	6	2	10	2	6	2
Site ID	SB13	SB13B	SB14	SB14B	SB15	SB15B	SB16	SB16B	SB17	SB17B	SB18
Parcel	B	B	B	B	B	B	B	B	B	B	B
Chloromethane											
Bromomethane											
Vinyl Chloride											
Chloroethane											
Methylene Chloride											
Acetone											
Carbon Disulfide											
1,1-Dichloroethene											
1,1-Dichloroethane											
1,2-Dichloroethene (total)											
Chloroform											
1,2-Dichloroethane											
2-Butanone											
1,1,1-Trichloroethane											
Carbon Tetrachloride											
Bromodichloromethane											
1,2-Dichloropropane											
cis-1,3-Dichloropropene											
Trichloroethene											
Dibromochloromethane											
1,1,2-Trichloroethane											
Benzene											
trans-1,3-Dichloropropene											
Bromoform											
4-Methyl-2-Pentanone											
2-Hexanone											
Tetrachloroethene											
1,1,2,2-Tetrachloroethane											
Toluene											
Chlorobenzene											
Ethylbenzene											
Styrene											
Xylenes (total)											

302198

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM

VOLATILE ORGANIC DATA
SOIL BORINGS

VOLATILES											
Sample ID No.	LT-SB-19	LT-SB-19B	LT-SB-20	LT-SB-20B	LT-SB-21	LT-SB-22	LT-SB-23	LT-SB-23B	LT-SB-24	LT-SB-24B	LT-SB-25
Traffic Report No.	SB1902	SB19B2	SB2002	SB20B4	LTSB21	LTSB22	SB2302	B23B24	SB2402	B24B24	SB2502
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1	1	1
Percent Moisture	16	15	32	18	23	31	15	13	15	14	13
Sample Date	08/21/96	08/21/96	8/21/96	8/21/96	10/21/96	10/21/96	09/03/96	09/03/96	09/03/96	09/03/96	09/03/96
Sample Time	1437	1450	1537	1551	1245	1200	1445	1452	1405	1415	1055
Beginning Depth	0	2	0	2	2	2	0	2	0	2	0
Ending Depth	2	4	2	4	4	4	2	4	2	4	2
Site ID	SB19	SB19B	SB20	SB20B	SB21	SB22	SB23	SB23B	SB24	SB24B	SB25
Parcel	B	B	B	B	C	C	C	C	C	C	C
Chloromethane					R	R					
Bromomethane					R	R					
Vinyl Chloride					R	R					
Chloroethane					R	R					
Methylene Chloride					R						
Acetone					R		50 E	B	41 E	B	33 E
Carbon Disulfide					R	R					
1,1-Dichloroethene					R	R					
1,1-Dichloroethane					R	R					
1,2-Dichloroethene (total)					R	R					
Chloroform					R	R			1 J		
1,2-Dichloroethane					R	R					
2-Butanone					R	R	2 J				15
1,1,1-Trichloroethane					R	R					
Carbon Tetrachloride					R	R					
Bromodichloromethane					R	R					
1,2-Dichloropropane					R	R					
cis-1,3-Dichloropropene					R	R					
Trichloroethene					R	5 J					
Dibromochloromethane					R	R					
1,1,2-Trichloroethane					R	R					
Benzene					R	R					
trans-1,3-Dichloropropene					R	R					
Bromoform					R	R					
4-Methyl-2-Pentanone					R	R	3 J		4 J	4 J	29
2-Hexanone					R	R					45
Tetrachloroethene					R	R					
1,1,2,2-Tetrachloroethane					R	R					
Toluene					R	R					
Chlorobenzene					R	R					
Ethylbenzene					R	R					
Styrene					R	R				19	
Xylenes (total)					R	R					

K:\8001202\REPT\DATA\VOA(SB XLS)soil borings

SITE N. .. LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM

VOLATILE ORGANIC DATA
SOIL BORINGS

VOLATILES											
Sample ID No.	LT-SB-25B	LT-SB-26	LT-SB-26B	LT-SB-27	LT-SB-27B	LT-SB-28	LT-SB-28B	LT-SB-29	LT-SB-31	LT-SB-32	LT-SB-33
Traffic Report No.	B25B24	SB2602	6B1012	SB2702	B27B46	SB2824	B28B46	LTSB29	LTSB31	LTSB32	LTSB33
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1	1	1
Percent Moisture	18	5	11	5	22	5	12	10	21	19	16
Sample Date	09/03/96	09/24/96	09/24/96	09/24/96	09/24/96	09/25/96	09/25/96	08/27/96	08/28/96	08/28/96	08/28/96
Sample Time	1100	1150	1249	1440	1540	1000	1019	1050	1115	1200	0915
Beginning Depth	2	0	10	0	4	2	4	3	3	3	3
Ending Depth	4	2	12	2	6	4	6	5	5	5	5
Site ID	SB25B	SB26	SB26B	SB27	SB27B	SB28	SB28B	SB29	SB31	SB32	SB33
Parcel	C	C	C	C	C	C	C	A	A	A	A
Chloromethane											
Bromomethane											
Vinyl Chloride											
Chloroethane											
Methylene Chloride								2 J			
Acetone	27 E					50 E			41 E	8	56 E
Carbon Disulfide									3 J	2 J	7 J
1,1-Dichloroethene											
1,1-Dichloroethane											
1,2-Dichloroethene (total)											
Chloroform											
1,2-Dichloroethane											
2-Butanone	6 J								9 J		10 J
1,1,1-Trichloroethane											
Carbon Tetrachloride											
Bromodichloromethane											
1,2-Dichloropropane											
cis-1,3-Dichloropropene											
Trichloroethene											
Dibromochloromethane											
1,1,2-Trichloroethane											
Benzene											
trans-1,3-Dichloropropene											
Bromoform											
4-Methyl-2-Pentanone	4 J										
2-Hexanone	39										
Tetrachloroethene											
1,1,2,2-Tetrachloroethane	4 J										
Toluene						1 J					
Chlorobenzene											
Ethylbenzene											
Styrene											
Xylenes (total)											

K:\8001202\RI\REPT\DATA\VOA\[SB XLS]soil borings

302200

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM

VOLATILE ORGANIC DATA
SOIL BORINGS

VOLATILES									
Sample ID No.	LT-SB-34	LT-SB-DUP04	LT-SB-35	LT-SB-36	LT-SB-37	LT-SB-40	LT-SB-41	LT-SB-DUP10	LT-SB-42
Traffic Report No.	LTSB34	BDUP04	LTSB35	LTSB36	LTSB37	LTSB40	LTSB41	BDUP10	LTSB42
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	12	13	11	7	15	19	10	28	15
Sample Date	08/28/96	08/28/96	08/28/96	8/27/96	8/27/96	9/6/96	09/23/96	09/23/96	09/23/96
Sample Time	0845	0845	0815	1605	1530	1005	1339	1339	1646
Beginning Depth	1	1	1	1	1	2	4	4	4
Ending Depth	3	3	3	3	3	4	8	8	8
Site ID	SB34	SB34	SB35	SB36	SB37	SB40	SB41	SB41	SB42
Parcel	A	A	A	A	A	C	C	C	C
Chloromethane									
Bromomethane									
Vinyl Chloride									
Chloroethane									
Methylene Chloride				2 J			2 J		3 J
Acetone	59 E	78 E	55 E						
Carbon Disulfide			7 J						
1,1-Dichloroethene		6 J							
1,1-Dichloroethane									
1,2-Dichloroethene (total)						5 J			
Chloroform									
1,2-Dichloroethane		2 J							
2-Butanone	9 J	10 J	7 J			7 J			
1,1,1-Trichloroethane									
Carbon Tetrachloride									
Bromodichloromethane									
1,2-Dichloropropane									
cis-1,3-Dichloropropene									
Trichloroethene						2 J			
Dibromochloromethane									
1,1,2-Trichloroethane									
Benzene			1 J						
trans-1,3-Dichloropropene									
Bromoform									
4-Methyl-2-Pentanone			3 J						
2-Hexanone									
Tetrachloroethene				3 J		2 J			
1,1,2,2-Tetrachloroethane									
Toluene						2 J			
Chlorobenzene									
Ethylbenzene									
Styrene									
Xylenes (total)						2 J			

K:\8001202\RIREPT\DATA\VOA\SB XLS]soil borings

SITE N LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM

VOLATILE ORGANIC DATA
MONITORING WELL BORINGS

VOLATILES									
Sample ID No.	LT-SB-MP-2D	LT-SB-MP-4D	LT-SB-DUP-05	LT-SB-MP-4DB	LT-SB-MP-5	LT-SB-MP-5B	LT-SB-MP-6	LT-SB-MP-6B	LT-SB-MP-8D
Traffic Report No.	MP2D13	MP4D13	BDUP05	P4DB35	BMP502	5B1820	BMP602	MP6B24	MP8D02
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	mg/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	25	8	7	6	11	20	15	13	8
Sample Date	09/26/96	08/29/96	08/29/96	08/29/96	09/05/96	09/05/96	08/28/96	08/28/96	09/18/96
Sample Time	1300	1010	1010	1020	1330	1550	1400	1410	0915
Beginning Depth	1	1	1	3	0	18	0	2	0
Ending Depth	3	3	3	5	2	20	2	4	2
Site ID	MP2D	MP4D	MP4D	MP4DB	MP5	MP5B	MP6	MP6B	MP8D
Parcel	A	C	C	C	B	B	A	A	B
Chloromethane									
Bromomethane									
Vinyl Chloride									
Chloroethane									
Methylene Chloride	7 J					3 J			
Acetone									
Carbon Disulfide	1 J								
1,1-Dichloroethene									
1,1-Dichloroethane									
1,2-Dichloroethene (total)									
Chloroform									
1,2-Dichloroethane									
2-Butanone									
1,1,1-Trichloroethane									
Carbon Tetrachloride									
Bromodichloromethane									
1,2-Dichloropropane									
cis-1,3-Dichloropropene									
Trichloroethene									
Dibromochloromethane									
1,1,2-Trichloroethane									
Benzene									
trans-1,3-Dichloropropene									
Bromoform									
4-Methyl-2-Pentanone									
2-Hexanone									
Tetrachloroethene									
1,1,2,2-Tetrachloroethane									
Toluene									
Chlorobenzene									
Ethylbenzene									
Styrene									
Xylenes (total)									

K:\8001202\RIREPT\DATA\VOA\[SB_MW.XLS]soil borings from mw's

SITE N. _ LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM

VOLATILE ORGANIC DATA
MONITORING WELL BORINGS

VOLATILES								
Sample ID No.	LT-SB-MP-8DB	LT-SB-MP-9D	LT-SB-DUP-06	LT-SB-9DB	LT-SB-MP-11D	LT-SB-MP-11DB	LT-SB-MP-16S	LT-SB-MP-16SB
Traffic Report No.	P8DB46	MP9D02	BDUP06	B9DB24	P11D02	1DB810	P16S02	P16S24
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	10	15	12	14	5	14	11	17
Sample Date	09/18/96	09/04/96	09/04/96	09/04/96	09/25/96	09/25/96	10/10/96	10/10/96
Sample Time	0940	1207	1207	1211	1601	1640	1345	1410
Beginning Depth	4	0	0	2	0	8	0	2
Ending Depth	6	2	2	4	2	10	2	4
Site ID	MP8DB	MP9D	MP9D	MP9DB	MP11D	MP11DB	MP16S	MP16SB
Parcel	B	B	B	B	C	C	C	C
Chloromethane								
Bromomethane								
Vinyl Chloride								
Chloroethane								
Methylene Chloride					3 J	5 J		
Acetone						15		
Carbon Disulfide								
1,1-Dichloroethene								
1,1-Dichloroethane								
1,2-Dichloroethene (total)								
Chloroform								
1,2-Dichloroethane								
2-Butanone								12 J
1,1,1-Trichloroethane								
Carbon Tetrachloride								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene								
Dibromochloromethane								
1,1,2-Trichloroethane								
Benzene								
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone								
2-Hexanone								
Tetrachloroethene								
1,1,2,2-Tetrachloroethane								
Toluene								
Chlorobenzene								
Ethylbenzene								
Styrene								
Xylenes (total)								

K:\8001202\REPT\DATA\VOA\[SB_MW XLS]soil borings from mw's

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM

VOLATILE ORGANIC DATA
MONITORING WELL BORINGS

VOLATILES								
Sample ID No.	LT-SB-MP-18	LT-SB-MP-18B	LT-SB-MP-20	LT-SB-MP-20B	LT-SB-MP-22	LT-SB-MP-22B	LT-SB-MP-22D	LT-SB-MP-22DB
Traffic Report No.	MP1802	P18B24	MP2002	P20B23	MP2213	P22B35	MP22D	MP22DB
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	mg/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	16	16	8	9	13	12	10	11
Sample Date	09/03/96	09/03/96	09/09/96	09/09/96	08/21/96	08/21/96	08/13/96	08/13/96
Sample Time	1515	1520	1345	1355	1455	1500	1230	1245
Beginning Depth	0	2	0	2	1	3	1	3
Ending Depth	2	4	2	3	3	5	3	5
Site ID	MP18	MP18B	MP20	MP20B	MP22	MP22B	MP22D	MP22DB
Parcel	C	C	A	A	A	A	A	A
Chloromethane								
Bromomethane								
Vinyl Chloride								
Chloroethane								
Methylene Chloride					2 J			
Acetone	8				190 E			
Carbon Disulfide								
1,1-Dichloroethene								
1,1-Dichloroethane								
1,2-Dichloroethene (total)			4 J	6 J				
Chloroform								
1,2-Dichloroethane								
2-Butanone					52		17	16
1,1,1-Trichloroethane								
Carbon Tetrachloride								
Bromodichloromethane								
1,2-Dichloropropane	3 J							
cis-1,3-Dichloropropene								
Trichloroethene			3 J					
Dibromochloromethane								
1,1,2-Trichloroethane								
Benzene	2 J							
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone	5 J							
2-Hexanone	26							
Tetrachloroethene			39 E	45				
1,1,2,2-Tetrachloroethane								
Toluene								
Chlorobenzene		1 J						
Ethylbenzene							8 J	10 J
Styrene		7 J						
Xylenes (total)								

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SITE NAME: [illegible]NGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM

VOLATILE ORGANIC DATA
SURFACE SOIL

VOLATILES													
Sample ID No.	LT-SS-01	LT-SS-02	LT-SS-03	LT-SS-04	LT-SS-05	LT-SS-06	LT-SS-07	LT-SS-08	LT-SS-09	LT-SS-10	LT-SS-11	LT-SS-DUP09	LT-SS-12
Traffic Report No.	LTSS01	LTSS02	LTSS03	LTSS04	LTSS05	LTSS06	LTSS07	LTSS08	LTSS09	LTSS10	LTSS11	SDUP09	LTSS12
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1	1	1	1	1
Percent Moisture	6	3	28	18	4	2	4	12	10	6	38	35	48
Sample Date	09/04/96	09/05/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	09/09/96	09/11/96	09/11/96	09/20/96	9/20/96	09/20/96
Sample Time	1211	1423	1454	1545	1125	1331	1404	1135	1345	1445	1058	1100	1200
Beginning Depth	0	0	0	0	0	0	0	0	0	0	0	0	0
Ending Depth	2	2	2	2	2	2	2	2	2	2	2	2	2
Site ID	SS01	SS02	SS03	SS04	SS05	SS06	SS07	SS08	SS09	SS10	SS11	SS11	SS12
Parcel	A	A	A	C	A	B	A	B	A	C	C	C	C
Chloromethane													
Bromomethane													
Vinyl Chloride													
Chloroethane													
Methylene Chloride		2 J		4 J	1 J	3 J	4 J	16		4 J	3 J		
Acetone						10 J							
Carbon Disulfide													
1,1-Dichloroethene													
1,1-Dichloroethane													
1,2-Dichloroethene (total)													
Chloroform													
1,2-Dichloroethane													
2-Butanone								4 J					
1,1,1-Trichloroethane													
Carbon Tetrachloride													
Bromodichloromethane													
1,2-Dichloropropane													
cis-1,3-Dichloropropene													
Trichloroethene													
Dibromochloromethane													
1,1,2-Trichloroethane													
Benzene								4 J					
trans-1,3-Dichloropropene													
Bromoform													
4-Methyl-2-Pentanone													
2-Hexanone													
Tetrachloroethene		2 J											
1,1,2,2-Tetrachloroethane													
Toluene													
Chlorobenzene													
Ethylbenzene													
Styrene													
Xylenes (total)													

SITE Name: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

VOLATILE ORGANIC DATA
TEST PITS

VOLATILES									
Sample ID No.	LT-SB-TP-01	LT-SB-TP-DUP	LT-SB-TP-02	LT-SB-TP-03	LT-SB-TP-04	LT-SB-TP-05	LT-SB-TP-06	LT-SB-TP-07	LT-SB-TP-08
Traffic Report No.	SBTP01	SBTPDU	SBTP02	SBTP03	SBTP04	SBTP05	SBTP06	SBTP07	SBTP08
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	22	20	12	17	11	29	11	9	14
Sample Date	08/13/96	08/13/96	08/14/96	08/15/96	08/15/96	08/15/96	08/14/96	08/16/96	08/20/96
Sample Time	1355	1355	0946	1350	0948	1152	1429	1046	1440
Beginning Depth	1	1	1	0	4	0	2	1	0
Ending Depth	2	2	2	1	5	1	3	2	1
Site ID	TP01	TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08
Parcel	B	B	B	B	B	B	B	B	C
Chloromethane									
Bromomethane									
Vinyl Chloride									
Chloroethane									
Methylene Chloride									
Acetone			56						
Carbon Disulfide									
1,1-Dichloroethene									
1,1-Dichloroethane									
1,2-Dichloroethene (total)									
Chloroform									
1,2-Dichloroethane									
2-Butanone			14	3 J					
1,1,1-Trichloroethane									
Carbon Tetrachloride									
Bromodichloromethane									
1,2-Dichloropropane									
cis-1,3-Dichloropropene									
Trichloroethene									
Dibromochloromethane									
1,1,2-Trichloroethane									
Benzene									
trans-1,3-Dichloropropene									
Bromoform									
4-Methyl-2-Pentanone			17 E						
2-Hexanone									
Tetrachloroethene									
1,1,2,2-Tetrachloroethane									
Toluene									
Chlorobenzene									
Ethylbenzene									
Styrene									
Xylenes (total)									

NOTES:

Blank Space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%.

302206

SITE N. LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURCES

VOLATILE ORGANIC DATA
GROUNDWATER - ROUND 1

VOLATILES									
Sample ID No.	LT-GW-GM-1	LT-GW-GM-2	LT-GW-GM-7	LT-GW-GM8	LT-GW-GM-9	LT-GW-GM10	LT-GW-GM11	LT-GW-GM12	LT-GW-GM-13
Traffic Report No.	GM-1	GM-2	GM7	GM8	GM9	GM10	GM11	GM12	GM13
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	Ug/L	Ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	10	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--	--
Chloromethane									
Bromomethane									
Vinyl Chloride									
Chloroethane									
Methylene Chloride		10 B							
Acetone					8 J				20 E
Carbon Disulfide									
1,1-Dichloroethene						21 J			
1,1-Dichloroethane						75 J			
1,2-Dichloroethene (total)	8.5 J					520			6 J
Chloroform									
1,2-Dichloroethane	5 J								
2-Butanone									
1,1,1-Trichloroethane						1200			
Carbon Tetrachloride						170			
Bromodichloromethane									
1,2-Dichloropropane									
cis-1,3-Dichloropropene									
Trichloroethene	4.1 J					320			4 J
Dibromochloromethane									
1,1,2-Trichloroethane	26								
Benzene									
trans-1,3-Dichloropropene									
Bromoform									
4-Methyl-2-Pentanone									
2-Hexanone									
Tetrachloroethene	3.1 J			1 J		110			
1,1,2,2-Tetrachloroethane									
Toluene									
Chlorobenzene									
Ethylbenzene									
Styrene									
Xylenes (total)									

302207

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURCES

VOLATILE ORGANIC DATA
GROUNDWATER - ROUND 1

VOLATILES								
Sample ID No.	LT-GW-GM14A	LT-GW-GM14B	LT-GW-EMW-1	LT-GW-EMW4	LT-GW-MW8S	LT-GW-MW8D	LT-GW-MW10D	LT-GW-MP-2D
Traffic Report No.	GM14A	GM14B	EMW1	EMW4	MW8S	MW8D	MW10D	MP-2D
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	Ug/L
Dilution Factor	1	1	11.1	1	33.3	250	227.3	1
Percent Moisture	–	–	–	–	–	–	–	–
Chloromethane								
Bromomethane								
Vinyl Chloride								72
Chloroethane								28
Methylene Chloride					860	120000	4800	
Acetone		280 D				17000	14000	63
Carbon Disulfide		1 J						
1,1-Dichloroethene					160 J	650 J		
1,1-Dichloroethane					1000	3600	1600 J	
1,2-Dichloroethene (total)			86 J		17000	150000	68000	184.9
Chloroform						230 J	2200 J	
1,2-Dichloroethane						790 J		4.9 J
2-Butanone		72				15000	7500	
1,1,1-Trichloroethane					5400	15000	7000	
Carbon Tetrachloride								
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene			250		4000	15000	31000	87
Dibromochloromethane								
1,1,2-Trichloroethane								
Benzene		1 J			160 J	540 J	540 J	3.3 J
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone						17000		
2-Hexanone								
Tetrachloroethene			1300		770	3100	6600	61
1,1,2,2-Tetrachloroethane								
Toluene		1 J			1400	64000	85000 D	
Chlorobenzene								
Ethylbenzene					52 J	2100 J	5800	
Styrene								
Xylenes (total)					230 J	11000	32000	

302208

SITE N. LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURCES

VOLATILE ORGANIC DATA
GROUNDWATER - ROUND 1

VOLATILES								
Sample ID No.	LT-GW-MP-4	LT-GW-MP-5	LT-GW-MP-6	LT-GW-MP11D	LT-GW-MP-16S	LT-GW-MP-16D	LT-GW-MP-17	LT-GW-MP18S
Traffic Report No.	MP4	MP5	MP-6	MP11	MP16S	MP16D	MP-17	MP18S
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	Ug/L	ug/L	ug/L	ug/L	Ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
Chloromethane			2.2 J					
Bromomethane								
Vinyl Chloride								1 J
Chloroethane								
Methylene Chloride		1 J						
Acetone	5 J	6 J			41	69	16	
Carbon Disulfide								
1,1-Dichloroethene								
1,1-Dichloroethane								8 J
1,2-Dichloroethene (total)			7.1 J			4 J		14
Chloroform								
1,2-Dichloroethane								2 J
2-Butanone			3700	120	220	120 E		
1,1,1-Trichloroethane								3 J
Carbon Tetrachloride								2 J
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene			4.4 J			3 J		9 J
Dibromochloromethane								
1,1,2-Trichloroethane								1 J
Benzene							2.9 J	0.9 J
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone								
2-Hexanone								
Tetrachloroethene			40					5 J
1,1,2,2-Tetrachloroethane								1 J
Toluene				1 J		28	4.8 J	1 J
Chlorobenzene								1 J
Ethylbenzene						5 J		2 J
Styrene								
Xylenes (total)						25	3 J	9 J

302209

SITE N... LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURCES

VOLATILE ORGANIC DATA
GROUNDWATER - ROUND 1

VOLATILES							
Sample ID No.	LT-GW-MP18D	LT-GW-MP-19D	LT-GW-MP-20	LT-GW-MP-21D	LT-GW-MP-22	LT-GW-MP-22D	LT-GW-DUP-04
Traffic Report No.	MP18D	MP19D	MP-20	MP-21D	MP-22	MP-22D	DUP04
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	Ug/L	Ug/L	Ug/L	Ug/L	ug/L
Dilution Factor	1	1	1	5	1	1	1
Percent Moisture	–	–	--	--	–	--	–
Chloromethane							
Bromomethane							
Vinyl Chloride	4 J			14 J			
Chloroethane							
Methylene Chloride					11 B		
Acetone							
Carbon Disulfide							
1,1-Dichloroethene							
1,1-Dichloroethane	3 J						
1,2-Dichloroethene (total)	4 J		7.2 J	420			
Chloroform							
1,2-Dichloroethane							
2-Butanone			3800 E				
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Bromodichloromethane							
1,2-Dichloropropane							
cis-1,3-Dichloropropene							
Trichloroethene			4.4 J	140			
Dibromochloromethane							
1,1,2-Trichloroethane							
Benzene							
trans-1,3-Dichloropropene							
Bromoform							
4-Methyl-2-Pentanone							
2-Hexanone							
Tetrachloroethene		13	38	590			
1,1,2,2-Tetrachloroethane							
Toluene							
Chlorobenzene							
Ethylbenzene							
Styrene							
Xylenes (total)							

NOTES:
Blank Space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%.

302210

VOLATILE ORGANIC DATA
GROUNDWATER - ROUND 2

SITE NAME:LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

Note: These samples were collected during the second round of groundwater sampling.

VOLATILES									
Sample ID No.	LT-GW-GM-1	LT-GW-GM-2	LT-GW-GM-7	LT-GW-GM-8	LT-GW-GM-9	LT-GW-GM-10	LT-GW-GM-11	LT-GW-GM-12	LT-GW-GM-13
Traffic Report No.	GM1	GM2	GM7	GM8	GM9	GM10	GM11	GM12	GM13
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	50	1	1	1	1	5	1	1	1
Percent Moisture	–	–	–	–	–	–	–	–	–
Chloromethane									
Bromomethane									
Vinyl Chloride	96 J								
Chloroethane									
Methylene Chloride				1 J			1 J		
Acetone			4 J	10 E	6 J		9 J		
Carbon Disulfide									
1,1-Dichloroethene									
1,1-Dichloroethane						38 J			
1,2-Dichloroethene (total)	3700					280			5 J
Chloroform									
1,2-Dichloroethane									
2-Butanone									
1,1,1-Trichloroethane						680			
Carbon Tetrachloride									
Bromodichloromethane									
1,2-Dichloropropane									
cis-1,3-Dichloropropene									
Trichloroethene	2200					180			4 J
Dibromochloromethane									
1,1,2-Trichloroethane									
Benzene									
trans-1,3-Dichloropropene									
Bromoform									
4-Methyl-2-Pentanone									
2-Hexanone									
Tetrachloroethene	6900			4 J		110			
1,1,2,2-Tetrachloroethane									
Toluene							2 J		
Chlorobenzene									
Ethylbenzene									
Styrene									
Xylenes (total)									

302211

VOLATILE ORGANIC DATA
GROUNDWATER - ROUND 2

SITE NAME:LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

VOLATILES									
Sample ID No.	LT-GW-GM-14A	LT-GW-GM-14B	LT-GW-GM-15	LT-GW-EMW-1	LT-GW-EMW-4	LT-GW-MW-8S	LT-GW-MW-8D	LT-GW-MW-10D	LT-GW-MP-2D
Traffic Report No.	GM14A	GM14BDL	GM15	EMW1	EMW4	MW8S	MW8D	MW10D	MP2D
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	10	1	7.7	1	83.3	555.6	500	1
Percent Moisture	–	–	–	–	–	–	–	–	–
Chloromethane									
Bromomethane									
Vinyl Chloride									86
Chloroethane									27
Methylene Chloride							55000		
Acetone								13000 E	
Carbon Disulfide									
1,1-Dichloroethene									
1,1-Dichloroethane			1 J			920	3400 J	2600 J	
1,2-Dichloroethene (total)			2 J	70 J		14000	100000	99000	190
Chloroform								4000 J	
1,2-Dichloroethane									
2-Butanone									
1,1,1-Trichloroethane						4800	16000	12000	
Carbon Tetrachloride									
Bromodichloromethane									
1,2-Dichloropropane									
cis-1,3-Dichloropropene									
Trichloroethene				210		4600	20000	28000	96
Dibromochloromethane									
1,1,2-Trichloroethane									
Benzene									2 J
trans-1,3-Dichloropropene									
Bromoform									
4-Methyl-2-Pentanone							7900		
2-Hexanone									
Tetrachloroethene				1100		1200	2800 J	7800	90
1,1,2,2-Tetrachloroethane									
Toluene						460 J	53000	90000	
Chlorobenzene									
Ethylbenzene							2100 J	7600	
Styrene									
Xylenes (total)							12000	36000	

302212

VOLATILE ORGANIC DATA
GROUNDWATER - ROUND 2

SITE NAME:LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

VOLATILES									
Sample ID No.	LT-GW-MP-4	LT-GW-MP-5	LT-GW-MP-6	LT-GW-MP-11D	LT-GW-MP-16S	LT-GW-MP-16D	LT-GW-MP-17	LT-GW-MP-18S	LT-GW-MP-18D
Traffic Report No.	MP4	MP5	MP6	MP11D	MP16S	MP16D	MP17	MP18S	MP18D
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	–	–	–	–	–	–	–	–	–
Chloromethane									
Bromomethane									
Vinyl Chloride								1 J	5 J
Chloroethane									
Methylene Chloride								0.9 J	
Acetone			4 J	25	9 J	30			
Carbon Disulfide									
1,1-Dichloroethene									
1,1-Dichloroethane		1 J						6 J	2 J
1,2-Dichloroethene (total)			7 J					17	5 J
Chloroform									
1,2-Dichloroethane									
2-Butanone					170				
1,1,1-Trichloroethane								4 J	
Carbon Tetrachloride									
Bromodichloromethane									
1,2-Dichloropropane									
cis-1,3-Dichloropropene									
Trichloroethene			6 J				1 J	12	
Dibromochloromethane									
1,1,2-Trichloroethane								2 J	
Benzene		1 J							
trans-1,3-Dichloropropene									
Bromoform									
4-Methyl-2-Pentanone									
2-Hexanone									
Tetrachloroethene			62					8 J	
1,1,2,2-Tetrachloroethane								2 J	
Toluene						2 J			
Chlorobenzene									
Ethylbenzene								4 J	
Styrene									
Xylenes (total)								17	

302213

VOLATILE ORGANIC DATA
GROUNDWATER - ROUND 2

SITE NAME:LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

VOLATILES	LT-GW-MP-19D	LT-GW-MP-20	LT-GW-MP-21D	LT-GW-MP-22	LT-GW-MP-22D	LT-GW-DUP-05	LT-GW-DUP-06
Sample ID No.	MP19D	MP20	MP21D	MP22	MP22D	DUP05	DUP06
Traffic Report No.	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Matrix	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Units	1	1	5	1	1	1	1
Dilution Factor	--	--	--	--	--	--	--
Percent Moisture							
Chloromethane							
Bromomethane							
Vinyl Chloride		2 J	16 J				
Chloroethane							
Methylene Chloride							0.9 J
Acetone					68		
Carbon Disulfide							
1,1-Dichloroethene		3 J					
1,1-Dichloroethane	3 J	1 J					
1,2-Dichloroethene (total)		6 J	530		4 J		
Chloroform							
1,2-Dichloroethane		8 J					
2-Butanone							
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Bromodichloromethane							
1,2-Dichloropropane							
cis-1,3-Dichloropropene							
Trichloroethene		6 J	170				
Dibromochloromethane							
1,1,2-Trichloroethane		65					
Benzene							
trans-1,3-Dichloropropene							
Bromoform							
4-Methyl-2-Pentanone							
2-Hexanone							
Tetrachloroethene	94	11	700				
1,1,2,2-Tetrachloroethane							
Toluene							
Chlorobenzene							
Ethylbenzene							
Styrene							
Xylenes (total)							

NOTES:
Blank Space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%.

302214

VOLATILE ORGANIC DATA
ORE SAMPLES

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

VOLATILES		ORE-01 DUP			
Sample ID No.	LT-DW-ORE-01	LT-DW-ORE-DUP	LT-DW-ORE-02	LT-DW-ORE-03	LT-KONICA-01
Lab Number	DWORE01	DWOREDUP	DWORE02	DWORE03	KONICA01
Matrix	SOIL	SOIL	SOIL	SOIL	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
Dilution Factor	1	1	1	1	1
Percent Moisture	29	32	32	26	–
Chloromethane					
Bromomethane					
Vinyl Chloride					
Chloroethane					
Methylene Chloride					170 E
Acetone					16
Carbon Disulfide	10 J	4 J		6 J	
1,1-Dichloroethene					
1,1-Dichloroethane					
1,2-Dichloroethene (total)					
Chloroform					
1,2-Dichloroethane					
2-Butanone					
1,1,1-Trichloroethane					
Carbon Tetrachloride					
Bromodichloromethane					
1,2-Dichloropropane					
cis-1,3-Dichloropropene					
Trichloroethene					
Dibromochloromethane					
1,1,2-Trichloroethane					
Benzene					
trans-1,3-Dichloropropene					
Bromoform					
4-Methyl-2-Pentanone					
2-Hexanone					
Tetrachloroethene					
1,1,2,2-Tetrachloroethane					
Toluene					
Chlorobenzene					
Ethylbenzene					
Styrene					
Xylenes (total)					

NOTES:
Blank Space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%.

SEMI-VOLATILE ORGANIC COMPOUNDS DATA

SITE N. ..E. Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES									
Sample ID No.	LT-SB-01R	LT-SB-02R	LT-SB-02B	LT-SB-03R	LT-SB-03B	LT-SB-04R	LT-SB-04B	LT-SB-05	LT-SB-05B
Traffic Report No.	SB01R	SB02R	SB0235	SB03R	B03B3S	SB04R	B04B3S	SB0502	B05B24
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	2	1	1	1	1	1
Percent Moisture	17	12	11	11	10	9	10	17	23
Sample Date	3/19/97	3/19/97	08/23/96	3/19/97	08/26/96	3/19/97	08/26/96	09/04/96	09/04/96
Sample Time	1000	0840	1310	1051	1145	1335	1415	1050	1055
Beginning Depth	1	1	3	1	3	3	3	0	2
Ending Depth	3	3	5	3	5	5	5	2	4
Site ID	SB01	SB02	SB02B	SB03	SB03B	SB04	SB04B	SB05	SB05B
Parcel	A	A	A	A	A	A	A	A	A
Phenol							R		
bis(2-chloroethyl)ether									
2-Chlorophenol							R		
1,3-Dichlorobenzene									
1,4-Dichlorobenzene									
1,2-Dichlorobenzene									
2-Methylphenol							R		
2,2'-oxybis(1-Chloropropane)									
4-Methylphenol							R		
N-Nitroso-di-n-dipropylamine									
Hexachloroethane									
Nitrobenzene									
Isophorone									
2-Nitrophenol							R		
2,4-Dimethylphenol							R		
bis(2-Chloroethoxy)methane									
2,4-Dichlorophenol							R		
1,2,4-Trichlorobenzene									
Naphthalene								47 J	56 J
4-Chloroaniline									
Hexachlorobutadiene									
4-Chloro-3-Methylphenol							R		
2-Methylnaphthalene	69 J							48 J	
Hexachlorocyclopentadiene									
2,4,6-Trichlorophenol							R		
2,4,5-Trichlorophenol							R		
2-Chloronaphthalene									
2-Nitroaniline									
Dimethylphthalate									
Acenaphthylene									
2,6-Dinitrotoluene									
3-Nitroaniline									
Acenaphthene	72 J							68 J	
2,4-Dinitrophenol							R		
4-Nitrophenol							R		
Dibenzofuran								46 J	
2,4-Dinitrotoluene									
Diethylphthalate			500 J						
4-Chorophenyl-phenyl ether									

302217

SITE N... E: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES									
Sample ID No.	LT-SB-01R	LT-SB-02R	LT-SB-02B	LT-SB-03R	LT-SB-03B	LT-SB-04R	LT-SB-04B	LT-SB-05	LT-SB-05B
Traffic Report No.	SB01R	SB02R	SB0235	SB03R	B03B3S	SB04R	B04B3S	SB0502	B05B24
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	2	1	1	1	1	1
Percent Moisture	17	12	11	11	10	9	10	17	23
Sample Date	3/19/97	3/19/97	08/23/96	3/19/97	08/26/96	3/19/97	08/26/96	09/04/96	09/04/96
Sample Time	1000	0840	1310	1051	1145	1335	1415	1050	1055
Beginning Depth	1	1	3	1	3	3	3	0	2
Ending Depth	3	3	5	3	5	5	5	2	4
Site ID	SB01	SB02	SB02B	SB03	SB03B	SB04	SB04B	SB05	SB05B
Parcel	A	A	A	A	A	A	A	A	A
Fluorene	80 J							74 J	
4-Nitroaniline									
4,6-Dinitro-2-methylphenol							R		
N-nitrosodiphenylamine									
4-Bromophenyl-phenyl ether									
Hexachlorobenzene									
Pentachlorophenol							R		
Phenanthrene	650	75 J	32 J	1100				970	300 J
Anthracene	170 J			250 J				99 J	290 J
Carbazole								90 J	
Di-n-butylphthalate									
Fluoranthene	1100	120 J	110 J	2900	27 J	48 J		1300 E	360 J
Pyrene	1200	140 J	34 J	4000	36 J	52 J		1000 E	330 J
Butylbenzylphthalate									
3,3'-Dichlorobenzidine									
Benzo(a)anthracene	570			1700				540 E	120 J
Chrysene	580		79 J	1900	20 J			860 E	190 J
bis(2-ethylhexyl)phthalate	150 J								
Di-n-octylphthalate									
Benzo(b)fluoranthene	1000 Y	58 J	7800	1600	48 J		30 J	1300 E	500 E
Benzo(k)fluoranthene		81 J		1500				420 E	
Benzo(a)pyrene	620	81 J	2200 E	1900				480 E	46 J
Indeno(1,2,3-cd)pyrene	460		1300 E	1200	22 J			440 E	110 J
Dibenz(a,h)anthracene	170 J			420 J				170 J	
Benzo(g,h,i)perylene	560		1100 E	1700	35 J			390 J	89 J

302218

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES										
Sample ID No.	LT-SB-06R	LT-SB-07R	LT-SB-07B	LT-SB-08	LT-SB-09R	LT-SB-09B	LT-SB-10	LT-SB-10B	LT-SB-11
Traffic Report No.	SB06R	SB07R	B07B24	SB0802	SB09R	B09B68	SB1002	B10B24	SB1102
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	13	20	8	10	23	17	16	30	9
Sample Date	3/19/97	3/20/97	08/27/96	08/27/96	3/18/97	08/28/96	08/28/96	08/28/96	08/26/96
Sample Time	0925	0920	0830	0910	1015	1131	1415	1419	1234
Beginning Depth	2	0	2	0	0	6	0	2	0
Ending Depth	4	2	4	2	2	8	2	4	2
Site ID	SB06	SB07	SB07B	SB08	SB09	SB09B	SB10	SB10B	SB11
Parcel	A	A	A	A	B	B	B	B	B
Phenol									
bis(2-chloroethyl)ether									
2-Chlorophenol									
1,3-Dichlorobenzene									
1,4-Dichlorobenzene									
1,2-Dichlorobenzene									
2-Methylphenol									
2,2'-oxybis(1-Chloropropane)									
4-Methylphenol									
N-Nitroso-di-n-dipropylamine									
Hexachloroethane									
Nitrobenzene									
Isophorone									
2-Nitrophenol									
2,4-Dimethylphenol									
bis(2-Chloroethoxy)methane									
2,4-Dichlorophenol									
1,2,4-Trichlorobenzene									
Naphthalene							45 J		
4-Chloroaniline									
Hexachlorobutadiene									
4-Chloro-3-Methylphenol									
2-Methylnaphthalene									
Hexachlorocyclopentadiene									
2,4,6-Trichlorophenol									
2,4,5-Trichlorophenol									
2-Chloronaphthalene									
2-Nitroaniline									
Dimethylphthalate									
Acenaphthylene									
2,6-Dinitrotoluene									
3-Nitroaniline									
Acenaphthene			560 J						
2,4-Dinitrophenol									
4-Nitrophenol									
Dibenzofuran			560 J						
2,4-Dinitrotoluene									
Diethylphthalate									
4-Chorophenyl-phenyl ether									

302219

SITE N... Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES									
Sample ID No.	LT-SB-06R	LT-SB-07R	LT-SB-07B	LT-SB-08	LT-SB-09R	LT-SB-09B	LT-SB-10	LT-SB-10B	LT-SB-11
Traffic Report No.	SB06R	SB07R	B07B24	SB0802	SB09R	B09B68	SB1002	B10B24	SB1102
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	13	20	8	10	23	17	16	30	9
Sample Date	3/19/97	3/20/97	08/27/96	08/27/96	3/18/97	08/28/96	08/28/96	08/28/96	08/26/96
Sample Time	0925	0920	0830	0910	1015	1131	1415	1419	1234
Beginning Depth	2	0	2	0	0	6	0	2	0
Ending Depth	4	2	4	2	2	8	2	4	2
Site ID	SB06	SB07	SB07B	SB08	SB09	SB09B	SB10	SB10B	SB11
Parcel	A	A	A	A	B	B	B	B	B
Fluorene			900 J						
4-Nitroaniline									
4,6-Dinitro-2-methylphenol									
N-nitrosodiphenylamine									
4-Bromophenyl-phenyl ether									
Hexachlorobenzene									
Pentachlorophenol									
Phenanthrene	160 J	71 J							150 J
Anthracene	36 J								21 J
Carbazole									21 J
Di-n-butylphthalate									
Fluoranthene	280 J	150 J	410 J				120 J		240 E
Pyrene	350 J	210 J	620 J				95 J		200 E
Butylbenzylphthalate									
3,3'-Dichlorobenzidine									
Benzo(a)anthracene	200 J	100 J					51 J		100 J
Chrysene	220 J	130 J	420 J				44 J		150 J
bis(2-ethylhexyl)phthalate	120 J	80 J			120 J				
Di-n-octylphthalate									
Benzo(b)fluoranthene	290 J	130 J	360 J				86 J		360 E
Benzo(k)fluoranthene	140 J	110 J							
Benzo(a)pyrene	230 J	130 J	200 J						75 J
Indeno(1,2,3-cd)pyrene	160 J	120 J							110 J
Dibenz(a,h)anthracene	75 J								
Benzo(g,h,i)perylene	170 J	150 J	220 J						130 J

302220

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES											
Sample ID No.	LT-SB-11B	LT-SB-12	LT-SB-12B	LT-SB-13	LT-SB-DUP-01	LT-SB-13B	LT-SB-14	LT-SB-14B	LT-SB-15	LT-SB-15B
Traffic Report No.	11B810	SB1202	B12B24	SB1304	BDUP01	3B1416	SB1402	B14B68	SBIS02	B1SB46
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1	1
Percent Moisture	7	29	19	11	12	11	17	6	32	12
Sample Date	08/26/96	08/28/96	08/28/96	08/22/96	8/22/96	08/29/96	08/30/96	08/30/96	08/28/96	08/28/96
Sample Time	1455	0900	0915	1534	1534	1602	1010	1045	1457	1516
Beginning Depth	8	0	2	0	0	14	0	6	0	4
Ending Depth	10	2	4	4	4	16	2	8	2	6
Site ID	SB11B	SB12	SB12B	SB13	SB13	SB13B	SB14	SB14B	SB15	SB15B
Parcel	B	B	B	B	B	B	B	B	B	B
Phenol										
bis(2-chloroethyl)ether										
2-Chlorophenol										
1,3-Dichlorobenzene										
1,4-Dichlorobenzene										
1,2-Dichlorobenzene										
2-Methylphenol										
2,2'-oxybis(1-Chloropropane)										
4-Methylphenol										
N-Nitroso-di-n-dipropylamine										
Hexachloroethane										
Nitrobenzene										
Isophorone										
2-Nitrophenol										
2,4-Dimethylphenol										
bis(2-Chloroethoxy)methane										
2,4-Dichlorophenol										
1,2,4-Trichlorobenzene										
Naphthalene										
4-Chloroaniline										
Hexachlorobutadiene										
4-Chloro-3-Methylphenol										
2-Methylnaphthalene										
Hexachlorocyclopentadiene										
2,4,6-Trichlorophenol										
2,4,5-Trichlorophenol										
2-Chloronaphthalene										
2-Nitroaniline										
Dimethylphthalate										
Acenaphthylene										
2,6-Dinitrotoluene										
3-Nitroaniline										
Acenaphthene										
2,4-Dinitrophenol										
4-Nitrophenol										
Dibenzofuran										
2,4-Dinitrotoluene										
Diethylphthalate										
4-Chorophenyl-phenyl ether										

SITE : Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES											
Sample ID No.	LT-SB-11B	LT-SB-12	LT-SB-12B	LT-SB-13	LT-SB-DUP-01	LT-SB-13B	LT-SB-14	LT-SB-14B	LT-SB-15	LT-SB-15B
Traffic Report No.	11B810	SB1202	B12B24	SB1304	BDUP01	3B1416	SB1402	B14B68	SBIS02	B1SB46
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1	1
Percent Moisture	7	29	19	11	12	11	17	6	32	12
Sample Date	08/26/96	08/28/96	08/28/96	08/22/96	8/22/96	08/29/96	08/30/96	08/30/96	08/28/96	08/28/96
Sample Time	1455	0900	0915	1534	1534	1602	1010	1045	1457	1516
Beginning Depth	8	0	2	0	0	14	0	6	0	4
Ending Depth	10	2	4	4	4	16	2	8	2	6
Site ID	SB11B	SB12	SB12B	SB13	SB13	SB13B	SB14	SB14B	SB15	SB15B
Parcel	B	B	B	B	B	B	B	B	B	B
Fluorene										
4-Nitroaniline										
4,6-Dinitro-2-methylphenol										
N-nitrosodiphenylamine										
4-Bromophenyl-phenyl ether										
Hexachlorobenzene										
Pentachlorophenol										
Phenanthrene	30 J	50 J								43 J
Anthracene										
Carbazole										
Di-n-butylphthalate										
Fluoranthene	27 J	120 J							74 J	76 J
Pyrene		95 J							67 J	64 J
Butylbenzylphthalate										
3,3'-Dichlorobenzidine					23 J					
Benzo(a)anthracene										
Chrysene		62 J							52 J	48 J
bis(2-ethylhexyl)phthalate										
Di-n-octylphthalate										
Benzo(b)fluoranthene		130 J		19 J					89 J	110 J
Benzo(k)fluoranthene										
Benzo(a)pyrene										
Indeno(1,2,3-cd)pyrene		49 J								
Dibenz(a,h)anthracene										
Benzo(g,h,i)perylene		51 J								42 J

302222

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES										
Sample ID No.	LT-SB-16R	LT-SB-16B	LT-SB-17	LT-SB-17B	LT-SB-18R	LT-SB-19	LT-SB-19B	LT-SB-20	LT-SB-20BR	LT-SB-21R
Traffic Report No.	SB16R	16B810	SB1702	B17B46	SB18R	SB1902	SB19B2	SB2002	SB20BR	SB21R
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	2	1	1	1	1	1	1	1	1	1
Percent Moisture	29	9	15	11	5	16	15	32	33	15
Sample Date	3/18/97	08/22/96	08/29/96	08/29/96	3/17/97	08/21/96	08/21/96	8/21/96	3/17/97	3/20/97
Sample Time	0930	1004	0910	0911	1215	1437	1450	1537	1520	1245
Beginning Depth	0	8	0	4	0	0	2	0	2	2
Ending Depth	2	10	2	6	2	2	4	2	4	4
Site ID	SB16	SB16B	SB17	SB17B	SB18	SB19	SB19B	SB20	SB20B	SB21
Parcel	B	B	B	B	B	B	B	B	B	C
Phenol										
bis(2-chloroethyl)ether										
2-Chlorophenol										
1,3-Dichlorobenzene										
1,4-Dichlorobenzene										
1,2-Dichlorobenzene										
2-Methylphenol										
2,2'-oxybis(1-Chloropropane)										
4-Methylphenol										
N-Nitroso-di-n-dipropylamine										
Hexachloroethane										
Nitrobenzene										
Isophorone										
2-Nitrophenol										
2,4-Dimethylphenol										
bis(2-Chloroethoxy)methane										
2,4-Dichlorophenol										
1,2,4-Trichlorobenzene										
Naphthalene										
4-Chloroaniline										
Hexachlorobutadiene										
4-Chloro-3-Methylphenol										
2-Methylnaphthalene										
Hexachlorocyclopentadiene										
2,4,6-Trichlorophenol										
2,4,5-Trichlorophenol										
2-Chloronaphthalene										
2-Nitroaniline										
Dimethylphthalate										
Acenaphthylene										
2,6-Dinitrotoluene										
3-Nitroaniline										
Acenaphthene										
2,4-Dinitrophenol										
4-Nitrophenol										
Dibenzofuran										
2,4-Dinitrotoluene										
Diethylphthalate										
4-Chorophenyl-phenyl ether										

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES										
Sample ID No.	LT-SB-16R	LT-SB-16B	LT-SB-17	LT-SB-17B	LT-SB-18R	LT-SB-19	LT-SB-19B	LT-SB-20	LT-SB-20BR	LT-SB-21R
Traffic Report No.	SB16R	16B810	SB1702	B17B46	SB18R	SB1902	SB19B2	SB2002	SB20BR	SB21R
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	2	1	1	1	1	1	1	1	1	1
Percent Moisture	29	9	15	11	5	16	15	32	33	15
Sample Date	3/18/97	08/22/96	08/29/96	08/29/96	3/17/97	08/21/96	08/21/96	8/21/96	3/17/97	3/20/97
Sample Time	0930	1004	0910	0911	1215	1437	1450	1537	1520	1245
Beginning Depth	0	8	0	4	0	0	2	0	2	2
Ending Depth	2	10	2	6	2	2	4	2	4	4
Site ID	SB16	SB16B	SB17	SB17B	SB18	SB19	SB19B	SB20	SB20B	SB21
Parcel	B	B	B	B	B	B	B	B	B	C
Fluorene										
4-Nitroaniline										
4,6-Dinitro-2-methylphenol										
N-nitrosodiphenylamine										
4-Bromophenyl-phenyl ether										
Hexachlorobenzene										
Pentachlorophenol										
Phenanthrene	220 J									
Anthracene	52 J									
Carbazole										
Di-n-butylphthalate										
Fluoranthene	390 J									63 J
Pyrene	520 J									86 J
Butylbenzylphthalate										
3,3'-Dichlorobenzidine										
Benzo(a)anthracene	270 J									
Chrysene	360 J									
bis(2-ethylhexyl)phthalate	140 J									
Di-n-octylphthalate										
Benzo(b)fluoranthene	550 YJ									
Benzo(k)fluoranthene										
Benzo(a)pyrene	320 J									
Indeno(1,2,3-cd)pyrene	220 J									
Dibenz(a,h)anthracene										
Benzo(g,h,i)perylene	280 J									

SITE : ..C: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES										
Sample ID No.	LT-SB-22	LT-SB-23	LT-SB-23B	LT-SB-24	LT-SB-24B	LT-SB-25	LT-SB-25B	LT-SB-26	LT-SB-26B	LT-SB-27
Traffic Report No.	LTSB22	SB2302	B23B24	SB2402DL	B24B24	SB2502DL	B25B24	SB2602	6B1012	SB2702
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	UG/KG	UG/KG	UG/KG
Dilution Factor	1	1	1	50	1	50	1	1	1	1
Percent Moisture	31	15	12	15	14	13	18	18	11	18
Sample Date	10/21/96	09/03/96	09/03/96	09/03/96	09/03/96	09/03/96	09/03/96	09/24/96	09/24/96	09/24/96
Sample Time	1200	1445	1452	1405	1415	1055	1100	1150	1249	1440
Beginning Depth	????	0	2	0	2	0	2	0	10	0
Ending Depth	????	2	4	2	4	2	4	2	12	2
Site ID	SB22	SB23	SB23B	SB24	SB24B	SB25	SB25B	SB26	SB26B	SB27
Parcel	C	C	C	C	C	C	C	C	C	C
Phenol									R	
bis(2-chloroethyl)ether										
2-Chlorophenol									R	
1,3-Dichlorobenzene										
1,4-Dichlorobenzene										
1,2-Dichlorobenzene										
2-Methylphenol									R	
2,2'-oxybis(1-Chloropropane)										
4-Methylphenol									R	
N-Nitroso-di-n-dipropylamine										
Hexachloroethane										
Nitrobenzene										
Isophorone										
2-Nitrophenol									R	
2,4-Dimethylphenol									R	
bis(2-Chloroethoxy)methane										
2,4-Dichlorophenol									R	
1,2,4-Trichlorobenzene										
Naphthalene										
4-Chloroaniline										
Hexachlorobutadiene										
4-Chloro-3-Methylphenol									R	
2-Methylnaphthalene										
Hexachlorocyclopentadiene										
2,4,6-Trichlorophenol									R	
2,4,5-Trichlorophenol									R	
2-Chloronaphthalene										
2-Nitroaniline										
Dimethylphthalate										
Acenaphthylene										
2,6-Dinitrotoluene										
3-Nitroaniline										
Acenaphthene					170 J					
2,4-Dinitrophenol									R	
4-Nitrophenol									R	
Dibenzofuran										
2,4-Dinitrotoluene										
Diethylphthalate										
4-Chorophenyl-phenyl ether										

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES										
Sample ID No.	LT-SB-22	LT-SB-23	LT-SB-23B	LT-SB-24	LT-SB-24B	LT-SB-25	LT-SB-25B	LT-SB-26	LT-SB-26B	LT-SB-27
Traffic Report No.	LTSB22	SB2302	B23B24	SB2402DL	B24B24	SB2502DL	B25B24	SB2602	6B1012	SB2702
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	UG/KG	UG/KG	UG/KG
Dilution Factor	1	1	1	50	1	50	1	1	1	1
Percent Moisture	31	15	12	15	14	13	18	18	11	18
Sample Date	10/21/96	09/03/96	09/03/96	09/03/96	09/03/96	09/03/96	09/03/96	09/24/96	09/24/96	09/24/96
Sample Time	1200	1445	1452	1405	1415	1055	1100	1150	1249	1440
Beginning Depth	????	0	2	0	2	0	2	0	10	0
Ending Depth	????	2	4	2	4	2	4	2	12	2
Site ID	SB22	SB23	SB23B	SB24	SB24B	SB25	SB25B	SB26	SB26B	SB27
Parcel	C	C	C	C	C	C	C	C	C	C
Fluorene					380 J			47 J		
4-Nitroaniline										
4,6-Dinitro-2-methylphenol									R	
N-nitrosodiphenylamine				5300 J	530 E	10000 J	2400 E			
4-Bromophenyl-phenyl ether										
Hexachlorobenzene										
Pentachlorophenol									R	
Phenanthrene	320 J							360 J		100 J
Anthracene										
Carbazole										
Di-n-butylphthalate										
Fluoranthene	530		140 J					320 J		170 J
Pyrene	420 J		170 J					410		110 J
Butylbenzylphthalate										
3,3'-Dichlorobenzidine										
Benzo(a)anthracene	260 J							170 J		59 J
Chrysene	310 J		68 J					230 J		92 J
bis(2-ethylhexyl)phthalate										
Di-n-octylphthalate										
Benzo(b)fluoranthene	670		100 J					400 J		140 J
Benzo(k)fluoranthene	220 J									
Benzo(a)pyrene	250 J							89 J		
Indeno(1,2,3-cd)pyrene	350 J							110 J		57 J
Dibenz(a,h)anthracene										
Benzo(g,h,i)perylene	320 J							88 J		42 J

302226

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES									
Sample ID No.	LT-SB-27B	LT-SB-28R	LT-SB-28B	LT-SB-29R	LT-SB-31	LT-SB-32	LT-SB-33R	LT-SB-DUP-13	LT-SB-34R
Traffic Report No.	B27B46	SB28R	B28B46	SB29R	LTSB31DLRE	LTSB32	SB33R	SBDUP13	SB34R
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	UG/KG	ug/kg	UG/KG	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	25	1	1	1	7.1
Percent Moisture	22	20	12	14	13	19	23	24	19
Sample Date	09/24/96	3/20/97	09/25/96	3/20/97	08/28/96	08/28/96	3/19/97	3/19/97	3/19/97
Sample Time	1540	1437	1019	0940	1115	1200	1425	1425	1515
Beginning Depth	4	2	4	3	3	3	3	3	1
Ending Depth	6	4	6	5	5	5	5	5	3
Site ID	SB27B	SB28	SB28B	SB29	SB31	SB32	SB33	SB33	SB34
Parcel	C	C	C	A	A	A	A	A	A
Phenol									
bis(2-chloroethyl)ether									
2-Chlorophenol									
1,3-Dichlorobenzene									
1,4-Dichlorobenzene									
1,2-Dichlorobenzene									
2-Methylphenol									
2,2'-oxybis(1-Chloropropane)									
4-Methylphenol									
N-Nitroso-di-n-dipropylamine									
Hexachloroethane									
Nitrobenzene									
Isophorone									
2-Nitrophenol									
2,4-Dimethylphenol									
bis(2-Chloroethoxy)methane									
2,4-Dichlorophenol									
1,2,4-Trichlorobenzene									
Naphthalene					210 J				
4-Chloroaniline									
Hexachlorobutadiene									
4-Chloro-3-Methylphenol									
2-Methylnaphthalene									
Hexachlorocyclopentadiene									
2,4,6-Trichlorophenol									
2,4,5-Trichlorophenol									
2-Chloronaphthalene									
2-Nitroaniline									
Dimethylphthalate									
Acenaphthylene									
2,6-Dinitrotoluene									
3-Nitroaniline									
Acenaphthene					3800 J		140 J		
2,4-Dinitrophenol									
4-Nitrophenol									
Dibenzofuran							67 J		
2,4-Dinitrotoluene									
Diethylphthalate									
4-Chorophenyl-phenyl ether									

302227

SITE N.. ..E.: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES									
Sample ID No.	LT-SB-27B	LT-SB-28R	LT-SB-28B	LT-SB-29R	LT-SB-31	LT-SB-32	LT-SB-33R	LT-SB-DUP-13	LT-SB-34R
Traffic Report No.	B27B46	SB28R	B28B46	SB29R	LTSB31DLRE	LTSB32	SB33R	SBDUP13	SB34R
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	UG/KG	ug/kg	UG/KG	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	25	1	1	1	7.1
Percent Moisture	22	20	12	14	13	19	23	24	19
Sample Date	09/24/96	3/20/97	09/25/96	3/20/97	08/28/96	08/28/96	3/19/97	3/19/97	3/19/97
Sample Time	1540	1437	1019	0940	1115	1200	1425	1425	1515
Beginning Depth	4	2	4	3	3	3	3	3	1
Ending Depth	6	4	6	5	5	5	5	5	3
Site ID	SB27B	SB28	SB28B	SB29	SB31	SB32	SB33	SB33	SB34
Parcel	C	C	C	A	A	A	A	A	A
Fluorene					3100 J		130 J		
4-Nitroaniline									
4,6-Dinitro-2-methylphenol									
N-nitrosodiphenylamine									
4-Bromophenyl-phenyl ether									
Hexachlorobenzene									
Pentachlorophenol									
Phenanthrene		460	68 J	79 J	33000 E	230 J	1100	140 J	
Anthracene					2400 J		220 J	39 J	
Carbazole							94 J		
Di-n-butylphthalate									
Fluoranthene		420	130 J	88 J	26000 E	290 J	1200	210 J	630 J
Pyrene		380 J	100 J	140 J	28000 E	270 J	1100	240 J	710 J
Butylbenzylphthalate									
3,3'-Dichlorobenzidine									
Benzo(a)anthracene		110 J	43 J		9900 J	120 J	460	91 J	
Chrysene		200 J	86 J		11000 E	130 J	500	100 J	
bis(2-ethylhexyl)phthalate		290 J							16000
Di-n-octylphthalate									
Benzo(b)fluoranthene		200 J	90 J		14000 E	250 J	390 J	140 YJ	820 JY
Benzo(k)fluoranthene							280 J		
Benzo(a)pyrene					2900 J	72 J	390 J	92 J	
Indeno(1,2,3-cd)pyrene		72 J			6300 J	56 J	260 J		
Dibenz(a,h)anthracene							110 J		
Benzo(g,h,i)perylene		93 J			6900 J	52 J	320 J		1200 J

302228

SITE Name: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES							
Sample ID No.	LT-SB-35R	LT-SB-36R	LT-SB-37R	LT-SB-40R	LT-SB-DUP-12	LT-SB-41R	LT-SB-42
Traffic Report No.	SB35R	SB36R	SB37R	SB40R	SBDUP12	SBM41R	LTSB42
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	UG/KG
Dilution Factor	1	1	1	1	1	1	1
Percent Moisture	11	11	8	12	14	13	16
Sample Date	3/19/97	3/19/97	3/19/97	3/18/97	3/18/97	3/20/97	09/23/96
Sample Time	1315	0900	1027	1345	1345	1400	1646
Beginning Depth	1	1	1	3	3	4	4
Ending Depth	3	3	3	5	5	8	6
Site ID	SB35	SB36	SB37	SB40	SB40	SB41	SB42
Parcel	A	A	A	C	C	C	C
Phenol							
bis(2-chloroethyl)ether							
2-Chlorophenol							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
1,2-Dichlorobenzene							
2-Methylphenol							
2,2'-oxybis(1-Chloropropane)							
4-Methylphenol							
N-Nitroso-di-n-dipropylamine							
Hexachloroethane							
Nitrobenzene							
Isophorone							
2-Nitrophenol							
2,4-Dimethylphenol							
bis(2-Chloroethoxy)methane							
2,4-Dichlorophenol							
1,2,4-Trichlorobenzene							
Naphthalene							
4-Chloroaniline							
Hexachlorobutadiene							
4-Chloro-3-Methylphenol							
2-Methylnaphthalene							
Hexachlorocyclopentadiene							
2,4,6-Trichlorophenol							
2,4,5-Trichlorophenol							
2-Chloronaphthalene							
2-Nitroaniline							
Dimethylphthalate							
Acenaphthylene							
2,6-Dinitrotoluene							
3-Nitroaniline							
Acenaphthene	64 J						
2,4-Dinitrophenol							
4-Nitrophenol							
Dibenzofuran							
2,4-Dinitrotoluene							
Diethylphthalate							
4-Chorophenyl-phenyl ether							

SITE N... Li Tungsten
PROJECT #: 8001-202
EPA CASE NO: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SOIL BORINGS

SEMI-VOLATILES							
Sample ID No.	LT-SB-35R	LT-SB-36R	LT-SB-37R	LT-SB-40R	LT-SB-DUP-12	LT-SB-41R	LT-SB-42
Traffic Report No.	SB35R	SB36R	SB37R	SB40R	SBDUP12	SBM41R	LTSB42
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	UG/KG
Dilution Factor	1	1	1	1	1	1	1
Percent Moisture	11	11	8	12	14	13	16
Sample Date	3/19/97	3/19/97	3/19/97	3/18/97	3/18/97	3/20/97	09/23/96
Sample Time	1315	0900	1027	1345	1345	1400	1646
Beginning Depth	1	1	1	3	3	4	4
Ending Depth	3	3	3	5	5	8	6
Site ID	SB35	SB36	SB37	SB40	SB40	SB41	SB42
Parcel	A	A	A	C	C	C	C
Fluorene							
4-Nitroaniline							
4,6-Dinitro-2-methylphenol							
N-nitrosodiphenylamine							
4-Bromophenyl-phenyl ether							
Hexachlorobenzene							
Pentachlorophenol							
Phenanthrene	220 J	100 J	270 J				
Anthracene	94 J		43 J				
Carbazole							
Di-n-butylphthalate							
Fluoranthene	480	220 J	270 J				
Pyrene	430	290 J	260 J				
Butylbenzylphthalate							
3,3'-Dichlorobenzidine							
Benzo(a)anthracene	220 J	150 J	110 J				
Chrysene	220 J	160 J	120 J				
bis(2-ethylhexyl)phthalate				110 J	230 J	68 J	
Di-n-octylphthalate							
Benzo(b)fluoranthene	220 J	260 YJ	190 YJ				
Benzo(k)fluoranthene	160 J						
Benzo(a)pyrene	220 J	170 J	110 J				
Indeno(1,2,3-cd)pyrene	130 J	110 J					
Dibenz(a,h)anthracene	65 J						
Benzo(g,h,i)perylene	160 J	160 J					

NOTES:

Blank space - compound analyzed for, but not detected

B - compound found in lab blank as well as sample, indicated possible/probable blank contamination

E - estimated value

J - estimated value, compound present below CRQL but above IDL

R - analysis did not pass EPA QA/QC

N - presumptive evidence of the presence of the material

NR - analysis not required

Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%

302230

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
MONITORING WELL BORINGS

SEMI-VOLATILES								
Sample ID No.	LT-SB-MP-2DR	LT-SB-MP-4DR	LT-SB-MP-4DB	LT-SB-MP-5	LT-SB-MP-5B	LT-SB-MP-6	LT-SB-MP-6B	LT-SB-MP-8D
Traffic Report No.	SBMP2DR	SBMP4DR	P4DB35	BMP502	5B1820	BMP602	MP6B24	MP8D02
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	UG/KG	UG/KG	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	13	12	6	11	20	15	13	8
Sample Date	3/19/97	3/17/97	08/29/96	09/05/96	09/05/96	08/28/96	08/28/96	09/18/96
Sample Time	1445	1615	1020	1330	1550	1400	1410	0915
Beginning Depth	1	1	3	0	18	0	2	0
Ending Depth	3	3	5	2	20	2	4	2
Site ID	MP2D	MP4D	MP4DB	MP5	MP5B	MP6	MP6B	MP8D
Parcel	A	C	C	B	B	A	A	B
Phenol								
bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
1,2-Dichlorobenzene								
2-Methylphenol								
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol								
N-Nitroso-di-n-dipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone								
2-Nitrophenol								
2,4-Dimethylphenol								
bis(2-Chloroethoxy)methane								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene							60 J	
4-Chloroaniline								
Hexachlorobutadiene								
4-Chloro-3-Methylphenol								
2-Methylnaphthalene	210 J							
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
3-Nitroaniline								
Acenaphthene							86 J	
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran	210 J							
2,4-Dinitrotoluene								
Diethylphthalate								
4-Chorophenyl-phenyl ether								

SITE N[illegible]: LI Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
MONITORING WELL BORINGS

SEMI-VOLATILES								
Sample ID No.	LT-SB-MP-2DR	LT-SB-MP-4DR	LT-SB-MP-4DB	LT-SB-MP-5	LT-SB-MP-5B	LT-SB-MP-6	LT-SB-MP-6B	LT-SB-MP-8D
Traffic Report No.	SBMP2DR	SBMP4DR	P4DB35	BMP502	5B1820	BMP602	MP6B24	MP8D02
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	UG/KG	UG/KG	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	13	12	6	11	20	15	13	8
Sample Date	3/19/97	3/17/97	08/29/96	09/05/96	09/05/96	08/28/96	08/28/96	09/18/96
Sample Time	1445	1615	1020	1330	1550	1400	1410	0915
Beginning Depth	1	1	3	0	18	0	2	0
Ending Depth	3	3	5	2	20	2	4	2
Site ID	MP2D	MP4D	MP4DB	MP5	MP5B	MP6	MP6B	MP8D
Parcel	A	C	C	B	B	A	A	B
Fluorene							68 J	
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								
N-nitrosodiphenylamine								
4-Bromophenyl-phenyl ether								
Hexachlorobenzene								
Pentachlorophenol								
Phenanthrene	1700						510 E	
Anthracene							74 J	
Carbazole	490						58 J	
Di-n-butylphthalate							380 J	
Fluoranthene	1400			91 J			510 E	
Pyrene	960			75 J			380 J	
Butylbenzylphthalate							380 J	
3,3'-Dichlorobenzidine							380 J	
Benzo(a)anthracene	280 J						170 J	
Chrysene	500			53 J			180 J	
bis(2-ethylhexyl)phthalate	320 J						380 J	
Di-n-octylphthalate							380 J	
Benzo(b)fluoranthene	540 Y			120 J			360 J	
Benzo(k)fluoranthene							380 J	
Benzo(a)pyrene	180 J			38 J			110 J	
Indeno(1,2,3-cd)pyrene				53 J			120 J	
Dibenz(a,h)anthracene							380 J	
Benzo(g,h,i)perylene	180 J			49 J			110 J	

K:\8001202\RIREPT\DATA\SEMIVOA[SB_MW XLS]Sheet1

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
MONITORING WELL BORINGS

SEMI-VOLATILES							
Sample ID No.	LT-SB-MP-8DB	LT-SB-MP-9DR	LT-SB-MP-9DB	LT-SB-MP-11D	LT-SB-MP-11DB	LT-SB-MP-16S	LT-SB-MP-16SB
Traffic Report No.	P8DB46	SBMP9DR	B9DB24	P11D02	1DB810	P16S02	P16S24
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	UG/KG	UG/KG	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1
Percent Moisture	10	17	14	5	14	13	15
Sample Date	09/18/96	3/18/97	09/04/96	09/25/96	09/25/96	10/10/96	10/10/96
Sample Time	0940	1500	1211	1601	1640	1345	1410
Beginning Depth	4	0	2	0	8	0	2
Ending Depth	6	2	4	2	10	2	4
Site ID	MP8DB	MP9D	MP9DB	MP11D	MP11DB	MP16S	MP16SB
Parcel	B	B	B	C	C	C	C
Phenol							
bis(2-chloroethyl)ether							
2-Chlorophenol							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
1,2-Dichlorobenzene							
2-Methylphenol							
2,2'-oxybis(1-Chloropropane)							
4-Methylphenol							
N-Nitroso-di-n-dipropylamine							
Hexachloroethane							
Nitrobenzene							
Isophorone							
2-Nitrophenol							
2,4-Dimethylphenol							
bis(2-Chloroethoxy)methane							
2,4-Dichlorophenol							
1,2,4-Trichlorobenzene							
Naphthalene							
4-Chloroaniline							
Hexachlorobutadiene							
4-Chloro-3-Methylphenol							
2-Methylnaphthalene							
Hexachlorocyclopentadiene							
2,4,6-Trichlorophenol							
2,4,5-Trichlorophenol							
2-Chloronaphthalene							
2-Nitroaniline							
Dimethylphthalate							
Acenaphthylene							
2,6-Dinitrotoluene							
3-Nitroaniline							
Acenaphthene							
2,4-Dinitrophenol							
4-Nitrophenol							
Dibenzofuran							
2,4-Dinitrotoluene							
Diethylphthalate							
4-Chorophenyl-phenyl ether							

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
MONITORING WELL BORINGS

SEMI-VOLATILES							
Sample ID No.	LT-SB-MP-8DB	LT-SB-MP-9DR	LT-SB-MP-9DB	LT-SB-MP-11D	LT-SB-MP-11DB	LT-SB-MP-16S	LT-SB-MP-16SB
Traffic Report No.	P8DB46	SBMP9DR	B9DB24	P11D02	1DB810	P16S02	P16S24
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	UG/KG	UG/KG	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1
Percent Moisture	10	17	14	5	14	13	15
Sample Date	09/18/96	3/18/97	09/04/96	09/25/96	09/25/96	10/10/96	10/10/96
Sample Time	0940	1500	1211	1601	1640	1345	1410
Beginning Depth	4	0	2	0	8	0	2
Ending Depth	6	2	4	2	10	2	4
Site ID	MP8DB	MP9D	MP9DB	MP11D	MP11DB	MP16S	MP16SB
Parcel	B	B	B	C	C	C	C
Fluorene							
4-Nitroaniline							
4,6-Dinitro-2-methylphenol							
N-nitrosodiphenylamine							
4-Bromophenyl-phenyl ether							
Hexachlorobenzene							
Pentachlorophenol							
Phenanthrene							
Anthracene							
Carbazole							
Di-n-butylphthalate							
Fluoranthene							
Pyrene							
Butylbenzylphthalate							
3,3'-Dichlorobenzidine							
Benzo(a)anthracene							
Chrysene							
bis(2-ethylhexyl)phthalate							
Di-n-octylphthalate							
Benzo(b)fluoranthene							
Benzo(k)fluoranthene							
Benzo(a)pyrene							130 J
Indeno(1,2,3-cd)pyrene							
Dibenz(a,h)anthracene							
Benzo(g,h,i)perylene	83 J						

302234

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
MONITORING WELL BORINGS

SEMI-VOLATILES								
Sample ID No.	LT-SB-MP-18	LT-SB-MP-18B	LT-SB-MP-20R	LT-SB-MP-20BR	LT-SB-MP-22R	LT-SB-MP-22BR	LT-SB-MP-22D	LT-SB-MP-22DB
Traffic Report No.	MP1802	P18B24	SBMP20R	SBMP20BR	SBMP22R	SBMP22BR	MP22D_	MP22DB
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1.4	1	1
Percent Moisture	17	17	18	19	11	13	10	11
Sample Date	09/03/96	09/03/96	3/20/97	3/20/97	3/20/97	3/20/97	08/13/96	08/13/96
Sample Time	1515	1520	1040	1045	0950	1010	1230	1245
Beginning Depth	0	2	0	2	1	3	1	3
Ending Depth	2	4	2	3	3	5	3	5
Site ID	MP18	MP18B	MP20	MP20B	MP22	MP22B	MP22D	MP22DB
Parcel	C	C	A	A	A	A	A	A
Phenol								
bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
1,2-Dichlorobenzene								
2-Methylphenol								
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol								
N-Nitroso-di-n-dipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone								
2-Nitrophenol								
2,4-Dimethylphenol								
bis(2-Chloroethoxy)methane								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene						450 J		740
4-Chloroaniline								
Hexachlorobutadiene								
4-Chloro-3-Methylphenol								
2-Methylnaphthalene						270 J	610	4600
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
3-Nitroaniline								
Acenaphthene					110 J	490 J		
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran						440 J	830	780
2,4-Dinitrotoluene								
Diethylphthalate								
4-Chorophenyl-phenyl ether								

SITE Name: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
MONITORING WELL BORINGS

SEMI-VOLATILES								
Sample ID No.	LT-SB-MP-18	LT-SB-MP-18B	LT-SB-MP-20R	LT-SB-MP-20BR	LT-SB-MP-22R	LT-SB-MP-22BR	LT-SB-MP-22D	LT-SB-MP-22DB
Traffic Report No.	MP1802	P18B24	SBMP20R	SBMP20BR	SBMP22R	SBMP22BR	MP22D_	MP22DB
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1.4	1	1
Percent Moisture	17	17	18	19	11	13	10	11
Sample Date	09/03/96	09/03/96	3/20/97	3/20/97	3/20/97	3/20/97	08/13/96	08/13/96
Sample Time	1515	1520	1040	1045	0950	1010	1230	1245
Beginning Depth	0	2	0	2	1	3	1	3
Ending Depth	2	4	2	3	3	5	3	5
Site ID	MP18	MP18B	MP20	MP20B	MP22	MP22B	MP22D	MP22DB
Parcel	C	C	A	A	A	A	A	A
Fluorene					86 J	580		
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								
N-nitrosodiphenylamine								
4-Bromophenyl-phenyl ether								
Hexachlorobenzene								
Pentachlorophenol								
Phenanthrene		110 J	86 J		1000	3500	2500	1900
Anthracene		22 J			190 J	880		
Carbazole						310 J		
Di-n-butylphthalate								
Fluoranthene		160 J	120 J		600	2600	1000	240 J
Pyrene		240 J	180 J		970	2500	900	270 J
Butylbenzylphthalate								
3,3'-Dichlorobenzidine								
Benzo(a)anthracene		99 J	68 J		310 J	1100	440	
Chrysene		120 J	90 J		360 J	1100	450	88 J
bis(2-ethylhexyl)phthalate		100 J	310 J					
Di-n-octylphthalate								
Benzo(b)fluoranthene		120 J			190 J	740	930	85 J
Benzo(k)fluoranthene		81 J			210 J	710		
Benzo(a)pyrene		100 J	77 J		280 J	850	460	60 J
Indeno(1,2,3-cd)pyrene		75 J			180 J	500 J	410	
Dibenz(a,h)anthracene						180 J		
Benzo(g,h,i)perylene		110 J			230 J	570		

K:\8001202\RIREPT\DATA\SEMIVOA\[SB_MW XLS]Sheet1

NOTES:

Blank space - compound analyzed for, but not detected

B - compound found in lab blank as well as sample, indicated possible/probable blank contamination

E - estimated value

J - estimated value, compound present below CRQL but above IDL

R - analysis did not pass EPA QA/QC

N - presumptive evidence of the presence of the material

NR - analysis not required

Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SURFACE SOIL

SEMI-VOLATILES									
Sample ID No.	LT-SS-01R	LT-SS-02	LT-SS-03R	LT-SS-04	LT-SS-05R	LT-SS-06R	LT-SS-07	LT-SS-08R	LT-SS-09
Traffic Report No.	SS01R	LTSS02 RE	SS03R	LTSS04	SS05R	SB06R	LTSS07	SS08R	LTSS09
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	5	1	1	1	1
Percent Moisture	13	3	32	18	16	13	4	10	10
Sample Date	3/18/97	09/05/96	3/20/97	09/05/96	3/20/97	3/17/97	09/06/96	3/18/97	09/11/96
Sample Time	1435	1423	1529	1545	1521	1240	1404	1400	1345
Beginning Depth	0	0	0	0	0	0	0	0	0
Ending Depth	2	2	2	2	2	2	2	2	2
Site ID	SS01	SS02	SS03	SS04	SS05	SS06	SS07	SS08	SS09
Parcel	A	A	A	C	A	B	A	B	A
Phenol									
bis(2-chloroethyl)ether									
2-Chlorophenol									
1,3-Dichlorobenzene									
1,4-Dichlorobenzene									
1,2-Dichlorobenzene									
2-Methylphenol									
2,2'-oxybis(1-Chloropropane)									
4-Methylphenol									
N-Nitroso-di-n-dipropylamine									
Hexachloroethane									
Nitrobenzene									
Isophorone									
2-Nitrophenol									
2,4-Dimethylphenol									
bis(2-Chloroethoxy)methane									
2,4-Dichlorophenol									
1,2,4-Trichlorobenzene									
Naphthalene							190 J		
4-Chloroaniline									
Hexachlorobutadiene									
4-Chloro-3-Methylphenol									
2-Methylnaphthalene							91 J		
Hexachlorocyclopentadiene									
2,4,6-Trichlorophenol									
2,4,5-Trichlorophenol									
2-Chloronaphthalene									
2-Nitroaniline									
Dimethylphthalate							36 J		
Acenaphthylene							50 J		
2,6-Dinitrotoluene									
3-Nitroaniline									
Acenaphthene				330 J			640 E		
2,4-Dinitrophenol									
4-Nitrophenol									
Dibenzofuran				180 J			300 J		
2,4-Dinitrotoluene									
Diethylphthalate			100 J						
4-Chorophenyl-phenyl ether									

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SURFACE SOIL

SEMI-VOLATILES									
Sample ID No.	LT-SS-01R	LT-SS-02	LT-SS-03R	LT-SS-04	LT-SS-05R	LT-SS-06R	LT-SS-07	LT-SS-08R	LT-SS-09
Traffic Report No.	SS01R	LTSS02 RE	SS03R	LTSS04	SS05R	SB06R	LTSS07	SS08R	LTSS09
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	5	1	1	1	1
Percent Moisture	13	3	32	18	16	13	4	10	10
Sample Date	3/18/97	09/05/96	3/20/97	09/05/96	3/20/97	3/17/97	09/06/96	3/18/97	09/11/96
Sample Time	1435	1423	1529	1545	1521	1240	1404	1400	1345
Beginning Depth	0	0	0	0	0	0	0	0	0
Ending Depth	2	2	2	2	2	2	2	2	2
Site ID	SS01	SS02	SS03	SS04	SS05	SS06	SS07	SS08	SS09
Parcel	A	A	A	C	A	B	A	B	A
Fluorene					260 J		570 E		
4-Nitroaniline									
4,6-Dinitro-2-methylphenol									
N-nitrosodiphenylamine									
4-Bromophenyl-phenyl ether									
Hexachlorobenzene									
Pentachlorophenol			3600						
Phenanthrene		170 J			3800		3400 E		72 J
Anthracene					700 J		690 E		
Carbazole					700 J		1000 E		
Di-n-butylphthalate									17 J
Fluoranthene	110 J	250 J	150 J		5400		10,000 E	64 J	240 J
Pyrene	150 J	190 J	210 J		5800		7300 E	86 J	210 J
Butylbenzylphthalate									51 J
3,3'-Dichlorobenzidine									
Benzo(a)anthracene	68 J	81 J			3100				92 J
Chrysene	90 J	130 J		41 J	4000		440 E		190 J
bis(2-ethylhexyl)phthalate	150 J		300 J		910 J		51 J	100 J	
Di-n-octylphthalate									
Benzo(b)fluoranthene		400 E			6900 Y		10,000 E		500
Benzo(k)fluoranthene									120 J
Benzo(a)pyrene		43 J			3600		3900 E		120 J
Indeno(1,2,3-cd)pyrene		93 J			3800		2200 E		110 J
Dibenz(a,h)anthracene					1300 J		770 E		
Benzo(g,h,i)perylene		81 J			4700		1700 E		83 J

302238

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SURFACE SOIL

SEMI-VOLATILES				
Sample ID No.	LT-SS-10	LT-SS-11	LT-SS-DUP09	LT-SS-12
Traffic Report No.	LTSSS10	LTSS11	SDUP09	LTSS12
Matrix	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	10	1	1
Percent Moisture	6	38	35	48
Sample Date	09/11/96	09/20/96	9/20/96	09/20/96
Sample Time	1445	1058	1100	1200
Beginning Depth	0	0	0	0
Ending Depth	2	2	2	2
Site ID	SS10	SS11	SS11	SS12
Parcel	C	C	C	C
Phenol				
bis(2-chloroethyl)ether				
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene				
1,2-Dichlorobenzene				
2-Methylphenol				
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol				
N-Nitroso-di-n-dipropylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone				
2-Nitrophenol				
2,4-Dimethylphenol				
bis(2-Chloroethoxy)methane				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene				
4-Chloroaniline				
Hexachlorobutadiene				
4-Chloro-3-Methylphenol				
2-Methylnaphthalene				
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene				
3-Nitroaniline				
Acenaphthene				
2,4-Dinitrophenol				
4-Nitrophenol				
Dibenzofuran				
2,4-Dinitrotoluene				
Diethylphthalate				
4-Chorophenyl-phenyl ether				

SITE N. _: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
SURFACE SOIL

SEMI-VOLATILES				
Sample ID No.	LT-SS-10	LT-SS-11	LT-SS-DUP09	LT-SS-12
Traffic Report No.	LTSSS10	LTSS11	SDUP09	LTSS12
Matrix	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	10	1	1
Percent Moisture	6	38	35	48
Sample Date	09/11/96	09/20/96	9/20/96	09/20/96
Sample Time	1445	1058	1100	1200
Beginning Depth	0	0	0	0
Ending Depth	2	2	2	2
Site ID	SS10	SS11	SS11	SS12
Parcel	C	C	C	C
Fluorene				
4-Nitroaniline				
4,6-Dinitro-2-methylphenol				
N-nitrosodiphenylamine				
4-Bromophenyl-phenyl ether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene				
Anthracene				65 J
Carbazole				
Di-n-butylphthalate				
Fluoranthene				130 J
Pyrene				100 J
Butylbenzylphthalate				
3,3'-Dichlorobenzidine				
Benzo(a)anthracene				
Chrysene				73 J
bis(2-ethylhexyl)phthalate				
Di-n-octylphthalate				
Benzo(b)fluoranthene				150 J
Benzo(k)fluoranthene				
Benzo(a)pyrene				
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				

NOTES:

Blank space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicated possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%

302240

SITE NAME: LI Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
TEST PITS

SEMI-VOLATILES									
Sample ID No.	LT-SB-TP-01	LT-SB-TP-DUP	LT-SB-TP-02R	LT-SB-TP-03R	LT-SB-TP-04R	LT-SB-TP-05	LT-SB-TP-06	LT-SB-TP-07	LT-SB-TP-08
Traffic Report No.	SBTP01	SBTPDU	SBTP02R	SBTP03R	SBTP04R	SBTP05	SBTP06	SBTP07	SBTP08
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	2	2	10	1	1	1	1
Percent Moisture	22	20	19	19	15	29	11	9	14
Sample Date	08/13/96	08/13/96	3/18/97	3/18/97	3/18/97	08/15/96	08/14/96	08/16/96	08/20/96
Sample Time	1355	1355	1100	0905	0950	1152	1429	1046	1440
Beginning Depth	1	1	1	0	4	0	2	1	0
Ending Depth	2	2	3	1	5	1	3	2	1
Site ID	TP01	TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08
Parcel	B	B	B	B	B	B	B	B	C
Phenol									
bis(2-chloroethyl)ether									
2-Chlorophenol									
1,3-Dichlorobenzene									
1,4-Dichlorobenzene									
1,2-Dichlorobenzene									
2-Methylphenol									
2,2'-oxybis(1-Chloropropane)									
4-Methylphenol									
N-Nitroso-di-n-dipropylamine									
Hexachloroethane									
Nitrobenzene									
Isophorone									
2-Nitrophenol									
2,4-Dimethylphenol									
bis(2-Chloroethoxy)methane									
2,4-Dichlorophenol									
1,2,4-Trichlorobenzene									
Naphthalene									
4-Chloroaniline									
Hexachlorobutadiene									
4-Chloro-3-Methylphenol									
2-Methylnaphthalene									
Hexachlorocyclopentadiene									
2,4,6-Trichlorophenol									
2,4,5-Trichlorophenol									
2-Chloronaphthalene									
2-Nitroaniline									
Dimethylphthalate									
Acenaphthylene									
2,6-Dinitrotoluene									
3-Nitroaniline									
Acenaphthene									
2,4-Dinitrophenol									
4-Nitrophenol									
Dibenzofuran									
2,4-Dinitrotoluene									
Diethylphthalate									
4-Chorophenyl-phenyl ether									

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO: NA
LAB NAME: Maxim Technologies

SEMI-VOLATILE DATA
TEST PITS

SEMI-VOLATILES	LT-SB-TP-01	LT-SB-TP-DUP	LT-SB-TP-02R	LT-SB-TP-03R	LT-SB-TP-04R	LT-SB-TP-05	LT-SB-TP-06	LT-SB-TP-07	LT-SB-TP-08
Sample ID No.	SBTP01	SBTPDU	SBTP02R	SBTP03R	SBTP04R	SBTP05	SBTP06	SBTP07	SBTP08
Traffic Report No.	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Matrix	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Units	1	1	2	2	10	1	1	1	1
Dilution Factor	22	20	19	19	15	29	11	9	14
Percent Moisture	08/13/96	08/13/96	3/18/97	3/18/97	3/18/97	08/15/96	08/14/96	08/16/96	08/20/96
Sample Date	1355	1355	1100	0905	0950	1152	1429	1046	1440
Sample Time	1	1	1	0	4	0	2	1	0
Beginning Depth	2	2	3	1	5	1	3	2	1
Ending Depth	TP01	TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08
Site ID	B	B	B	B	B	B	B	B	C
Parcel									
Fluorene									
4-Nitroaniline									
4,6-Dinitro-2-methylphenol									
N-nitrosodiphenylamine									
4-Bromophenyl-phenyl ether									
Hexachlorobenzene									
Pentachlorophenol									
Phenanthrene	85 J	110 J		320 J		400 J			
Anthracene				66 J					
Carbazole									
Di-n-butylphthalate						58 J			
Fluoranthene	160 J	250 J		530 J		590			
Pyrene	140 J	230 J		820		590			
Butylbenzylphthalate						100 J			
3,3'-Dichlorobenzidine									
Benzo(a)anthracene				360 J		260 J			
Chrysene	120 J	190 J		400 J		330 J			
bis(2-ethylhexyl)phthalate									
Di-n-octylphthalate									
Benzo(b)fluoranthene	510	520		320 J		1000 E			
Benzo(k)fluoranthene				370 J					
Benzo(a)pyrene		120 J		390 J		200 J			
Indeno(1,2,3-cd)pyrene	160 J	150 J		250 J		170 J			
Dibenz(a,h)anthracene									
Benzo(g,h,i)perylene				310 J		170 J			

NOTES:

Blank space - compound analyzed for, but not detected

B - compound found in lab blank as well as sample, indicated possible/probable blank contamination

E - estimated value

J - estimated value, compound present below CRQL but above IDL

R - analysis did not pass EPA QA/QC

N - presumptive evidence of the presence of the material

NR - analysis not required

Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%

302242

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO: NA
LAB NAME: MAXIM TECHNOLOGIES

SEMI-VOLATILE DATA
SURFACE WATER / SEDIMENT

SEMI-VOLATILES								
Sample ID No.	LT-SW-01	LT-SW-04	LT-SW-05	LT-SW-08	LT-SW-09	LT-SW-10	LT-SW-11	LT-SED-02
Traffic Report No.	LTSW01	LTSW04	LTSW05	LTSW08RE	LTSW09	LTSW10	LTSW11	LTSED2RE
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	SOIL
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	14
Phenol								
bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
1,2-Dichlorobenzene								
2-Methylphenol								
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol								
N-Nitroso-di-n-dipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone								
2-Nitrophenol								
2,4-Dimethylphenol								
bis(2-Chloroethoxy)methane								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene								
4-Chloroaniline								
Hexachlorobutadiene								
4-Chloro-3-Methylphenol								
2-Methylnaphthalene								
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
3-Nitroaniline								
Acenaphthene								
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran								
2,4-Dinitrotoluene								
Diethylphthalate			1 J					
4-Chorophenyl-phenyl ether								
Fluorene								
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								
N-nitrosodiphenylamine								
4-Bromophenyl-phenyl ether								
Hexachlorobenzene								

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

SEMI-VOLATILE DATA
SURFACE WATER / SEDIMENT

SEMI-VOLATILES								
Sample ID No.	LT-SW-01	LT-SW-04	LT-SW-05	LT-SW-08	LT-SW-09	LT-SW-10	LT-SW-11	LT-SED-02
Traffic Report No.	LTSW01	LTSW04	LTSW05	LTSW08RE	LTSW09	LTSW10	LTSW11	LTSED2RE
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	SOIL
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	14
Pentachlorophenol								
Phenanthrene								41 J
Anthracene								
Carbazole								
Di-n-butylphthalate	1 J						1 J	
Fluoranthene								68 J
Pyrene								51 J
Butylbenzylphthalate								
3,3'-Dichlorobenzidine								
Benzo(a)anthracene								29 J
Chrysene								54 J
bis(2-ethylhexyl)phthalate	1 J				1 J		4 J	21 J
Di-n-octylphthalate								
Benzo(b)fluoranthene								62 J
Benzo(k)fluoranthene								36 J
Benzo(a)pyrene								21 J
Indeno(1,2,3-cd)pyrene								27 J
Dibenz(a,h)anthracene								
Benzo(g,h,i)perylene								22 J

NOTES:
Blank space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicated possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - *analysis not required*
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

SEMI-VOLATILE DATA
SURFACE WATER / SEDIMENT

SEMI-VOLATILES								
Sample ID No.	LT-SED-03	LT-SED-04	LT-SED-05	LT-SED-08	LT-SED-09	LT-SED-10	LT-SED-11	LT-SED-DP-02
Traffic Report No.	LTSED3	LTSED4	TSED05	LTSED8	LTSED9	TSED10	LTSED11	SDDP02
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	29	63	84	30	31	19	32	18
Phenol								R
bis(2-chloroethyl)ether								
2-Chlorophenol								R
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
1,2-Dichlorobenzene								
2-Methylphenol								R
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol								R
N-Nitroso-di-n-dipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone								
2-Nitrophenol								R
2,4-Dimethylphenol								R
bis(2-Chloroethoxy)methane								
2,4-Dichlorophenol								R
1,2,4-Trichlorobenzene								
Naphthalene								
4-Chloroaniline								
Hexachlorobutadiene								
4-Chloro-3-Methylphenol								R
2-Methylnaphthalene								130 J
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								R
2,4,5-Trichlorophenol								R
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
3-Nitroaniline								
Acenaphthene								
2,4-Dinitrophenol								R
4-Nitrophenol								R
Dibenzofuran								
2,4-Dinitrotoluene								
Diethylphthalate								
4-Chorophenyl-phenyl ether								
Fluorene								
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								R
N-nitrosodiphenylamine								260 J
4-Bromophenyl-phenyl ether								
Hexachlorobenzene								

SITE N... ...e: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

SEMI-VOLATILE DATA
SURFACE WATER / SEDIMENT

SEMI-VOLATILES								
Sample ID No.	LT-SED-03	LT-SED-04	LT-SED-05	LT-SED-08	LT-SED-09	LT-SED-10	LT-SED-11	LT-SED-DP-02
Traffic Report No.	LTSED3	LTSED4	TSED05	LTSED8	LTSED9	TSED10	LTSED11	SDDP02
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	29	63	84	30	31	19	32	18
Pentachlorophenol	80 J							R
Phenanthrene	64 J			53 J			99 J	240 J
Anthracene								
Carbazole								
Di-n-butylphthalate								
Fluoranthene	98 J	120 J		74 J			160 J	160 J
Pyrene	110 J	93 J		59 J	52 J		130 J	240 J
Butylbenzylphthalate								52 J
3,3'-Dichlorobenzidine								
Benzo(a)anthracene			290 J				80 J	150 J
Chrysene	94 J		580 J				100 J	170 J
bis(2-ethylhexyl)phthalate								
Di-n-octylphthalate								
Benzo(b)fluoranthene	150 J	110 J	600 J	54 J	55 J		200 J	150 J
Benzo(k)fluoranthene			260 J				66 J	
Benzo(a)pyrene	50 J						75 J	42 J
Indeno(1,2,3-cd)pyrene	49 J						85 J	
Dibenz(a,h)anthracene								
Benzo(g,h,i)perylene	62 J						130 J	41 J

302246

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

SEMI-VOLATILE DATA
SURFACE WATER / SEDIMENT

SEMI-VOLATILES			
Sample ID No.	LT-SED-DP3	LT-SED-DP5	LT-SED-DP-29
Traffic Report No.	SEDDP3	SEDDP5	SDDP29
Matrix	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1
Percent Moisture	37	32	20
Phenol			R
bis(2-chloroethyl)ether			
2-Chlorophenol			R
1,3-Dichlorobenzene			
1,4-Dichlorobenzene			
1,2-Dichlorobenzene			
2-Methylphenol			R
2,2'-oxybis(1-Chloropropane)			
4-Methylphenol			R
N-Nitroso-di-n-dipropylamine			
Hexachloroethane			
Nitrobenzene			
Isophorone			
2-Nitrophenol			R
2,4-Dimethylphenol			R
bis(2-Chloroethoxy)methane			
2,4-Dichlorophenol			R
1,2,4-Trichlorobenzene		87 J	
Naphthalene		300 J	
4-Chloroaniline			
Hexachlorobutadiene			
4-Chloro-3-Methylphenol			R
2-Methylnaphthalene		280 J	99 J
Hexachlorocyclopentadiene			
2,4,6-Trichlorophenol			R
2,4,5-Trichlorophenol			R
2-Chloronaphthalene			
2-Nitroaniline			
Dimethylphthalate	560	170 J	
Acenaphthylene		120 J	
2,6-Dinitrotoluene			
3-Nitroaniline			
Acenaphthene		970	96 J
2,4-Dinitrophenol			R
4-Nitrophenol			R
Dibenzofuran		550	
2,4-Dinitrotoluene			
Diethylphthalate			
4-Chorophenyl-phenyl ether			
Fluorene		1100	87 J
4-Nitroaniline			
4,6-Dinitro-2-methylphenol			R
N-nitrosodiphenylamine	4100 E		
4-Bromophenyl-phenyl ether			
Hexachlorobenzene			

SITE N... LI Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURCES

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 1

SEMI-VOLATILES								
Sample ID No.	LT-GW-GM-1	LT-GW-GM-2	LT-GW-GM-7	LT-GW-GM8	LT-GW-GM-9	LT-GW-GM10	LT-GW-GM11	LT-GW-GM12
Traffic Report No.	LT-GW-GM-1	GM-2	GM7	GM8	GM9	GM10	GM11	GM12
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
Phenol								
bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
1,2-Dichlorobenzene								
2-Methylphenol								
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol								
N-Nitroso-di-n-dipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone					6 J			
2-Nitrophenol								
2,4-Dimethylphenol								
bis(2-Chloroethoxy)methane								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene								
4-Chloroaniline								
Hexachlorobutadiene								
4-Chloro-3-Methylphenol								
2-Methylnaphthalene								
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
3-Nitroaniline								
Acenaphthene								
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran								
2,4-Dinitrotoluene								
Diethylphthalate								
4-Chorophenyl-phenyl ether								
Fluorene								
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								
N-nitrosodiphenylamine								
4-Bromophenyl-phenyl ether								
Hexachlorobenzene								

302248

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURCES

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 1

SEMI-VOLATILES								
Sample ID No.	LT-GW-GM-1	LT-GW-GM-2	LT-GW-GM-7	LT-GW-GM8	LT-GW-GM-9	LT-GW-GM10	LT-GW-GM11	LT-GW-GM12
Traffic Report No.	LT-GW-GM-1	GM-2	GM7	GM8	GM9	GM10	GM11	GM12
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
Pentachlorophenol								
Phenanthrene								
Anthracene								
Carbazole								
Di-n-butylphthalate				2 J			1 J	
Fluoranthene								
Pyrene								
Butylbenzylphthalate								
3,3'-Dichlorobenzidine								
Benzo(a)anthracene								
Chrysene								
bis(2-ethylhexyl)phthalate	1 J	0.51 J						
Di-n-octylphthalate								
Benzo(b)fluoranthene								
Benzo(k)fluoranthene								
Benzo(a)pyrene								
Indeno(1,2,3-cd)pyrene								
Dibenz(a,h)anthracene								
Benzo(g,h,i)perylene								

302249

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 1

SEMI-VOLATILES	LT-GW-GM-13	LT-GW-GM14A	LT-GW-GM14B	LT-GW-EMW-1	LT-GW-EMW4	LT-GW-MW8S	LT-GW-MW8D	LT-GW-MW10D
Sample ID No.	GM13	GM14A	GM14B	EMW1	EMW4	MW8S	MW8D	MW10D
Traffic Report No.	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Matrix	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Units	1	1	1	1	1	2.5	12.5	50
Dilution Factor	--	--	--	--	--	--	--	--
Percent Moisture								
Phenol						20 J	180	630
bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene							20 J	
1,4-Dichlorobenzene							39 J	100 J
1,2-Dichlorobenzene							440	1300
2-Methylphenol						18 J	140	410 J
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol			72			26	190	420 J
N-Nitroso-di-n-dipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone							500	530
2-Nitrophenol								
2,4-Dimethylphenol								
bis(2-Chloroethoxy)methane								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene						6 J	420	2300
4-Chloroaniline								
Hexachlorobutadiene								
4-Chloro-3-Methylphenol								
2-Methylnaphthalene							17 J	120 J
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
3-Nitroaniline								
Acenaphthene								
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran								
2,4-Dinitrotoluene								
Diethylphthalate								
4-Chorophenyl-phenyl ether								
Fluorene								
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								
N-nitrosodiphenylamine								
4-Bromophenyl-phenyl ether								
Hexachlorobenzene								

302250

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 1

SEMI-VOLATILES								
Sample ID No.	LT-GW-GM-13	LT-GW-GM14A	LT-GW-GM14B	LT-GW-EMW-1	LT-GW-EMW4	LT-GW-MW8S	LT-GW-MW8D	LT-GW-MW10D
Traffic Report No.	GM13	GM14A	GM14B	EMW1	EMW4	MW8S	MW8D	MW10D
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	2.5	12.5	50
Percent Moisture	--	--	--	--	--	--	--	--
Pentachlorophenol								
Phenanthrene								
Anthracene								
Carbazole								
Di-n-butylphthalate					1 J	2 J	180	790
Fluoranthene								
Pyrene								
Butylbenzylphthalate								
3,3'-Dichlorobenzidine								
Benzo(a)anthracene								
Chrysene								
bis(2-ethylhexyl)phthalate								2400
Di-n-octylphthalate								
Benzo(b)fluoranthene								
Benzo(k)fluoranthene								
Benzo(a)pyrene								
Indeno(1,2,3-cd)pyrene								
Dibenz(a,h)anthracene								
Benzo(g,h,i)perylene								

302251

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 1

SEMI-VOLATILES								
Sample ID No.	LT-GW-MP-2D	LT-GW-MP-4	LT-GW-MP-5	LT-GW-MP-6	LT-GW-MP11D	LT-GW-MP-16S	LT-GW-MP-16D	LT-GW-MP-17
Traffic Report No.	MP-2D	MP4	MP5	LT-GW-MP-6	MP11D	MP16S	MP16D	MP-17RE
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
Phenol								
bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
1,2-Dichlorobenzene								
2-Methylphenol								
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol							3 J	
N-Nitroso-di-n-dipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone								
2-Nitrophenol								
2,4-Dimethylphenol								
bis(2-Chloroethoxy)methane								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene	0.54 J						2 J	
4-Chloroaniline								
Hexachlorobutadiene								
4-Chloro-3-Methylphenol								
2-Methylnaphthalene	0.74 J							
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								1.3 J
Acenaphthylene								
2,6-Dinitrotoluene								
3-Nitroaniline								
Acenaphthene								
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran								
2,4-Dinitrotoluene								
Diethylphthalate								
4-Chorophenyl-phenyl ether								
Fluorene								
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								
N-nitrosodiphenylamine								
4-Bromophenyl-phenyl ether								
Hexachlorobenzene								

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 1

SEMI-VOLATILES								
Sample ID No.	LT-GW-MP-2D	LT-GW-MP-4	LT-GW-MP-5	LT-GW-MP-6	LT-GW-MP11D	LT-GW-MP-16S	LT-GW-MP-16D	LT-GW-MP-17
Traffic Report No.	MP-2D	MP4	MP5	LT-GW-MP-6	MP11D	MP16S	MP16D	MP-17RE
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	–	–	–	–	–	--	--	--
Pentachlorophenol								
Phenanthrene								
Anthracene								
Carbazole								
Di-n-butylphthalate							6 J	
Fluoranthene								
Pyrene								
Butylbenzylphthalate								
3,3'-Dichlorobenzidine								
Benzo(a)anthracene								
Chrysene								
bis(2-ethylhexyl)phthalate	0.65 J			4 J				
Di-n-octylphthalate								
Benzo(b)fluoranthene								
Benzo(k)fluoranthene								
Benzo(a)pyrene								
Indeno(1,2,3-cd)pyrene								
Dibenz(a,h)anthracene								
Benzo(g,h,i)perylene								

302253

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 1

SEMI-VOLATILES	LT-GW-MP18S	LT-GW-MP18D	LT-GW-MP-19D	LT-GW-MP-20	LT-GW-MP-21D	LT-GW-MP-22	LT-GW-MP-22D	LT-GW-DUP-04
Sample ID No.	MP18S	MP18D	MP19D	LT-GW-MP-20	MP-21D	MP-22	MP-22D	DUP04
Traffic Report No.	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Matrix	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Units	1	2	1	1	1	1	1	1
Dilution Factor	--	--	--	--	--	--	--	--
Percent Moisture								
Phenol							9.5 J	
bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
1,2-Dichlorobenzene								
2-Methylphenol								
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol							2.1 J	
N-Nitroso-di-n-dipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone								
2-Nitrophenol								
2,4-Dimethylphenol								
bis(2-Chloroethoxy)methane								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene		49						
4-Chloroaniline								
Hexachlorobutadiene								
4-Chloro-3-Methylphenol								
2-Methylnaphthalene	0.5 J	120					6.2 J	
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
3-Nitroaniline								
Acenaphthene		4 J					0.68 J	
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran		5 J					0.51 J	
2,4-Dinitrotoluene								
Diethylphthalate								
4-Chorophenyl-phenyl ether								
Fluorene		4 J					0.67 J	
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								
N-nitrosodiphenylamine								
4-Bromophenyl-phenyl ether								
Hexachlorobenzene								

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 1

SEMI-VOLATILES								
Sample ID No.	LT-GW-MP18S	LT-GW-MP18D	LT-GW-MP-19D	LT-GW-MP-20	LT-GW-MP-21D	LT-GW-MP-22	LT-GW-MP-22D	LT-GW-DUP-04
Traffic Report No.	MP18S	MP18D	MP19D	LT-GW-MP-20	MP-21D	MP-22	MP-22D	DUP04
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	2	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
Pentachlorophenol								
Phenanthrene		3 J					0.59 J	
Anthracene								
Carbazole								
Di-n-butylphthalate		1 J				0.72 J		
Fluoranthene								
Pyrene								
Butylbenzylphthalate								
3,3'-Dichlorobenzidine								
Benzo(a)anthracene								
Chrysene								
bis(2-ethylhexyl)phthalate				2 J	1.2 J	1.4 J	1.4 J	
Di-n-octylphthalate								
Benzo(b)fluoranthene								
Benzo(k)fluoranthene								
Benzo(a)pyrene								
Indeno(1,2,3-cd)pyrene								
Dibenz(a,h)anthracene								
Benzo(g,h,i)perylene								

NOTES:

Blank space - compound analyzed for, but not detected

B - compound found in lab blank as well as sample, indicated possible/probable blank contamination

E - estimated value

J - estimated value, compound present below CRQL but above IDL

R - analysis did not pass EPA QA/QC

N - presumptive evidence of the presence of the material

NR - analysis not required

Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%

302255

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 2

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

Note: These samples were collected during the second round of groundwater sampling.

SEMI-VOLATILES								
Sample ID No.	LT-GW-GM-1	LT-GW-GM-2	LT-GW-GM-7	LT-GW-GM-8	LT-GW-GM-9	LT-GW-GM-10	LT-GW-GM-11	LT-GW-GM-12
Traffic Report No.	GM1	GM2	GM7	GM8	GM9	GM10	GM11	GM12
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
Phenol								
bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								
1,2-Dichlorobenzene								
2-Methylphenol								
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol								
N-Nitroso-di-n-dipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone								
2-Nitrophenol								
2,4-Dimethylphenol								
bis(2-Chloroethoxy)methane								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene								
4-Chloroaniline								
Hexachlorobutadiene								
4-Chloro-3-Methylphenol								
2-Methylnaphthalene								
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
3-Nitroaniline								
Acenaphthene								
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran								
2,4-Dinitrotoluene								
Diethylphthalate								
4-Chorophenyl-phenyl ether								
Fluorene								
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 2

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

Note: These samples were collected during the second round of groundwater sampling.

SEMI-VOLATILES								
Sample ID No.	LT-GW-GM-1	LT-GW-GM-2	LT-GW-GM-7	LT-GW-GM-8	LT-GW-GM-9	LT-GW-GM-10	LT-GW-GM-11	LT-GW-GM-12
Traffic Report No.	GM1	GM2	GM7	GM8	GM9	GM10	GM11	GM12
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
N-nitrosodiphenylamine								
4-Bromophenyl-phenyl ether								
Hexachlorobenzene								
Pentachlorophenol								
Phenanthrene								
Anthracene								
Carbazole								
Di-n-butylphthalate								
Fluoranthene								
Pyrene								
Butylbenzylphthalate								
3,3'-Dichlorobenzidine								
Benzo(a)anthracene								
Chrysene								
bis(2-ethylhexyl)phthalate	2 J	4 J						
Di-n-octylphthalate								
Benzo(b)fluoranthene								
Benzo(k)fluoranthene								
Benzo(a)pyrene								
Indeno(1,2,3-cd)pyrene								
Dibenz(a,h)anthracene								
Benzo(g,h,i)perylene								

302257

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 2

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

SEMI-VOLATILES	LT-GW-GM-13	LT-GW-GM-14A	LT-GW-GM-14B	LT-GW-GM-15	LT-GW-EMW-1	LT-GW-EMW-4	LT-GW-MW-8S
Sample ID No.	GM13	GM14A	GM14B	GM15	EMW1	EMW4	MW8S
Traffic Report No.	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Matrix	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Units	1	1	2.5	1	1	1	1
Dilution Factor	--	--	--	--	--	--	--
Percent Moisture							
Phenol							3 J
bis(2-chloroethyl)ether							
2-Chlorophenol							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
1,2-Dichlorobenzene							
2-Methylphenol							2 J
2,2'-oxybis(1-Chloropropane)							
4-Methylphenol			130				3 J
N-Nitroso-di-n-dipropylamine							
Hexachloroethane							
Nitrobenzene							
Isophorone							
2-Nitrophenol							
2,4-Dimethylphenol							
bis(2-Chloroethoxy)methane							
2,4-Dichlorophenol							
1,2,4-Trichlorobenzene							
Naphthalene							1 J
4-Chloroaniline							
Hexachlorobutadiene							
4-Chloro-3-Methylphenol							
2-Methylnaphthalene							
Hexachlorocyclopentadiene							
2,4,6-Trichlorophenol							
2,4,5-Trichlorophenol							
2-Chloronaphthalene							
2-Nitroaniline							
Dimethylphthalate							
Acenaphthylene							
2,6-Dinitrotoluene							
3-Nitroaniline							
Acenaphthene							
2,4-Dinitrophenol							
4-Nitrophenol							
Dibenzofuran							
2,4-Dinitrotoluene							
Diethylphthalate				7 J			
4-Chorophenyl-phenyl ether							
Fluorene		3 J					
4-Nitroaniline							
4,6-Dinitro-2-methylphenol							

302258

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 2

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

SEMI-VOLATILES							
Sample ID No.	LT-GW-GM-13	LT-GW-GM-14A	LT-GW-GM-14B	LT-GW-GM-15	LT-GW-EMW-1	LT-GW-EMW-4	LT-GW-MW-8S
Traffic Report No.	GM13	GM14A	GM14B	GM15	EMW1	EMW4	MW8S
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	2.5	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--
N-nitrosodiphenylamine							
4-Bromophenyl-phenyl ether							
Hexachlorobenzene							
Pentachlorophenol							
Phenanthrene		3 J					
Anthracene							
Carbazole							
Di-n-butylphthalate							
Fluoranthene							
Pyrene							
Butylbenzylphthalate							
3,3'-Dichlorobenzidine							
Benzo(a)anthracene							
Chrysene							
bis(2-ethylhexyl)phthalate		2 J	3 J				8 J
Di-n-octylphthalate							
Benzo(b)fluoranthene							
Benzo(k)fluoranthene							
Benzo(a)pyrene							
Indeno(1,2,3-cd)pyrene							
Dibenz(a,h)anthracene							
Benzo(g,h,i)perylene							

302259

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 2

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

SEMI-VOLATILES								
Sample ID No.	LT-GW-MW-8D	LT-GW-MW-10D	LT-GW-MP-2D	LT-GW-MP-4	LT-GW-MP-5	LT-GW-MP-6	LT-GW-MP-11D	LT-GW-MP-16S
Traffic Report No.	MW8D	MW10D	MP2D	MP4	MP5	MP6	MP11D	MP16S
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	8.3	20	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
Phenol	140	470						
bis(2-chloroethyl)ether								
2-Chlorophenol								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene	20 J	54 J						
1,2-Dichlorobenzene	240	630						
2-Methylphenol	98	410						
2,2'-oxybis(1-Chloropropane)								
4-Methylphenol	140	380						
N-Nitroso-di-n-dipropylamine								
Hexachloroethane								
Nitrobenzene								
Isophorone	210	220						
2-Nitrophenol								
2,4-Dimethylphenol	26 J	110 J						
bis(2-Chloroethoxy)methane								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene	280	850						
4-Chloroaniline								
Hexachlorobutadiene								
4-Chloro-3-Methylphenol								
2-Methylnaphthalene	13 J	28 J						
Hexachlorocyclopentadiene								
2,4,6-Trichlorophenol								
2,4,5-Trichlorophenol								
2-Chloronaphthalene								
2-Nitroaniline								
Dimethylphthalate								
Acenaphthylene								
2,6-Dinitrotoluene								
3-Nitroaniline								
Acenaphthene								
2,4-Dinitrophenol								
4-Nitrophenol								
Dibenzofuran								
2,4-Dinitrotoluene								
Diethylphthalate	7 J	62 J						
4-Chorophenyl-phenyl ether								
Fluorene								
4-Nitroaniline								
4,6-Dinitro-2-methylphenol								

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 2

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

SEMI-VOLATILES								
Sample ID No.	LT-GW-MW-8D	LT-GW-MW-10D	LT-GW-MP-2D	LT-GW-MP-4	LT-GW-MP-5	LT-GW-MP-6	LT-GW-MP-11D	LT-GW-MP-16S
Traffic Report No.	MW8D	MW10D	MP2D	MP4	MP5	MP6	MP11D	MP16S
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	8.3	20	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
N-nitrosodiphenylamine								
4-Bromophenyl-phenyl ether								
Hexachlorobenzene								
Pentachlorophenol								
Phenanthrene								
Anthracene								
Carbazole								
Di-n-butylphthalate	170	92 J						
Fluoranthene								
Pyrene								
Butylbenzylphthalate								
3,3'-Dichlorobenzidine								
Benzo(a)anthracene								
Chrysene								
bis(2-ethylhexyl)phthalate		180 J	1 J					
Di-n-octylphthalate								
Benzo(b)fluoranthene								
Benzo(k)fluoranthene								
Benzo(a)pyrene								
Indeno(1,2,3-cd)pyrene								
Dibenz(a,h)anthracene								
Benzo(g,h,i)perylene								

302261

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 2

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

SEMI-VOLATILES							
Sample ID No.	LT-GW-MP-16D	LT-GW-MP-17	LT-GW-MP-18S	LT-GW-MP-18D	LT-GW-MP-19D	LT-GW-MP-20	LT-GW-MP-21D
Traffic Report No.	MP16D	MP17	MP18S	MP18D	MP19D	MP20	MP21D
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	2.5	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--
Phenol		3 J					
bis(2-chloroethyl)ether							
2-Chlorophenol							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
1,2-Dichlorobenzene							
2-Methylphenol							
2,2'-oxybis(1-Chloropropane)							
4-Methylphenol							
N-Nitroso-di-n-dipropylamine							
Hexachloroethane							
Nitrobenzene							
Isophorone							
2-Nitrophenol							
2,4-Dimethylphenol							
bis(2-Chloroethoxy)methane							
2,4-Dichlorophenol							
1,2,4-Trichlorobenzene							
Naphthalene			44				
4-Chloroaniline							
Hexachlorobutadiene							
4-Chloro-3-Methylphenol							
2-Methylnaphthalene			100				
Hexachlorocyclopentadiene							
2,4,6-Trichlorophenol							
2,4,5-Trichlorophenol							
2-Chloronaphthalene							
2-Nitroaniline							
Dimethylphthalate							
Acenaphthylene							
2,6-Dinitrotoluene							
3-Nitroaniline							
Acenaphthene			3 J				
2,4-Dinitrophenol							
4-Nitrophenol							
Dibenzofuran			4 J				
2,4-Dinitrotoluene							
Diethylphthalate							
4-Chorophenyl-phenyl ether							
Fluorene			4 J				
4-Nitroaniline							
4,6-Dinitro-2-methylphenol							

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 2

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

SEMI-VOLATILES							
Sample ID No.	LT-GW-MP-16D	LT-GW-MP-17	LT-GW-MP-18S	LT-GW-MP-18D	LT-GW-MP-19D	LT-GW-MP-20	LT-GW-MP-21D
Traffic Report No.	MP16D	MP17	MP18S	MP18D	MP19D	MP20	MP21D
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	2.5	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--
N-nitrosodiphenylamine							
4-Bromophenyl-phenyl ether							
Hexachlorobenzene							
Pentachlorophenol							
Phenanthrene			2 J				
Anthracene							
Carbazole							
Di-n-butylphthalate				0.5 J	0.6 J		
Fluoranthene							
Pyrene							
Butylbenzylphthalate							
3,3'-Dichlorobenzidine							
Benzo(a)anthracene							
Chrysene							
bis(2-ethylhexyl)phthalate		1 J	3 J	7 J		2 J	
Di-n-octylphthalate				1 J			
Benzo(b)fluoranthene							
Benzo(k)fluoranthene							
Benzo(a)pyrene							
Indeno(1,2,3-cd)pyrene							
Dibenz(a,h)anthracene							
Benzo(g,h,i)perylene							

302263

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 2

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

SEMI-VOLATILES				
Sample ID No.	LT-GW-MP-22	LT-GW-MP-22D	LT-GW-DUP05	LT-GW-DUP-06
Traffic Report No.	MP22	MP22D	DUP05	DUP06
Matrix	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1
Percent Moisture	--	--	--	--
Phenol		34		
bis(2-chloroethyl)ether				
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene				
1,2-Dichlorobenzene				
2-Methylphenol				
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol		23		
N-Nitroso-di-n-dipropylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone				
2-Nitrophenol				
2,4-Dimethylphenol				
bis(2-Chloroethoxy)methane				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene		5 J		
4-Chloroaniline				
Hexachlorobutadiene				
4-Chloro-3-Methylphenol				
2-Methylnaphthalene		10		
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene				
3-Nitroaniline				
Acenaphthene				
2,4-Dinitrophenol				
4-Nitrophenol				
Dibenzofuran				
2,4-Dinitrotoluene				
Diethylphthalate				
4-Chorophenyl-phenyl ether				
Fluorene				
4-Nitroaniline				
4,6-Dinitro-2-methylphenol				

302264

SEMI-VOLATILE DATA
GROUNDWATER - ROUND 2

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

SEMI-VOLATILES				
Sample ID No.	LT-GW-MP-22	LT-GW-MP-22D	LT-GW-DUP05	LT-GW-DUP-06
Traffic Report No.	MP22	MP22D	DUP05	DUP06
Matrix	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1
Percent Moisture	--	--	--	--
N-nitrosodiphenylamine				
4-Bromophenyl-phenyl ether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene		0.8 J		
Anthracene				
Carbazole				
Di-n-butylphthalate				
Fluoranthene				
Pyrene				
Butylbenzylphthalate				
3,3'-Dichlorobenzidine				
Benzo(a)anthracene				
Chrysene				
bis(2-ethylhexyl)phthalate	2 J	2 J		0.7 J
Di-n-octylphthalate				
Benzo(b)fluoranthene				
Benzo(k)fluoranthene				
Benzo(a)pyrene				
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				

NOTES:
Blank space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicated possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%

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SEMI-VOLATILE DATA
ORE SAMPLES

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

SEMI-VOLATILES		ORE -01 DUP			
Sample ID No.	LT-DW-ORE-01	LT-DW-ORE-DUP	LT-DW-ORE-02	LT-DW-ORE-03	LT-KONICA-01
Traffic Report No.	DWORE01	DWOREDUP	DWORE02	DWORE03	KONICA01
Matrix	SOIL	SOIL	SOIL	SOIL	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
Dilution Factor	1	1	1	1	1
Percent Moisture	29	29	33	27	–
Phenol					
bis(2-chloroethyl)ether					
2-Chlorophenol					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					
1,2-Dichlorobenzene					
2-Methylphenol					
2,2'-oxybis(1-Chloropropane)					
4-Methylphenol					
N-Nitroso-di-n-dipropylamine					
Hexachloroethane					
Nitrobenzene					
Isophorone					
2-Nitrophenol					
2,4-Dimethylphenol					
bis(2-Chloroethoxy)methane					
2,4-Dichlorophenol					
1,2,4-Trichlorobenzene	67 J	92 J			
Naphthalene					
4-Chloroaniline					
Hexachlorobutadiene					
4-Chloro-3-Methylphenol					
2-Methylnaphthalene				30 J	
Hexachlorocyclopentadiene					
2,4,6-Trichlorophenol					
2,4,5-Trichlorophenol					
2-Chloronaphthalene					
2-Nitroaniline					
Dimethylphthalate					
Acenaphthylene					
2,6-Dinitrotoluene					
3-Nitroaniline					
Acenaphthene					
2,4-Dinitrophenol					
4-Nitrophenol					
Dibenzofuran					
2,4-Dinitrotoluene					
Diethylphthalate				43 J	
4-Chorophenyl-phenyl ether					
Fluorene					
4-Nitroaniline					
4,6-Dinitro-2-methylphenol					

302266

SEMI-VOLATILE DATA
ORE SAMPLES

SITE NAME: Li Tungsten
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

SEMI-VOLATILES		ORE -01 DUP			
Sample ID No.	LT-DW-ORE-01	LT-DW-ORE-DUP	LT-DW-ORE-02	LT-DW-ORE-03	LT-KONICA-01
Traffic Report No.	DWORE01	DWOREDUP	DWORE02	DWORE03	KONICA01
Matrix	SOIL	SOIL	SOIL	SOIL	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
Dilution Factor	1	1	1	1	1
Percent Moisture	29	29	33	27	--
N-nitrosodiphenylamine					
4-Bromophenyl-phenyl ether					
Hexachlorobenzene					
Pentachlorophenol					
Phenanthrene	120 J	160 J	200 J	160 J	
Anthracene			29 J		
Carbazole			33 J		
Di-n-butylphthalate			520		
Fluoranthene	230 J	360 J	290 J	220 J	
Pyrene	360 J	490	370 J	310 J	
Butylbenzylphthalate					
3,3'-Dichlorobenzidine					
Benzo(a)anthracene	83 J	170 J	140 J	140 J	
Chrysene	110 J	180 J	160 J	110 J	
bis(2-ethylhexyl)phthalate	540	410 J	1300	530	
Di-n-octylphthalate					
Benzo(b)fluoranthene	180 YJ	320 YJ	220 YJ	240 YJ	
Benzo(k)fluoranthene					
Benzo(a)pyrene		140 J	120 J	110 J	
Indeno(1,2,3-cd)pyrene	61 J			54 J	
Dibenz(a,h)anthracene					
Benzo(g,h,i)perylene	250 J	220 J	210 J	88 J	

NOTES:

Blank space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicated possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%

302267

INORGANICS DATA

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SOIL BORINGS

INORGANICS							
Sample ID No.	LT-SB-01	LT-SB-02	LT-SB-02B	LT-SB-03	LT-SB-03B	LT-SB-04	LT-SB-04B
Lab Number	SB0113	SB0213	SB0235	SB0313	B03B3S	SB0413	B04B3S
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	87.4	89.5	89.0	90.6	90.1	91.2	89.7
Aluminum	5200	7820	6920	4190	4880	2140	2230
Antimony	2.3 J						
Arsenic	R	R	R	R	R	R	R
Barium	46.9	31.9 J	27.6 J	24.3 J	41.3 J	11.3 J	12.5 J
Beryllium	0.32 J	0.44 J	0.33 J	0.4 J	0.27 J		
Cadmium							
Calcium	32800	1040 J	3240	2470	21200	5450	4040
Chromium	13.6	15.8	31.6	10.8	19.6	12.3	27.4
Cobalt	27	5.2 J	5.5 J	5 J	9.5 J	3.1 J	3.7 J
Copper	52 E	5.8 E	6.2 E	15.4 E	54.3 E	11.1 E	53.2 E
Iron	11900	8470	7530	11600	10900	7610	5180
Lead	62.5	14.6	9.2	42.1	13.5	18.6	168
Magnesium	10800	1830	1990	1420	8450	2330	2250
Manganese	255	134	132	120	145	72.5	46.9
Mercury	0.06 J					0.05 J	0.11
Nickel	45.2 E	7.2 J	11.8 E	8.7 J	25.9 E	6.6 J	10.8 E
Potassium	611 J	715 J	791 J	724 J	497 J	807 J	736 J
Selenium	1.5 E			1.5 E	1.3 E	4.8 E	6.6 E
Silver	R						R
Sodium	323 J	44.1 J	57.1 J	43.8 J	69.4 J	35.3 J	32 J
Thallium							
Vanadium	15.1	17.1	16.2	13	13.9	9.9 J	8.8 J
Zinc	116 E	29.7 E	19.9 E	34.1 E	68.2 E	17.9 E	14.3 E
Cyanide							

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SOIL BORINGS

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-SB-05 SB0502 SOIL mg/kg 83.2	LT-SB-05B B05B24 SOIL mg/kg 76.6	LT-SB-06 LTSB06 SOIL mg/kg 76.1	LT-SB-07 SB0702 SOIL mg/kg 86.7	LT-SB-07B B07B24 SOIL mg/kg 92.3	LT-SB-08 SB0802 SOIL mg/kg 89.7	LT-SB-09 SB0902 SOIL mg/kg 90.7
Aluminum	3570	7050	4540	2760	1050	7830	5810
Antimony			18.6 E		19.9 E		5610
Arsenic	62.1	91.6	95	R	57.7	R	341
Barium	47.5 J	128	110 E	43.1 J	17.4 J	59.3	73
Beryllium				0.24 J		0.44 J	
Cadmium	8.9	0.76 J	0.86 J		0.63 J	1.9	12.3
Calcium	16400	1120 J	145000	5810	4360	11400	3940 E
Chromium	7.8	18.6	76.1 E	44.9	18	13.2	40.6 E
Cobalt	18.3	10 J	1310	7.4 J	23	34.6	63.9
Copper	73.3 E	78.9 E	1140	35.1 E	24.6 E	89.7 E	1820 E
Iron	38100	19400	86200	16600	7270	12500	76600
Lead	107	324	174 E	54.4	32.9	58.1	R
Magnesium	9170	1280 J	38200 E	1290	769 J	2470	2540
Manganese	129 E	55.8 E	R	92.1	59.4	171	858 E
Mercury	0.36	0.24	1.3	0.1 J	0.83	0.06 J	0.69
Nickel	84.4	28.3	652	10.1 E	69.8 E	19.4 E	145
Potassium	498 J	1430	331 J	897 J	444 J	1340	721 J
Selenium	8.5	18.4 E	10	5.2 E	8.5 E	2.3 E	R
Silver	0.74 J	0.86 J	9.1 E	R	R	R	114
Sodium	437 J	373 J	2200	71.9 J	70.6 J	177 J	1050 J
Thallium							
Vanadium	18	36.4	19.9	12.5	8.1 J	15.7	31.9
Zinc	89.3	115	529 E	75.4 E	69.8 E	152 E	483 E
Cyanide	0.4 J	0.31 J					0.39 J

302270

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SOIL BORINGS

INORGANICS							
Sample ID No.	LT-SB-09B	LT-SB-10	LT-SB-10B	LT-SB-11	LT-SB-11B	LT-SB-12	LT-SB-12B
Lab Number	B09B68	SB1002	B10B24	SB1102	11B810	SB1202	B12B24
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	83.4	83.5	70.2	90.8	92.7	71.1	81.4
Aluminum	6350	10600	6900	9370	4270	7740	8290
Antimony	121	29.1 E	5.3 J	7.7 J		42.3 E	
Arsenic	17.5	21.6	10.2 E	418	R	105	6.8 E
Barium	48.9	198	83.4	125	49	132	59.5
Beryllium		1.1 J	0.96 J	1.1	0.25 J		
Cadmium	0.79 J			11.7			
Calcium	2010 E	1350 E	1390 J	47800	619 J	3640 E	1800 E
Chromium	18.1 E	19.8 E	15.6 E	17.9	21	20.5 E	19.4 E
Cobalt	7.2 J	51.8	14 J	554	6.2 J	20.5	9 J
Copper	157 E	1080 E	86.2 E	679	22.1 E	128 E	11.1 E
Iron	8960	45900	32300	27900	9630	211000	22800
Lead	R	R	R	1960	7.7	R	R
Magnesium	1960	2180	1490	2870	1200	1820	2870
Manganese	108 E	5170 E	1400 E	1380	1880	2030 E	273 E
Mercury		0.45		1.4		0.26	
Nickel	54	200	27.6	2900	9.7 E	31.7	13.5
Potassium	662 J	1270	897 J	1070 J	1040 J	830 J	1630
Selenium	R	R		127	1.1 E	R	
Silver	R	R	R	26.4 E		R	
Sodium	109 J	799 J	176 J	1200	31.9 J	107 J	36.5 J
Thallium		4.3			1.4 J		
Vanadium	25.5	30	24.8	36.5	12.7	28.4	24.4
Zinc	82.4 E	259 E	57 E	859 E	33.6 E	267 E	41.4 E
Cyanide		0.47 J				0.41 J	

302271

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SOIL BORINGS

INORGANICS							
Sample ID No.	LT-SB-13	LT-SB-13B	LT-SB-14	LT-SB-14B	LT-SB-15	LT-SB-15B	LT-SB-16
Lab Number	SB1304	3B1416	SB1402	B14B68	SB1502	B15B46	SB1602
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	89.4	89.4	82.9	93.7	68.3	87.5	89.4
Aluminum	11500	6890	9390	2590	20300	10200	11400
Antimony			50.8 E		79.6	74.5	42.2 E
Arsenic	R	2.4 E	168	1.6 J	1340	191	R
Barium	58	87.4	976	34.9 J	478	71.3	30.1 J
Beryllium	0.71 J	1.1			6.8		0.59 J
Cadmium			3.9		5.6	0.65 J	
Calcium	555 J	2120	5980	214 J	20400 E	1880 E	441 J
Chromium	20.8	23	58.4	13.4	1620 E	31.5 E	21.6
Cobalt	8.4 J	7.6 J	2240 E	35.6 E	4620	196	11.2
Copper	10.1 E	9.6 E	2230 E	42.9 E	4610 E	413 E	156 E
Iron	15500	12100	37200	5730	173000	30100	17100
Lead	16.1	5.1 E	3300 E	6.3 E	R	R	853
Magnesium	2200	2370	1900	673 J	3920	2110	2330
Manganese	626	2220 E	1350 E	151 E	90000 E	1040 E	246
Mercury	0.06 J		0.86 E		0.98	0.06 J	
Nickel	11.1 E	21 E	953 E	23.3 E	22000	153	140 E
Potassium	1260	2100	844 J	450 J	650 J	734 J	823 J
Selenium		1.9 E	26.1 E		R	R	2.8 E
Silver			59.5	0.33 J	66.7	13.6	R
Sodium	49.9 J	62.2 J	1940	71.9 J	16600	650 J	87.6 J
Thallium		1.1 J			22.7		
Vanadium	27.7	15.9	21.2	5.4 J		26.4	30.2
Zinc	42.7 E	62.5 E	346 E	13.1 E	1400 E	154 E	55.5 E
Cyanide			0.67 E		0.91 E		

302272

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SOIL BORINGS

INORGANICS							
Sample ID No.	LT-SB-16B	LT-SB-17	LT-SB-17B	LT-SB-18	LT-SB-19	LT-SB-19B	LT-SB-20
Lab Number	16B810	SB1702	B17B46	SB1802	SB1902	SB19B2	SB2002
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	90.9	85.3	89	95.9	84.3	85.1	67.9
Aluminum	4030	11200	9720	3690	6400	7890	56600
Antimony	1.3 J	23.6 E		17.9	36	3.5 J	416
Arsenic	R	123	45.9	205	662	41.2	1790
Barium	22.7 J	170	54.4	22.3 J	66.6	103	164
Beryllium	0.23 J	3.3 E	1.4 E	0.29 J	0.36 J	0.48 J	0.82 J
Cadmium		5.2	1.2	1.3			5.1
Calcium	445 J	6050	1560	370 J	285 J	339 J	3730
Chromium	33	53	52.4	9.3	19.9	20.4	93.7
Cobalt	6.2 J	250 E	55.7 E	5.2 J	4.2 J	4.3 J	4660
Copper	44.7	396 E	69.5 E	179 E	207 E	157 E	2160 E
Iron	9690	41600	20300	23200	25200	20600	193000
Lead	36	1020 E	152 E	337	775	96.8	3710
Magnesium	1280	2160	1790	9820	1410	1270	2510
Manganese	252	20800 E	6300 E	262 E	155 E	172 E	5680 E
Mercury		0.36 E	0.18 E	0.17	0.26		
Nickel	17.2 E	731 E	193 E	6.9 J	7.6 J	8.3 J	28900
Potassium	1100	1570	1660	419 J	645 J	705 J	1800
Selenium		13.4 E	7.8 E	1.5 E	4.6 E		33.1
Silver	R	12.3	3.7	R	R	R	103
Sodium	26.7 J	3530	1090 J	64.6 J	35.7 J	51.5 J	36500
Thallium		3.6 E					
Vanadium	12	18.1	16.4	14.2	26.2	25.5	24.8
Zinc	34 E	425 E	102 E	104 E	88.4 E	44.1 E	1270 E
Cyanide			0.25 J				0.46 J

302273

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SOIL BORINGS

INORGANICS							
Sample ID No.	LT-SB-20B	LT-SB-21	LT-SB-22	LT-SB-23	LT-SB-23B	LT-SB-24	LT-SB-24B
Lab Number	SB20B4	LTSB21	LTSB22	SB2302	B23B24	SB2402	B24B24
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	81.8	76.7	68.8	85	86.7	85.4	87.6
Aluminum	11800	6310	6080	7520	3210	4080	8720
Antimony	1.8 J	3490 E	1710 E	443 E	1050 E	1920 E	116 E
Arsenic	10	1600	1400	7.3 E	161	114	14.1
Barium	75.5	244	544 E	26.6 J	83.3	209	29.2 J
Beryllium	0.65 J	0.82 J					
Cadmium		18.8	20.5		2	0.89 J	9.9
Calcium	392 J	19500	18700	506 J	2620	1260	659 J
Chromium	28.7	53.5 E	73.7 E	12.9	29.5	25.8	17.1
Cobalt	30.5	59.5	119	8.7 J	9.2 J	6.7 J	5.4 J
Copper	443 E	6740	2810	9.6 E	1180 E	276 E	9.9 E
Iron	27500	91300	144000	11600	38900	69200	14900
Lead	19.1	1330 E	2080 E	8.3 E	434 E	1080 E	25.4 E
Magnesium	2920	2410 E	3210 E	1740	900 J	918 J	2700
Manganese	218 E	R	R	106 E	229 E	834 E	132 E
Mercury		29.5	16	0.06 J	3.3 E	1.7 E	0.19 E
Nickel	201	175	311	18.7 E	19 E	14.4 E	11.1 E
Potassium	1850	1230 J	936 J	508 J	704 J	1440	1970
Selenium	1.3 E	91.9	175		10 E	7.4 E	
Silver	R	63.9	24.6		9	10.6	
Sodium	449 J	1730	1560	198 J	373 J	2300	219 J
Thallium							
Vanadium	38	23.2	30.7	18.1	14.8	20.3	21
Zinc	108 E	1870 E	2870 E	70.9 E	315 E	187 E	240 E
Cyanide			8 J				

302274

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SOIL BORINGS

INORGANICS							
Sample ID No.	LT-SB-25	LT-SB-25B	LT-SB-26	LT-SB-26B	LT-SB-27	LT-SB-27B	LT-SB-28
Lab Number	SB2502	B25B24	SB2602	6B1012	SB2702	B27B46	SB2824
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	86.7	76.6	81.9	88.6	81.7	77.5	87.4
Aluminum	1380	5040	6600	1460	393	12000	2020
Antimony	1420 E	10.2 J		2.6 J	73.3 E		16.4 E
Arsenic	503	192	10.9	1290	6300	9.1	1620
Barium	360	63.1	25.8 J	12.8 J	13.5 J	29.1 J	33 J
Beryllium							
Cadmium	2		1.4		6.6		6.3
Calcium	1810	1210 J	2730 E	98 J	452 J	2190 E	354 J
Chromium	14.5	19.6	14.1 E	8.4	9.8 E	32.6	9 E
Cobalt	14.6 E	2.9 J	3.1 J	1.7 J	17.5	7.9 J	2.4 J
Copper	183 E	70.1 E	219	100	1150	27.5	1040
Iron	62300	14800	11000	31700	313000	23300	17800
Lead	2730 E	336 E	56.7 E	137 E	570 E	13.8 E	2000 E
Magnesium	341 J	1820	2150	531 J	1030 J	4520	314 J
Manganese	1050 E	58.1 E	163 E	247 E	3650 E	275 E	135 E
Mercury	1.3 E	0.17 E	0.14		0.4		0.5
Nickel	14.9 E	9.4 J	9 J	3.4 J	19.2	16.6	3.5 J
Potassium	925 J	1410	354 J	587 J	472 J	2900	156 J
Selenium	14.4 E	7.1 E	R	R	R	R	R
Silver	45	0.95 J	0.39 J	12.8	90.6		29.6
Sodium	843 J	57.6 J		57.4 J	402 J		
Thallium							
Vanadium	10.6 J	18	18.3			26.7	
Zinc	202 E	40.8 E	143 E	102	1400 E	62 E	399 E
Cyanide							

302275

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SOIL BORINGS

INORGANICS							
Sample ID No.	LT-SB-28B	LT-SB-29	LT-SB-31	LT-SB-32	LT-SB-33	LT-SB-34	LT-SB-35
Lab Number	B28B46	LTSB29	LTSB31	LTSB32	LTSB33	LTSB34	LTSB35
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	88.1	89.7	78.5	81.2	83.9	87.8	88.7
Aluminum	2610	2260	2960	3830	1910	4160	4040
Antimony	1230 E	17.4 E					
Arsenic	2230	45.2	13.2	51.6	2.2 J	16.1 E	7.3 E
Barium	40.1 J	26.5 J	42 J	61.2	12.3 J	47.3	26.9 J
Beryllium							
Cadmium	179	9		1.4			
Calcium	1920 E	6550	812 J	5090 E	4790 E	26300 E	19800 E
Chromium	12.2 E	24.8	9.4 E	12.7 E	14.4 E	12.2 E	10.6 E
Cobalt	107	54.4	5.3 J	42.6	8.2 J	12 E	81.1
Copper	688	111 E	58.9 E	134 E	16.2 E	16.2 E	8.6 E
Iron	174000	6050	8970	20900	4600	9990	8390
Lead	419 E	79.6	R	R	R	R	R
Magnesium	752 J	2020	988 J	2910	791 J	1670	5620
Manganese	504 E	112	66.7 E	65.9 E	62 E	322 E	145 E
Mercury	4.7	0.25	0.08 J	0.23		0.37 E	0.13
Nickel	83.2	85.9 E	8.3 J	31.5	6.5 J	15.6	38.2
Potassium	481 J	914 J	624 J	862 J	563 J	711 J	543 J
Selenium	R	11.8	R	R		R	R
Silver	84.6	R		R		R	
Sodium	51.1 J	78 J	425 J	294 J	69.9 J	120 J	119 J
Thallium							
Vanadium		8.2 J	19.1	30.7	9.2 J	16.4	13.2
Zinc	10400 E	594 E	68.6 E	108 E	27.6 E	44.2 E	172 E
Cyanide			0.31 J				

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SOIL BORINGS

INORGANICS					
Sample ID No.	LT-SB-36	LT-SB-37	LT-SB-40	LT-SB-41	LT-SB-42
Lab Number	LTSB36	LTSB37	LTSB40	LTSB41	LTSB42
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	93.0	85.3	81.3	90.1	84.5
Aluminum	4620	6840	3190	1550	4940
Antimony			44.3 E		
Arsenic	R	R	2950	3.1 E	3.1 E
Barium	22.3 J	32.2 J	35.4 J	3.4 J	37.3 J
Beryllium	0.22 J	0.3 J			
Cadmium			4.2		
Calcium	9590	5400	2900	227 J	2370 E
Chromium	10	15.2	28.8	6.1	11.4
Cobalt	3.8 J	9.1 J		3.2 J	3.3 J
Copper	8.7 E	14.4 E	404 E	19.5	10.7
Iron	8600	9830	53900	4190	16300
Lead	27.4	20	575	4.3 E	4.2 E
Magnesium	1990	1610	652 J	400 J	1920
Manganese	157	219	59.4 E	61 E	122 E
Mercury	0.05 J	0.08 J	0.32		
Nickel	5.8 J	13.5 E	7.7 J	7.5 J	8.5 J
Potassium	538 J	966 J	699 J	346 J	1310
Selenium	4.6 E	2.1 E	3.9	R	R
Silver		R	14.4		
Sodium	47.7 J	324 J	242 J		
Thallium					
Vanadium	11.4	15.6	12.8		6.9 J
Zinc	39.2 E	68.4 E	251	25.2	17.7 E
Cyanide					

NOTES:
Blank Space - analyte analyzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302277

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
MONITORING WELL BORINGS

INORGANICS						
Sample ID No.	LT-SB-MP-2D	LT-SB-MP-4D	LT-SB-MP-4DB	LT-SB-MP-5	LT-SB-MP-5B	LT-SB-MP-6
Lab Number	MP2D13	MP4D13	P4DB35	BMP502	5B1820	BMP602
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	75.3	92.4	93.9	89.4	80	85.5
Aluminum	10800	6270	5940	15400	3760	16900
Antimony						
Arsenic	63.8	2 J	1.4 J	14.9	6.5	8.7 E
Barium	53.1	23.1 J	20.6 J	62.8	32.8 J	126
Beryllium	1.1 J					0.7 J
Cadmium						
Calcium	78600 E	690 J	488 J	1180	681 J	1550 E
Chromium	19.5	10.8	11.1	21.9	7.7	29.1 E
Cobalt	53.4	4.5 J		15.9	2.6 J	12.8
Copper	260	3 J	2 J	26.9 E	7.5 E	20.4 E
Iron	16800	7920	6530	36700	25400	19100
Lead	15.7 E	4	3.2	103	3.9	R
Magnesium	9870	1460	1110	2250	1230 J	4300
Manganese	238 E	205 E	137 E	541 E	407 E	394 E
Mercury	0.1 J			0.11		0.22
Nickel	287	6 J	4.2 J	18.2	8.4 J	20.9
Potassium	1280 J	760 J	767 J	1270	1140 J	1310
Selenium	R			2.7		
Silver	0.39 J			0.6 J		
Sodium	253 J	25.9 J	46.1 J	84.5 J	73.5 J	64.3 J
Thallium						
Vanadium	21.2	12.1	9.5 J	46.3	15.3	32.5
Zinc	64.2 E	17.3 E	11.8 E	81.2	15.9	89.8 E
Cyanide				0.23 J		

302278

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNO

INORGANIC DATA
MONITORING WELL BORINGS

INORGANICS						
Sample ID No.	LT-SB-MP-6B	LT-SB-MP-8D	LT-SB-MP-8DB	LT-SB-MP-9D	LT-SB-9DB	LT-SB-MP-11D
Lab Number	MP6B24	MP8D02	P8DB46	MP9D02	B9DB24	P11D02
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	87.1	92	89.6	85	85.9	94.8
Aluminum	20300	5460	1940	6490	4170	3930
Antimony	3 J	7.1 J	286 E	1.4 J		
Arsenic	30.5	R	R	10	5.5 E	4.4
Barium	183	25.9 J	20.6 J	43.4 J	19.5 J	11.5 J
Beryllium						
Cadmium						
Calcium	3640 E	352 J	228 J	531 J	451 J	91.1 J
Chromium	73.2 E	23.3 E	18.3 E	14.7	29.4	6.5 E
Cobalt	20.4	6.2 J	2.4 J	8.4 J	2.5 J	2.2 J
Copper	44.4 E	43.9 E	31.5 E	14.8 E	6 E	4.1 J
Iron	26000	20000	8930	21700	21200	7040
Lead	R	104	37.3	30.6	2.7	15.3 E
Magnesium	9400	1080 J	506 J	1270	913 J	790 J
Manganese	524 E	196 E	193 E	948 E	361 E	125 E
Mercury	0.27	0.07 J			0.09 J	
Nickel	40.8	9.6	4 J	21.2	5.8 J	4.1 J
Potassium	6070	511 J	277 J	409 J	496 J	422 J
Selenium		2.2	1.8	1.6		R
Silver	R	1 J	0.52 J	0.69 J		
Sodium	131 J	47.4 J	175 J	159 J	59.1 J	
Thallium						
Vanadium	56.2	19.5	5.4 J	17.5	13.7	4.7 J
Zinc	109 E	34.4	38.6	39.8	15.4	13.9 E
Cyanide						

302279

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNO

INORGANIC DATA
MONITORING WELL BORINGS

INORGANICS						
Sample ID No.	LT-SB-MP-11DB	LT-SB-MP-16S	LT-SB-MP-16SB	LT-SB-MP-18	LT-SB-MP-18B	LT-SB-MP-20
Lab Number	1DB810	P16S02	P16S24	MP1802	P18B24	MP2002
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	85.5	88.5	83	83.5	83.5	91.6
Aluminum	5550	6060	7790	6830	8710	6400
Antimony				2430 E	1730 E	
Arsenic	4.5	3.6 E	3.9 E	442	205	6.4
Barium	18.2 J	53.4 E	199 E	359	192	46.4
Beryllium	0.75 J					
Cadmium				23.9	1.5	
Calcium	66.1 J	2030	25000	1900	1270	22700
Chromium	14	16.2 E	24.2 E	30.2	34.3	18.2
Cobalt	1.6 J	6 J	5.5 J	14.9 E	16.9 E	9.9 J
Copper	38.6	3.5 J	R	755 E	214 E	26.8 E
Iron	12700	15800	12400	61700	51900	11100
Lead	11.1 E	11.3 E	29.8 E	297 E	336 E	28.4
Magnesium	1510	1420 E	2550 E	1640	2570	2160
Manganese	55 E	R	R	462 E	338 E	310 E
Mercury				2.3 E	0.92 E	0.09 J
Nickel	6.5 J	8.6 J	11.9 E	21.8 E	28.9 E	17.3
Potassium	919 J	2510	1020 J	1040 J	1960	904 J
Selenium	R	2.5		10.8 E	11.8 E	
Silver	0.34 J		1.5 J	2.8	6.8	1.4 J
Sodium		60.5 J	162 J	2960	1120 J	169 J
Thallium						
Vanadium	20.6	21	12.1	19.8	30.6	16.1
Zinc	34 E	47.7 E	127 E	437 E	195 E	73.2
Cyanide						

302280

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNO

INORGANIC DATA
MONITORING WELL BORINGS

INORGANICS					
Sample ID No.	LT-SB-MP-20B	LT-SB-MP-22	LT-SB-MP-22B	LT-SB-MP-22D	LT-SB-MP-22DB
Lab Number	P20B23	MP2213	P22B35	MP22D_	MP22DB
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	90.6	87.4	88.2	89.5	88.8
Aluminum	6380	4880	4200	4250	5940
Antimony				16.5	
Arsenic	6	54.5	45.9	20	27.4
Barium	48.1	74.3	19.7 J	48.2	21.7 J
Beryllium		0.48 J	0.32 J	0.32 J	0.67 J
Cadmium		5.3	6.8	2.9	2.6
Calcium	23200	10200	10200	4650	967 J
Chromium	18.4	17.1	13.8	R	R
Cobalt	7.2 J	10.7 J	10.3 J	14.4	9.5 J
Copper	20.7 E	63.4 E	49.6 E	17.5 E	10 E
Iron	16200	10100	9730	10000	11500
Lead	12.4	65.8	92.5	134	34
Magnesium	2860	3530	4760	2210	804 J
Manganese	458 E	133 E	64.6 E	78.1 E	66.2 E
Mercury	0.07 J	0.57	0.25	0.06 J	0.1 J
Nickel	14.1	15.4	12	19.1	8.3 J
Potassium	1000 J	611 J	526 J	509 J	559 J
Selenium	1.1	4.1 E	2.4 E	2.8 E	1.7 E
Silver	0.86 J	R	R		
Sodium	139 J	85.9 J	101 J	90.1 J	75.4 J
Thallium					
Vanadium	13.5	14.7	11.3 J	13.4	15.2
Zinc	46.7	233 E	160 E	300 E	174 E
Cyanide					

NOTES:
Blank Space - analyte analyzed for, but not detected
R - analysis did not pass EPA QA/QC
NR - analysis not required
E - estimated value
J - estimated value, analyte present below CRDL but above IDL

302281

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SURFACE SOIL

INORGANICS							
Sample ID No.	LT-SS-01	LT-SS-02	LT-SS-03	LT-SS-04	LT-SS-05	LT-SS-06	LT-SS-07
Lab Number	LTSS01	LTSS02	LTSS03	LTSS04	LTSS05	LTSS06	LTSS07
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	93.9	96.8	72.2	82.4	96.3	97.6	95.7
Aluminum	13800	6490	4200	5910	6770	14300	8450
Antimony	8.8 J	13.3 E		79 E		47.4 E	21.9 E
Arsenic	59.9	125	523	6210	99.9	269	197
Barium	468	53.1	6400	386	186	313	471
Beryllium	0.92 J						
Cadmium	1.4	2.2		3.8	6.1	6.4	10.2
Calcium	39300	52700	1450	580 J	5250	9450	4700
Chromium	12.9	11.9	62	205	49.2	23.3	109
Cobalt	19.3	16.3	102	53.6	1210	165	1560
Copper	344 E	251 E	313 E	1470 E	1630 E	1690 E	437 E
Iron	30200	16700	124000	273000	14800	43500	43900
Lead	141	227	249	1980	688	551	521
Magnesium	20300	29400	633 J	908 J	2660	94000	2690
Manganese	11600 E	415 E	1530 E	49600 E	1060 E	1050 E	3950 E
Mercury	0.83	0.91	1.5	6.2	3.5	1.8	1.4
Nickel	35.4	28.1	84.2	44.5	1100	224	718
Potassium	662 J	694 J	684 J	493 J	820 J	627 J	1230
Selenium		3.4	149 E	19.6 E	36.7 E	3.3	
Silver	1 J	3.8	12.8	54.3	26.7	13.2	34.3
Sodium	3060	76.3 J	1460	3840	157 J	206 J	297 J
Thallium							
Vanadium	51.4	28.9	92.5	101	40.8	52.8	34.6
Zinc	668	367	340	1350	816	546	438
Cyanide	0.45 J		1.5	0.47 J	0.33 J		0.37 J

302282

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SURFACE SOIL

INORGANICS					
Sample ID No.	LT-SS-08	LT-SS-09	LT-SS-10	LT-SS-11	LT-SS-12
Lab Number	LTSS08	LTSS09	LTSS10	LTSS11	LTSS12
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	88.3	89.9	94	61.8	52.4
Aluminum	5440	6680	4900	16200	27700
Antimony	16.2 E		144 E		
Arsenic	324	35.2	534	R	R
Barium	212 J	51.6	1350	257 E	582 E
Beryllium				11	8.5
Cadmium	4.8		7.3	8.9	12.5
Calcium	11200	957 J	32900	76000 E	26500 E
Chromium	11.9	18.5	434	68.6 E	238 E
Cobalt	91.2	12.2	262	764	121
Copper	358 E	30.7 E	2070 E	1900 E	1310 E
Iron	29800	26400	74300	28600	142000
Lead	672	74	784	3040	2150
Magnesium	2690	1830	2410 E	23700 E	1850 J
Manganese	875 E	729 E	2930	2550 E	61700 E
Mercury	0.31	0.37	1.7	1.5	1.9
Nickel	125	20.5	216	304	91.4
Potassium	965 J	905 J	1560	6780	893 J
Selenium	5.8	3.7	261 E	68.4	72.1
Silver	13.2	2.5	9.8	25.5	11.5
Sodium	150 J		2460	600 J	2710
Thallium					
Vanadium	29.7	47.4	42	148	165
Zinc	376	55.6	1960	623	692
Cyanide		0.56		0.41 J	2.3

NOTES:
Blank Space - analyte analyzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302283

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
TEST PITS

INORGANICS						
Sample ID No.	LT-SB-TP-01	LT-SB-TP-02	LT-SB-TP-03	LT-SB-TP-04	LT-SB-TP-05	LT-SB-TP-06
Lab Number	SBTP01	SBTP02	SBTP03	SBTP04	SBTP05	SBTP06
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	77.7	87.6	83	88.8	71.1	89.0
Aluminum	9140	9760	8450	18300	12600	20700
Antimony		6 J	251	1.6 J	25.4	1.6 J
Arsenic	516	42	725	6 E	176	5.1 E
Barium	1820	50.2	247	117	1010	72.6
Beryllium	0.89 J	0.74 J	1 J	1.2	0.59 J	0.84 J
Cadmium	21.9	1.8	17.7		5.5	
Calcium	16000	847 J	16000	2350	18500	884 J
Chromium	112	16.8	20.8	41.3	51.6	34.4
Cobalt	2200	20.2	87.3	16	465	11.6
Copper	4190 E	110 E	1450 E	25.2 E	1110 E	15.1 E
Iron	97800	16800	38700	25600	46500	32000
Lead	2470 E	385	6100	9.7	2980	9.8
Magnesium	5480	2190	2830	6170	2120	4510
Manganese	2480 E	470 E	4870 E	273 E	1410 E	673 E
Mercury	8.4 E	0.22	1.3		3	
Nickel	1110	21.5	477	20.7	373	19.8
Potassium	1110 J	913 J	1020 J	4260	489 J	2790
Selenium	140	5.5	17.9		102	1.4 E
Silver	49.6	1.8 J	38.4		18.1	
Sodium	849 J	64.7 J	1450	98.3 J	341 J	91.3 J
Thallium						
Vanadium	95.1	28.5	20.3	54.8	102	45
Zinc	2820 E	84.2 E	1570 E	72.1 E	395 E	57 E
Cyanide	0.31 J		0.65		0.76	

302284

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
TEST PITS

INORGANICS		
Sample ID No.	LT-SB-TP-07	LT-SB-TP-08
Lab Number	SBTP07	SBTP08
Matrix	SOIL	SOIL
Units	mg/kg	mg/kg
Percent Solids	90.6	86.4
Aluminum	4550	3340
Antimony	26.7	19.1
Arsenic	61.4	694
Barium	57.6	25.9 J
Beryllium	0.4 J	
Cadmium	8	4
Calcium	8270	109 J
Chromium	45.9	11.7
Cobalt	26.1	3.4 J
Copper	150 E	111 E
Iron	17300	19000
Lead	246	1160
Magnesium	4940	954 J
Manganese	231 E	57.1 E
Mercury	1.2	0.67
Nickel	27.3	5.1 J
Potassium	764 J	942 J
Selenium	3.6 E	2.5 E
Silver	47.9	R
Sodium	78.3 J	98.4 J
Thallium		
Vanadium	17.4	13.8
Zinc	177 E	256 E
Cyanide		

NOTES:
Blank Space - analyte analyzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL

R - analysis did not pass EPA QA/QC
NR - analysis not required

302285

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SURFACE WATER / SEDIMENT

INORGANICS							
Sample ID No.	LT-SW-01	LT-SW-04	LT-SW-05	LT-SW-08	LT-SW-09	LT-SW-10	LT-SW-11
Lab Number	LTSW01	LTSW04	LTSW05	LTSW08	LTSW09	LTSW10	LTSW11
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--	--	--	--
Aluminum	1250 E	1220 E	171 J	77000 E	127 J	28000 E	13200 E
Antimony		283		2260		15.4 J	
Arsenic	192 E	173 E		8090 E		246 E	115 E
Barium	16 J	87.6 J	30.1 J	463	101 J	22.7 J	27.1 J
Beryllium		R				5.5	
Cadmium			2 J	846		79.2	22.7
Calcium	5590	361000	120000	106000	29800 E	47000	40900
Chromium	5.7 J	10.6		215		12	
Cobalt	18.4 J	905		42300	55.7 E	R	R
Copper	138 E	222 E		17100 E		4140 E	956 E
Iron	1470	7090	358 E	722000	13000 E	33600	24500
Lead	30.9 E	382 E		1180 E		377 E	292 E
Magnesium	624 J	58200	3920 J	30100	9770 E	15000	12200
Manganese	28.8	1460	166	5390	4970 E	3810	3350
Mercury	0.3	0.44		3.6		0.12 J	
Nickel	55.3	158 E		27900	17.7 J	116 E	54.9 E
Potassium	6710	16800	33500	18100	4690 J	2620 J	3760 J
Selenium	64.6	24.3	76.8	200		R	R
Silver	2.7 J	10.4		256		5.1 J	
Sodium	491000	29600	1180000	47800	296000 E	23000	19900
Thallium							
Vanadium	30.5 J	47.2 J	23.3 J	210			
Zinc	102 E	173 E	R	91200 E		4890 E	2040 E
Cyanide				5.1 J			

NOTES:
Blank Space - analyte anaylzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302286

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SURFACE WATER / SEDIMENT

INORGANICS							
Sample ID No.	LT-SED-02	LT-SED-03	LT-SED-04	LT-SED-O5	LT-SED-08	LT-SED-09	LT-SED-10
Lab Number	LTSED2	LTSED3	LTSED4	TSED05	LTSED8	LTSED9	TSED10
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	86	70.6	36.6	16	70	69.3	80.7
Aluminum	2210 E	2430 E	20600 E	10600 E	5860 E	5260 E	1060 E
Antimony	1010	30.7 E			3.8 J	5 J	35.2 E
Arsenic	613 E	1440 E	1320 E	115 E	25.6 E	11.8 E	1610 E
Barium	152	533	271 E	584 E	82.1	67.6	38.9 J
Beryllium			16.4 E	7.4 E			
Cadmium			10.3 E	19.8 E			5.1
Calcium	1310 E	3600 E	160000 E	165000 E	1360 J	1190 J	477 J
Chromium	19.4 E	25.3 E	394 E	123 E	18.2 E	15.1	9
Cobalt	87.6	284	6900 E	39300 E	77.2	47.8	8.7 J
Copper	224 E	384 E	7320 E	4920 E	34.2 E	191 E	239 E
Iron	49900	41000	70800 E	21100 E	33000	23100	54400
Lead	1220 E	5140 E	7090 E	1740 E	22.1 E	94.2 E	1950 E
Magnesium	410 J	167 J	14100 E	2490 J	1610 E	1650 E	346 J
Manganese	456 E	305 E	5350 E	10400 E	372 E	543 E	137 E
Mercury	3.4	6.2	1.6 E	0.4 J	0.08 J	0.18	0.17
Nickel	179 E	113 E	2640 E	10700 E	43.4 E	37.5 E	6.5 J
Potassium	886 J	1720	5030 E	3840 J	871 J	1090 J	1340
Selenium	44.3 E	262 E	515 E	63.1 E	3.6 E	2.7 E	9.8 E
Silver	35	110	43.4 E	68.1 E	0.65 J	3	19.8
Sodium	936 J	1150 J	710 J	75300 E	53.7 J	51.5 J	182 J
Thallium				17.7 E			
Vanadium	11.7	20.1	695 E	169 E	31.5	23	8.5 J
Zinc	148	112	2650 E	6100 E	87.2	60.4	435
Cyanide		0.3 J	0.95 J				0.53 J

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

INORGANIC DATA
SURFACE WATER / SEDIMENT

INORGANICS					
Sample ID No.	LT-SED-11	LT-SED-DP-02	LT-SED-DP-03	LT-SED-DP-05	LT-SED-DP-29
Lab Number	TSED11	SDDPO2	SEDDP3	SEDDP5	SDDP29
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Percent Solids	68.2	82.3	62.8	68.4	79.7
Aluminum	6890 J	2860 E	11100 E	9070 E	2960 E
Antimony	87.8		72.8 E	477	53.8 E
Arsenic	2080 E	454 E	278 E	387 E	98.5 E
Barium	71.7	154	525	681	150
Beryllium			2.9		
Cadmium	4.9	28.2	28.3	10.4	0.82 J
Calcium	962 J	19100 E	29600 E	16700 E	6030 E
Chromium	37.5 E	156 E	435 E	120 E	102 E
Cobalt	7.9 J	2430	5510	1930	837
Copper	418 E	11500 E	17600 E	3360 E	2920 E
Iron	52900	146000	106000	44300	70100
Lead	2840 E	343 E	1960 E	626 E	171 E
Magnesium	1640 E	12600 E	16300 E	4950 E	2200 E
Manganese	354 E	11100 E	8610 E	2890 E	1230 E
Mercury	2.1	1.1	6.5	2.8	1
Nickel	15.5	5640 E	7940 E	5620 E	2280 E
Potassium	1860	374 J	803 J	906 J	414 J
Selenium	15.8 E	31.1 E	50.6 E	56.9 E	29.4 E
Silver	63.3	108	122	70	51.8
Sodium	75.6 J	943 J	1930	2720	493 J
Thallium					
Vanadium	20.6	10 J	47.3	26.2	15.1
Zinc	466	3470	4900	2100	625
Cyanide		0.32 J	0.98	1.4	0.35 J

NOTES:
Blank Space - analyte anaylzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302288

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURCES/ITS

INORGANIC DATA
GROUNDWATER - ROUND 1

Note: These samples are from the first round of groundwater sampling

INORGANICS					
Sample ID No.	LT-GW-GM-1	LT-GW-GM-1F	LT-GW-GM-2	LT-GW-GM-2F	LT-GW-GM-7
Lab Number	GM-1	GM-1F	GM-2	GM-2F	GM7
Matrix	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--	--
Aluminum	106000		51900 E	15 J	10000 E
Antimony			9.5 J	6.1 J	
Arsenic	48.8	4.2 J	182	27.2	R
Barium	1290	103 J	776	47.1 J	1640 E
Beryllium	8.3		3.1 J		
Cadmium	3.4 J		3.2 J		5
Calcium	99400	107000	94900	87100	39700 E
Chromium	204		108 E		36.8 E
Cobalt	110	2.8 J	2950	361	19.8 J
Copper	377 E	4.8 J	872		68.4 E
Iron	186000		288000	19700	191000 E
Lead	413 E	2.1 J	98.7	2 J	12.5 E
Magnesium	45900	17800	37800	26700	16200 E
Manganese	18200	6940	10700	5020	42000 E
Mercury	1.2		0.26		
Nickel	247	18.4 J	7730	1150	32.9 J
Potassium	18800	6350 E	21000 E	15000 E	4460 J
Selenium	14.9 E		15.1 E	3.1 J	3 J
Silver			13.2		
Sodium	51900 E	63200 E	157000	157000	51400 E
Thallium	11.7	7.9 J	9.2 J		5.9 J
Vanadium	264 E		130		35 J
Zinc	897	38.1	263	5.2 J	93 E
Cyanide		NR		NR	5.8

302289

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS					
Sample ID No.	LT-GW-GM-7F	LT-GW-GM-8	LT-GW-GM-8F	LT-GW-GM-9	LT-GW-GM-9F
Lab Number	GM7F	GM8	GM8F	GM9	GM9F
Matrix	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--	--
Aluminum		21000 E	558	47700 E	194 J
Antimony					
Arsenic		R		R	
Barium	61.5 J	144 J	21.9 J	311 E	36.2 J
Beryllium		2 J	0.23 J	2.5 J	
Cadmium		4.2 J	3.1 J	3.6 J	
Calcium	35100 E	17800 E	16100 E	49600 E	47800 E
Chromium		28.7 E		108 E	
Cobalt		29 J	2.6 J	30.6 J	1.8 J
Copper	1.1 J	567 E	117	93 E	1.2 J
Iron	36 J	23600 E		96300 E	1780
Lead		55 E		31.4 E	
Magnesium	13500 E	13300 E	11000 E	21900 E	11200 E
Manganese	1520	3090 E	770	2780 E	1870
Mercury					
Nickel		26.9 J	10.8 J	77.7 E	11.6 J
Potassium	1960 J	3900 J	2300 J	11200 E	3890 J
Selenium					
Silver					
Sodium	51400 E	15400 E	15300 E	32700 E	34800 E
Thallium		6.5 J		5.5 J	
Vanadium		30.8 J		149 E	
Zinc	16.6 J	226 E	140 E	1410 E	139 E
Cyanide	NR		NR		NR

302290

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-GM-10 GM10 WATER ug/L --	LT-GW-GM-10F GM10F WATER ug/L --	LT-GW-GM-11 GM11 WATER ug/L --	LT-GW-GM-11F GM11F WATER ug/L --	LT-GW-GM-12 GM12F WATER ug/L --
Aluminum	53400 E	38.3 J	37600 E	591	15100 E
Antimony					
Arsenic	R		R		R
Barium	287 E	31.2 J	389 E	27.4 J	234 E
Beryllium	2.1 J	0.21 J	4.4 J	0.55 J	
Cadmium	1.6 J		2.7 J	1.6 J	0.86 J
Calcium	15900 E	13600 E	12800 E	10200 E	88600 E
Chromium	101 E		42.1 E		30.3 E
Cobalt	65.2 E	4.9 J	28 J	1 J	13.5 J
Copper	88.4 E		224 E	43.1	168 E
Iron	66600 E		42100 E		35200 E
Lead	50 E		29.8 E		28.5 E
Magnesium	17300 E	8780 E	9840 E	4580 J	17900 E
Manganese	1700 E	163	2870 E	588	3250 E
Mercury					
Nickel	235 E	12.8 J	43.6 E	9.7 J	21.3 J
Potassium	6940 E	1300 J	4300 J	583 J	6560 E
Selenium	3.5 J				
Silver					
Sodium	8780 E	9030 E	8100 E	8530 E	25300 E
Thallium			5.5 J		7.1 J
Vanadium	128 E		60 E		42.3 J
Zinc	336 E	26.6 E	132 E	54.8 E	101 E
Cyanide		NR		NR	

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-GM-12F GM12F WATER ug/L --	LT-GW-GM-13 GM13 WATER ug/L --	LT-GW-GM-13F GM13F WATER ug/L --	LT-GW-GM-14A GM14A WATER ug/L --
Aluminum	9.2 J	46800 E	42.3 J	15100 E
Antimony		25.8 J		11100 E
Arsenic		R		R
Barium	68 J	408 E	81.7 J	987 E
Beryllium				0.93 J
Cadmium		24	10.1	40.9
Calcium	86800 E	139000 E	127000 E	133000 E
Chromium		100 E		30 E
Cobalt	1.6 J	85.8 E	27.4 J	103 E
Copper	1.8 J	431 E	13.8 J	2630 E
Iron	7470	140000 E	906	126000 E
Lead		735 E		836 E
Magnesium	13200 E	56900 E	36900 E	12100 E
Manganese	2940	11800 E	10000	2100 E
Mercury				
Nickel		152 E	37.6 J	104 E
Potassium	3140 J	18000 E	5750 E	30200 E
Selenium		8.5 E	3 J	18.3 E
Silver		4.3 J		9.3 J
Sodium	25600 E	96600 E	97200 E	51900 E
Thallium		11.8	9.6 J	4.2 J
Vanadium		119 E		29.6 J
Zinc	27.9 E	873 E	273 E	1490 E
Cyanide	NR		NR	

302292

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS				
Sample ID No.	LT-GW-GM-14AF	LT-GW-GM-14B	LT-GW-GM-14BF	LT-GW-GM-15
Lab Number	GM14AF	GM14B	GM14BF	GM-15
Matrix	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--
Aluminum	2680	91000 E	4110	4750 E
Antimony	10.7 J	4720 E	4300	11 J
Arsenic		R	14500 E	11.7
Barium	22.8 J	369 E	35.1 J	245
Beryllium		11.1 E	1.1 J	
Cadmium	28.2	28.4		1.3 J
Calcium	125000 E	97900 E	70000 E	48800
Chromium		358 E	249	11.6 E
Cobalt	79.9			80.1
Copper	858	1220 E	170	164
Iron	3820	74300 E	7280	22700
Lead				83.1
Magnesium	10100 E	18400 E	5050 E	26200
Manganese	1720	1100 E	246	2720
Mercury		R	R	0.07 J
Nickel	76.5	142 E	36 J	42.4
Potassium	26500 E	33200 E	14900 E	5490 E
Selenium		1240 E	1280 E	4.2 J
Silver				1.5 J
Sodium	45800 E	7330000 E	7840000 E	79900
Thallium	4.5 J			
Vanadium		R	R	16.7 J
Zinc	1080 E	982 E	39.3 E	121
Cyanide	NR		NR	

302293

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS				
Sample ID No.	LT-GW-GM-15F	LT-GW-EMW-1	LT-GW-EMW-1F	LT-GW-EMW-4
Lab Number	GM-15F	EMW1	EMW1F	EMW4
Matrix	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--
Aluminum	43.7 J	15100 E	463	16500 E
Antimony				74.9 E
Arsenic		R		R
Barium	168 J	126 J	26.7 J	43.7 J
Beryllium		1.3 J		2.9 J
Cadmium		5.4	1 J	17
Calcium	47500	57400 E	57400 E	262000 E
Chromium		20.1 E		R
Cobalt	45.2 J	14 J	7 J	112 E
Copper		320 E	8.5 J	364 E
Iron	5830	122000 E	4530	69800 E
Lead		16.4 E		37 E
Magnesium	24200	17400 E	15800 E	36800 E
Manganese	2480	2200 E	1990	4080 E
Mercury		R	R	
Nickel	14.5 J	24.4 J	7.6 J	191 E
Potassium	4280 J	7300 E	5960 E	15500 E
Selenium				
Silver				6.3 J
Sodium	76000	34700 E	35600 E	93300 E
Thallium		4.8 J	5.1 J	4.9 J
Vanadium	1 J	45.5 J		16.8 J
Zinc	16.5 J	249 E	70.7 E	2930 E
Cyanide	NR		NR	

302294

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-EMW-4F EMW4F WATER ug/L --	LT-GW-MW-8S MW8S WATER ug/L --	LT-GW-MW-8SF MW8SF WATER ug/L --	LT-GW-MW-8D MW8D WATER ug/L --
Aluminum	13400	10600 E	24.3 J	172 J
Antimony				
Arsenic	84.7	R	6.3 J	R
Barium	32.4 J	83.5 J	42.5 J	93.6 J
Beryllium	2.8 J	0.42 J		
Cadmium	15.1	3.1 J	0.83 J	4.6 J
Calcium	260000 E	20100 E	21700 E	69400 E
Chromium	R	206 E		1.9 J
Cobalt	109	276 E	135	11.7 J
Copper	318	42.8 E	4.1 J	2.5 J
Iron	17000	67200 E	51300	174000 E
Lead	7.9	20 E		
Magnesium	36200 E	8480 E	7550 E	15000 E
Manganese	4000	7350 E	6790	8290 E
Mercury				
Nickel	185	54.4 E	6.7 J	4 J
Potassium	15000 E	2370 J	1240 J	2500 J
Selenium				
Silver	1.5 J	1.6 J		1.9 J
Sodium	88200 E	9870 E	10400 E	23000 E
Thallium	6.5 J	9.5 J	7.7 J	10.2
Vanadium		31 J		
Zinc	2920 E	108 E	15.2 J	21 E
Cyanide	NR		NR	

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS				
Sample ID No.	LT-GW-MW-8DF	LT-GW-MW-10D	LT-GW-MW-10DF	LT-GW-MP-2D
Lab Number	MW8DF	MW10D	MW10DF	MP-2D
Matrix	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--
Aluminum	14.6 J	90700 E	29.2 J	5140 E
Antimony				71.4 E
Arsenic	8.8 J	R		120
Barium	91.2 J	807 E	238 E	210
Beryllium		4.3 J		
Cadmium	4.4 J	1160	144	9
Calcium	70000 E	115000 E	112000 E	254000
Chromium		368 E	R	92.3 E
Cobalt	9.9 J	253 E	117	17600
Copper	6.9 J	3060 E	3.1 J	8670
Iron	171000	241000 E	62500	364000
Lead		93.2 E		388
Magnesium	15100 E	54000 E	47500 E	127000
Manganese	8320	18300 E	18000	34100
Mercury		0.63		0.79
Nickel	4.1 J	231 E	43.6	110000
Potassium	2480 J	26500 E	17400 E	28000 E
Selenium		7.3 E	2.7 J	37 E
Silver	1.5 J	5.2 J	2.5 J	152
Sodium	23100 E	97000 E	92300 E	438000
Thallium	11.2	23.7	18.5	R
Vanadium		282 E		44.7 J
Zinc	23.5 E	370 E	23.8 E	2170
Cyanide	NR		NR	

302296

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-MP-2DF MP-2DF WATER ug/L --	LT-GW-MP-4 MP4 WATER ug/L --	LT-GW-MP-4F MP4F WATER ug/L --	LT-GW-MP-5 MP5 WATER ug/L --	LT-GW-MP-5F MP5F WATER ug/L --
Aluminum		9320 E	27.4 J	14800 E	
Antimony					
Arsenic		R		R	
Barium	32 J	219 E	103 J	190 J	74 J
Beryllium					
Cadmium	1.6 J	1.5 J		1.2 J	
Calcium	264000	47100 E	48200 E	53500 E	52000 E
Chromium		31.6 E		35.5 E	
Cobalt	16500	23.8 J	4.8 J	18.9 J	
Copper	146	37.8 E	1.5 J	52 E	
Iron	269000	36900 E	145	38300 E	4800
Lead	23.6	11.7 E		16.3 E	
Magnesium	132000	12200 E	9730 E	21800 E	17200 E
Manganese	34200	7110 E	6880	1460 E	1150
Mercury		0.4			
Nickel	110000	47.7 E	15.8 J	33.5 J	3.1 J
Potassium	28300 E	12000 E	11100 E	6940 E	3560 J
Selenium	11.3				
Silver					
Sodium	466000	9580 E	9610 E	22400 E	21800 E
Thallium	R	6.8 J	7.1 J		
Vanadium		29.7 J		37.2 J	
Zinc	1320	167 E	45.1 E	120 E	39.7 E
Cyanide	NR		NR		NR

302297

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-MP-6 MP-6 WATER ug/L --	LT-GW-MP-6F MP-6F WATER ug/L --	LT-GW-MP-11D MP11D WATER ug/L --	LT-GW-MP-11DF MP11DF WATER ug/L --
Aluminum	7550	717 E	19000 E	79.9 J
Antimony				
Arsenic	16.7	9.2 J	R	
Barium	60.7 J	32.3 J	391 E	4 J
Beryllium			1.5 J	
Cadmium	15.4 E	22.6 E	2.9 J	
Calcium	71500 E	80200 E	112000 E	9420 E
Chromium	11.4		138 E	
Cobalt	69.3	76.7	86.7 E	
Copper	61.7 E	6 J	312 E	1.7 J
Iron	22500	1830	73300 E	18.9 J
Lead	24.1 E	2.4 J	83.3 E	
Magnesium	14800	16100	19100 E	297 J
Manganese	6400	6880	4700 E	0.42 J
Mercury	0.3			
Nickel	84.4	89.1	196 E	2.3 J
Potassium	3740 J	3730 J	24100 E	21400 E
Selenium	5.1 E		2.7 J	
Silver				
Sodium	36600 E	42600 E	66900 E	65000 E
Thallium		4.5 J	9.8 J	
Vanadium	17.3 J		82.6 E	3.9 J
Zinc .	1010 E	1290 E	680 E	8.7 J
Cyanide		NR		NR

302298

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS				
Sample ID No.	LT-GW-MP-16S	LT-GW-MP-16SF	LT-GW-MP-16D	LT-GW-MP-16DF
Lab Number	MP16S	MP16SF	MP16D	MP16DF
Matrix	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--
Aluminum	47900 E	489	54500 E	931
Antimony	7.3 J		15.8 J	
Arsenic	R		R	
Barium	445 E	26.8 J	760 E	53.6 J
Beryllium	2.4 J		1.8 J	
Cadmium	2.8 J		11	
Calcium	25000 E	35200 E	262000 E	59900 E
Chromium	129 E		209 E	1.7 J
Cobalt	72.6 E		262 E	
Copper	164 E	8.8 J	766 E	15.1 J
Iron	99300 E	43.4 J	149000 E	31.8 J
Lead	62.6 E		156 E	
Magnesium	16800 E	3230 J	39800 E	628 J
Manganese	1530 E	153	6230 E	30.3
Mercury				
Nickel	145 E	5.7 J	420 E	9.3 J
Potassium	R	R	213000 E	176000 E
Selenium	3.3 J	11.7 E	17.8 E	23.4 E
Silver			6.6 J	
Sodium	R	R	93300 E	87900 E
Thallium	5.9 J		4.1 J	
Vanadium	155 E	10 J	223 E	15.2 J
Zinc	322 E	7.9 J	721 E	7.5 J
Cyanide		NR		NR

302299

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS					
Sample ID No.	LT-GW-MP-17	LT-GW-MP-17F	LT-GW-MP-18S	LT-GW-MP-18SF	LT-GW-MP-18D
Lab Number	MP-17	MP-17F	MP18S	MP18SF	MP18D
Matrix	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--	--
Aluminum	41200 E	24.7 J	26700 E	10900	97000 E
Antimony	10.5 J		382 E	48.1 J	1510 E
Arsenic	42.4		R	40	R
Barium	418	88.4 J	79.6 J	10.6 J	565 E
Beryllium	2.4 J		4.5 J	4.1 J	7.8 E
Cadmium	2.6 J		20.7	19.9	58.2
Calcium	166000	170000	457000 E	460000 E	511000 E
Chromium	69.4 E		37.8 E	2.8 J	273 E
Cobalt	224	20.3 J	215 E	216	682 E
Copper	1730		591 E	352	591 E
Iron	143000	19800	276000 E	242000	1260000 E
Lead	106		42 E		330 E
Magnesium	39900	28100	22700 E	20700 E	227000 E
Manganese	5280	2500	5480 E	5500	43800 E
Mercury	0.16 J				
Nickel	458	44.6	332 E	315	1600 E
Potassium	33900 E	30400 E	8480 E	6640 E	39800 E
Selenium	52.2 E	28.6	9.8 E	4.4 J	30.6 J
Silver	18.5		2.7 J	2.5 J	8.5 J
Sodium	102000 E	113000 E	139000 E	150000 E	1630000 E
Thallium				6.8 J	
Vanadium	121	26.4 J	55.2 E	7.6 J	252 E
Zinc	826	112	3350 E	3300 E	17100 E
Cyanide		NR		NR	

302300

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS					
Sample ID No.	LT-GW-MP-18DF	LT-GW-MP-19D	LT-GW-MP-19DF	LT-GW-MP-20	LT-GW-MP-20F
Lab Number	MP18DF	MP19D	MP19DF	MP-20	MP-20F
Matrix	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--	--
Aluminum	70.8 J	65.4 J	13.8 J	10200	57 J
Antimony	16.6 J				
Arsenic					
Barium	22.6 J	21.5 J	12.5 J	69.8 J	30.6 J
Beryllium	0.32 J				
Cadmium	47.4				
Calcium	616000 E	5440 E	4100 J	48100	51900
Chromium	6.7 J			19.6	
Cobalt	671	43.3 J	13.2 J	9 J	3 J
Copper	11.8 J	19.8 J	5.4 J	19.6 J	1.5 J
Iron	1190000	150 E		16800	
Lead	9.5			16 E	
Magnesium	273000 E	3200 J	2570 J	7780	6460
Manganese	64700 E	770 E	6.6 J	1480	1410
Mercury				0.07 J	
Nickel	296	22.2 J	6.5 J	17.4 J	4.7 J
Potassium	36900 E	49100 E	48800 E	2180 J	1070 J
Selenium					
Silver	6.6 J			1.1 J	
Sodium	2030000 E	79900 E	78800 E	43300 E	48100 E
Thallium	65.1 J		3.9 J		
Vanadium	2.2 J			21.2 J	
Zinc	933	13.6 J	9 J	91.3	33.9
Cyanide	NR		NR		NR

302301

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS					
Sample ID No.	LT-GW-MP-21D	LT-GW-MP-21DF	LT-GW-MP-22	LT-GW-MP-22F	LT-GW-MP-22D
Lab Number	MP-21D	MP-21DF	MP-22	MP-22F	MP-22D
Matrix	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--	--
Aluminum	115 J	70.1 J	4950 E	136 J	73100 E
Antimony			64.7 E	52.8 J	11.6 J
Arsenic			542	403	438
Barium	118 J	96.3 J	90.5 J	31.6 J	967
Beryllium					3.7 J
Cadmium			4 J	1.7 J	50.6
Calcium	65800	49800	28800	29000	222000
Chromium			11.3 E		456 E
Cobalt	1.5 J		301	151	172
Copper			336	51.6	530
Iron	698		10100	93 J	195000
Lead	1.4 J	1.2 J	67.1		388
Magnesium	4290 J	3520 J	5970	5360	127000
Manganese	164		1040	887	13700
Mercury			0.43		0.7
Nickel	7.6 J	5.6 J	650	383	442
Potassium	32900 E	30800 E	12800 E	13200 E	201000 E
Selenium			R	R	28.9 E
Silver			6.7 J		9.2 J
Sodium	69100	67600	41600	44000	641000
Thallium					
Vanadium			18.7 J	13.2 J	158
Zinc	8.4 J	6.6 J	243	100	1350
Cyanide		NR		NR	

302302

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURC

INORGANIC DATA
GROUNDWATER - ROUND 1

INORGANICS			
Sample ID No.	LT-GW-MP-22DF	LT-GW-DUP02	LT-GW-DUP02F
Lab Number	MP-22DF	DUP02	DUP02F
Matrix	WATER	WATER	WATER
Units	ug/l	ug/L	ug/L
Percent Solids	--	--	--
Aluminum	263 E	40600 E	11.1 J
Antimony	5.8 J		
Arsenic	35.3	R	4.6 J
Barium	277 E	788 E	74.3 J
Beryllium		2.4 J	
Cadmium		2.4 J	
Calcium	92100	97600 E	91500 E
Chromium		72.3 E	
Cobalt	2.7 J	40.8 J	1.5 J
Copper		168 E	1.3 J
Iron	75.9 J	76700 E	9860
Lead		97.1 E	
Magnesium	66.6 J	31000 E	13800 E
Manganese	2 J	4410 E	3030
Mercury			
Nickel	50.9	56.5 E	
Potassium	223000 E	13700 E	3100 J
Selenium	22.6		
Silver			
Sodium	642000	24200 E	26100 E
Thallium		6.7 J	
Vanadium	16.9 J	141 E	
Zinc	8.3 J	220 E	9.6 J
Cyanide	NR		

NOTES:
Blank Space - analyte anaylzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302303

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

NOTE: These samples were collected during the second round of groundwater sampling

INORGANICS						
Sample ID No.	LT-GW-GM-1	LT-GW-GM-1F	LT-GW-GM-2	LT-GW-GM-2F	LT-GW-GM-7	LT-GW-GM-7F
Lab Number	GM1	GM1F	GM2	GM2F	GM7	GM7F
Matrix	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--	--	--
Aluminum	69600 E	11.7 J	20800 E	72.1 J	29400	14 J
Antimony	5.8 J		5.5 J			
Arsenic	37.8		67.7	13.5	29.8	
Barium	961	19.2 J	233	62.4 J	872	25.1 J
Beryllium	3.5 J					
Cadmium	3.8 J		3.9 J	1 J	9.7	0.41 J
Calcium	87900	52500	109000	108000	43700	39100
Chromium	129		43.1		89.8	
Cobalt	81.7	3.9 J	856	344	43.3 J	
Copper	489	1.7 J	396	1 J	259	1.6 J
Iron	111000		134000	48700	209000 E	33.7 J
Lead	331		44.7		29	
Magnesium	36200	6330	39700	37600	23900	16900
Manganese	17900	1820	10700	7600	23100	1860
Mercury	0.96				0.28	
Nickel	185 E	5.4 J	2010 E	921	93	5 J
Potassium	21300	1620 J	21500	19800	7860	2000 J
Selenium	5.1		6.6			
Silver	1.7 J		3.4 J		1.6 J	
Sodium	45000	46300	161000	159000	59000	58700
Thallium	10.1		6.4 J	4.4 J	15.5	
Vanadium	164		63.8		97.6	
Zinc	644	38.8	157	13.8 J	278	7.2 J
Cyanide						

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-GM-8 GM8 WATER ug/L --	LT-GW-GM-8F GM8 WATER ug/L --	LT-GW-GM-9 GM9 WATER ug/L --	LT-GW-GM-9F GM9 WATER ug/L --	LT-GW-GM-10 GM10 WATER ug/L --	LT-GW-GM-10F GM10F WATER ug/L --
Aluminum	57700	1420	30500	155 J	83100	166 J
Antimony					5.6 J	
Arsenic	26.3		9.9 J		31.4	
Barium	274	20.3 J	357	22.4 J	423	45.2 J
Beryllium	2.5 J	0.53 J	6.6		2.9 J	0.42 J
Cadmium	9	5.6	4.9 J		4.2 J	1.3 J
Calcium	23900	23700	62900	46800	24200	21600
Chromium	72		49.6		163	1.8 J
Cobalt	66.5	2.8 J	29.3 J	2.4 J	113	22.1 J
Copper	990	326 E	121		97.4	4.6 J
Iron	91400 E	26.9 J	46900 E	1590	105000 E	22.1 J
Lead	107		25.6		79	
Magnesium	21300	15400	20200	11300	26200	14400
Manganese	7740	1240	4130	1940	4040	325
Mercury	1.2		0.94		4.8	
Nickel	63	20.6 J	70.8	10.8 J	120	38 J
Potassium	7500	2470 J	7540	3390 J	9220	1800 J
Selenium						
Silver	1.8 J					
Sodium	19400 E	21600 E	26600	27500	10300	10800
Thallium	9.9 J		4.5 J		7.1 J	
Vanadium	83.6		178		197	
Zinc	417	259 E	2910	137 E	425	120 E
Cyanide	6.3 E					

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-GM-11 GM11 WATER ug/L --	LT-GW-GM-11F GM11F WATER ug/L --	LT-GW-GM-12 GM12 WATER ug/L --	LT-GW-GM-12F GM12F WATER ug/L --	LT-GW-GM-13 GM13 WATER ug/L --	LT-GW-GM-13F GM13F WATER ug/L --
Aluminum	71500	1040	42900	22.2 J	48600	90.8 J
Antimony					21.2 J	
Arsenic	32.4 E		18.7		25.2	
Barium	573	56.3 J	581	70.8 J	329	39.7 J
Beryllium	6.1	1.1 J	1.4 J			
Cadmium	5	1.6 J	3.6 J		15.8	8.5
Calcium	12900	10000	85800	73100	130000	120000
Chromium	97		84.3		87.3	1.6 J
Cobalt	60.1	2.1 J	37.7 J	1.9 J	66.4	18.9 J
Copper	228	13.2 J	122	1.3 J	299	20 J
Iron	99200 E	23.5 J	85500 E	2080	115000 E	433
Lead	49.8		62.3		664	
Magnesium	15800	4330 J	30200	14800	56300	36800
Manganese	5680	861	3720	2350	9200	8170
Mercury	0.71		0.41		0.41	
Nickel	95.4	15.1 J	62.5		129	37.8 J
Potassium	9120	1070 J	15100	2700 J	18900	5220
Selenium					6	
Silver			1 J		3 J	
Sodium	9470 E	10500 E	21500	22000	80900	80000
Thallium	9.9 J		7.3 J		6.8 J	5.9 J
Vanadium	136		124		107	
Zinc	211	18.7 J	197	4.4 J	696	294 E
Cyanide						

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS						
Sample ID No.	LT-GW-GM-14A	LT-GW-GM-14AF	LT-GW-GM-14B	LT-GW-GM-14BF	LT-GW-GM-15	LT-GW-GM-15F
Lab Number	GM14A	GM14AF	GM14B	GM14BF	GM15	GM15F
Matrix	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--	--	--
Aluminum	70600 E	2830	66300 E	4840 E	15600 E	12.7 J
Antimony	2410	66	1920	824 E	21.4 J	
Arsenic	203	12.6	10900	9440 E	21.1	
Barium	357	17 J	253	21.8 J	419	156 J
Beryllium	6.8		12.4	9.1 E	0.51 J	
Cadmium	234	26.4	9.1		5.5	
Calcium	248000	209000	86000	57800 E	47600	46300
Chromium	88.3		365	255 E	46	
Cobalt	190	94.2			358	223
Copper	36900	478	819	140 E	540	
Iron	139000	4730	42900	6560 E	61800	6250
Lead	812				175	
Magnesium	23900	16900	11500	4860 J	24800	22300
Manganese	4570	3340	824	375 E	3290	2340
Mercury	7.4		0.87	0.43 E	0.97	
Nickel	251 E	98.5	94.2 E	22.7 J	150 E	48.1
Potassium	14300	11600	30000	12600 E	7700	4870 J
Selenium	18		1310 E	1680 E	3 J	3.1 J
Silver	11.1				1.7 J	
Sodium	105000	93500	8400000	7650000 E	46000 E	59200 E
Thallium		4.9 J			8.3 J	4.5 J
Vanadium	85.4				74.4	
Zinc	7740	1450	500	11.2 J	536	18.3 J
Cyanide						

302307

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-EMW-1 EMW1 WATER ug/L --	LT-GW-EMW-1F EMW1F WATER ug/L --	LT-GW-EMW-4 EMW4 WATER ug/L --	LT-GW-EMW-4F EMW4F WATER ug/L --	LT-GW-MW-8S MW8S WATER ug/L --	LT-GW-MW-8SF MW8S WATER ug/L --
Aluminum	15300	412	15600	15300	12400	
Antimony			22.3 J		6.1 J	
Arsenic	101	5.5 J	773	16.2	13.2	6.8 J
Barium	132 J	23.7 J	28.9 J	27.3 J	102 J	50.9 J
Beryllium	0.71 J		1.1 J	1.1 J		
Cadmium	3.6 J	0.87 J	24.6	23.8	4 J	2.2 J
Calcium	53100	51400	289000	295000	26500	26300
Chromium	20.8		5.1 J	1.7 J	190	
Cobalt	13.3 J	4.7 J	100	101	214	94.9
Copper	245	3.9 J	447	441 E	41.3	2.3 J
Iron	63800 E	8000	32100 E	5110	90800 E	65800
Lead	11.8		17	10.2	17.5	
Magnesium	17600	15400	40000	40700	11000	9780
Manganese	2230	2020	3330	3410	6140	5790
Mercury					0.48	
Nickel	23.1 J	5.6 J	216	214	77.6	25.5 J
Potassium	6430	4790 J	10500	10800	3060 J	1850 J
Selenium						
Silver			1.7 J			
Sodium	32500	32400	68300	71300	11800	11800
Thallium			5.1 J	6.7 J	9.6 J	7.1 J
Vanadium	41.3 J		4.7 J		36.5 J	
Zinc	186	62.2 E	3390	3440 E	80.9	22.2 E
Cyanide						

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-MW-8D MW8D WATER ug/L --	LT-GW-MW-8DF MW8D WATER ug/L --	LT-GW-MW-10D MW10D WATER ug/L --	LT-GW-MW-10DF MW10D WATER ug/L --	LT-GW-MP-2D MP2D WATER ug/L --	LT-GW-MP-2DF MP2DF WATER ug/L --
Aluminum	67.3 J		122000	21.4 J	5060 E	54.9 J
Antimony					48 J	
Arsenic	16.6	13.7	37.2		134	
Barium	66.3 J	63.8 J	865	202	165 J	19.4 J
Beryllium						
Cadmium	4.1 J	3.8 J	1060	104	14.4	3.9 J
Calcium	53800	53000	87300	88500	212000	210000
Chromium	2.1 J		561	2.6 J	98.2	3.4 J
Cobalt	6.4 J	5 J	175	71.3	14300	12600
Copper	3.1 J	2.4 J	1940	2.7 J	8950	73.1
Iron	117000 E	114000	339000 E	93400	362000	198000
Lead			134		235	10.8
Magnesium	13000	12900	51100	38200	102000	102000
Manganese	6090	6020	21200	14000	26800	24900
Mercury			14.8		0.69	
Nickel	3.6 J	2.7 J	283	37 J	85700 E	80400
Potassium	2160 J	2120 J	28100	13200	24600	23500
Selenium			6.3		65.6	
Silver	1.2 J		16.8	1.2 J	112	1.9 J
Sodium	22000	21500	73600 E	82900 E	341000	337000
Thallium	6.8 J	4.4 J	22.1	13.2	R	R
Vanadium			431		42.4 J	2.2 J
Zinc	22.2	18.1 J	518	26.2 E	2460	1390
Cyanide			5.3 E			

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-MP-4 MP4 WATER ug/L --	LT-GW-MP-4F MP4F WATER ug/L --	LT-GW-MP-5 MP5 WATER ug/L --	LT-GW-MP-5F MP5 WATER ug/L --	LT-GW-MP-6 MP6 WATER ug/L --	LT-GW-MP-6F MP6 WATER ug/L --
Aluminum	11400 E	16.7 J	10700		7340	1030
Antimony	14.2 J					
Arsenic	57.4 E		9.3 J		13.7	
Barium	262	67.8 J	446	61.4 J	64.9 J	24.4 J
Beryllium			0.59 J			
Cadmium	3.5 J		6.7		23.7	22.3
Calcium	44800	33700	59200	51400	81000	81100
Chromium	48.6		56.1		9.8 J	
Cobalt	35.4 J	3.1 J	16.2 J		63.4	56.2
Copper	335 E		66.1		89.7	10.6 J
Iron	56600	77.8 J	204000 E	3420	13100 E	751
Lead	24.4 E		20.3		29.9	
Magnesium	16700	7720	20200	16800	18500	17200
Manganese	6000	4650	1900	1240	6120	6070
Mercury			0.2 J		0.21	
Nickel	58.7 E	12.2 J	25 J	3.3 J	96.8	85.8
Potassium	10700	8000	6500	3830 J	5920	5390
Selenium	3 J					
Silver	2 J					
Sodium	9080	8890	22200	21700	44600	45000
Thallium	11.4	7.7 J			7.1 J	7.5 J
Vanadium	43.6 J		30.2 J		11.8 J	
Zinc	301	57.5	85.6	7.1 J	1380	1290 E
Cyanide						

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-MP-11D MP11D WATER ug/L --	LT-GW-MP-11DF MP11D WATER ug/L --	LT-GW-MP-16S MP16S WATER ug/L --	LT-GW-MP-16SF MP16S WATER ug/L --	LT-GW-MP-16D MP16D WATER ug/L --	LT-GW-MP-16DF MP16D WATER ug/L --
Aluminum	170 J	10.5 J	7050		52000	36 J
Antimony						
Arsenic					28.2	
Barium	23.9 J	17.7 J	102 J	23 J	834	24 J
Beryllium	0.29 J	0.3 J	0.32 J			
Cadmium			1 J		6	
Calcium	5350	3020 J	17100	15800	281000	17200
Chromium	1.6 J		26.7		168	1.5 J
Cobalt			13.6 J		182	
Copper	3.7 J	1.5 J	33.1		754	2.3 J
Iron	788 E	24.3 J	21600 E	1160	110000 E	23.3 J
Lead			10		111	
Magnesium	1380 J	484 J	6800	4850 J	31100	3980 J
Manganese	48.2		594	352	14300	46.2
Mercury					1.2	
Nickel	4.5 J	2.7 J	30.2 J		291	4.8 J
Potassium	27100	26600	6110	4160 J	44100	29400
Selenium					R	R
Silver			2.5 J		352	
Sodium	47600	46600	7820	7770	21500	18500
Thallium					10.5	
Vanadium			25.3 J		194	2.7 J
Zinc	6.6 J	6.1 J	77.1	6.1 J	706	5.7 J
Cyanide						

302311

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-MP-17 MP17 WATER ug/L --	LT-GW-MP-17F MP17F WATER ug/L --	LT-GW-MP-18S MP18S WATER ug/L --	LT-GW-MP-18SF MP18SF WATER ug/L --	LT-GW-MP-18D MP18D WATER ug/L --
Aluminum	2970 E	26.9 J	22500 E	8190	27800 E
Antimony			133	10 J	708
Arsenic			150	36.4	17.5
Barium	128 J	87.1 J	64.2 J	8.1 J	119 J
Beryllium			2.3 J	1.4 J	
Cadmium	2 J	1.4 J	11	9.6	49.8
Calcium	159000	152000	482000	489000	554000
Chromium	11.4	4 J	35.2	2.6 J	72.6
Cobalt	45.8 J	6.5 J	142	134	722
Copper	327	2.2 J	275	26.1	188
Iron	77500	62700	286000	256000	1260000
Lead			41.8		124
Magnesium	25900	24400	20600	18300	247000
Manganese	2660	2430	5040	4950	68300
Mercury			0.27		0.39
Nickel	102 E	16.2 J	245 E	221	368 E
Potassium	22800	22000	7280	5510	33700
Selenium	89.7	78.5	8.6	3.6 J	
Silver	3.8 J		3.9 J	1.4 J	12.4
Sodium	93800	92400	69600	68300	1860000
Thallium					
Vanadium	44.5 J	35.4 J	64.4	7.7 J	80.9
Zinc	157	61	3250	3180	1460
Cyanide					

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS						
Sample ID No.	LT-GW-MP-18DF	LT-GW-MP-19D	LT-GW-MP-19DF	LT-GW-MP-20	LT-GW-MP-20F	LT-GW-MP-21D
Lab Number	MP18DF	MP19D	MP19D	MP20	MP20F	MP21D
Matrix	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Percent Solids	--	--	--	--	--	--
Aluminum	57.4 J	228	25.4 J	42200 E	9.7 J	248 E
Antimony	7.5 J			6.6 J		
Arsenic				16.9		
Barium	14.5 J	66 J	62.8 J	176 J	83.5 J	128 J
Beryllium				1.5 J		
Cadmium	43.7	3.4 J	2.9 J	2.2 J		
Calcium	538000	40100	38500	55700 E	77700 E	84300
Chromium	6.9 J	1.4 J		79.4	1.2 J	3.2 J
Cobalt	730	218	207	28.5 J	4.5 J	4.6 J
Copper	9.9 J	16.4 J	12.5 J	58.9	4 J	4.8 J
Iron	1150000	629 E	118	68900		5100
Lead	10.4			33.4		
Magnesium	261000	10900	10400	13100 E	17000 E	10800
Manganese	69800	2440	2220	R	R	1170
Mercury				0.14 J	0.11 J	0.17 J
Nickel	325	173	169	45.2 E	25 J	13.4 J
Potassium	32000	18300	16900	R	R	R
Selenium				3.8 J		
Silver	5.4 J	1.4 J				2.1 J
Sodium	1870000	69700	70100	44900	48600	44400
Thallium					7 J	4.1 J
Vanadium	4.2 J			90.8		
Zinc	1060	244	218 E	335	16.4 J	11.5 J
Cyanide						

302313

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-GW-MP-21DF MP21DF WATER ug/L --	LT-GW-MP-22 MP22 WATER ug/L --	LT-GW-MP-22F MP22F WATER ug/L --	LT-GW-MP-22D MP22D WATER ug/L --	LT-GW-MP-22DF MP22DF WATER ug/L --	LT-GW-DUP05 DUP05 WATER ug/L --
Aluminum		12600 E	167 J	1430 E	447	11400 E
Antimony		75.9	18.5 J	7 J		
Arsenic		504	160	39.1	25.8	13.8 E
Barium	131 J	215	21 J	993	872	239
Beryllium		0.64 J				
Cadmium		22.8	5.2	0.43 J		1.7 J
Calcium	82400	43500	33900	268000	255000	37400
Chromium		50.1	2 J	6.8 J	1.2 J	43.7
Cobalt	2.9 J	2390	539	23.6 J	2.2 J	32.3 J
Copper		4880	509	21 J	2.3 J	50.6 E
Iron	3510	25700	57.2 J	3130	55.8 J	56300
Lead		300				14.2 E
Magnesium	10700	10900	7590	3710 J		11900
Manganese	1220	2410	1230	431	0.42 J	5980
Mercury		R	R			
Nickel	7.3 J	4130 E	880	176 E	64.3	64 E
Potassium	R	13800	12200	236000	240000	11000
Selenium		31.2	14.3	20.8	22.5	
Silver		49.4 E	68.2 E	1.1 J		1.1 J
Sodium	46300	75600	74600	600000	607000	9310
Thallium						9.4 J
Vanadium		67.8				39.2 J
Zinc	13.2 J	1810	324	36.6	4.6 J	262
Cyanide						

SITE NAME: LI TUNGSTE
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
GROUNDWATER - ROUND 2

INORGANICS			
Sample ID No.	LT-GW-DUP05F	LT-GW-DUP06	LT-GW-DUP06F
Lab Number	DUP05F	DUP06	DUP06F
Matrix	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L
Percent Solids	--	--	--
Aluminum	12.2 J	51600	1290
Antimony			
Arsenic		18.7 E	
Barium	64.4 J	518	45.1 J
Beryllium		5.8	1.3 J
Cadmium		4 J	1.7 J
Calcium	32300	12100	9600
Chromium		60.4	
Cobalt	2.2 J	38 J	2 J
Copper		162	9.2 J
Iron	24.9 J	59100 E	42.7 J
Lead		35.6	
Magnesium	7600	11200	4110 J
Manganese	4290	3940	851
Mercury		0.75	
Nickel	9 J	64.8	14.9 J
Potassium	7630	6420	1040 J
Selenium			
Silver			
Sodium	9110	9660	10400
Thallium	5.7 J	7.8 J	
Vanadium		79.2	
Zinc	56.3	137	19.7 J
Cyanide			

NOTES:
Blank Space - analyte anaylzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302315

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

INORGANIC DATA
ORE SAMPLES

INORGANICS Sample ID No. Lab Number Matrix Units Percent Solids	LT-DW-ORE-DUP DWOREDP SOIL mg/kg 70.6	LT-DW-ORE-01 DWORE01 SOIL mg/kg 70.6	LT-DW-ORE-02 DWORE02 SOIL mg/kg 66.5	LT-DW-ORE-03 DWORE03 SOIL mg/kg 73.3	LT-KONICA-01F NICA01F WATER ug/L --	LT-KONICA-01 ONICA-01 WATER ug/L --
Aluminum	8400	12800	15800	17100		134000
Antimony	R	R	R	R		
Arsenic	212	279	428	495		152
Barium	600	994	534	506	25.2 J	4180
Beryllium	3.4 E	1.6 E	6.2 E			
Cadmium	19	28.4	11.9	74.6		21.6
Calcium	42700 E	24600 E	23400 E	12500 E	33700	49800 J
Chromium	293	391	328	414		378
Cobalt	9640	10800	4580	7070		127
Copper	34000	50400	12600	64400		274
Iron	78900	90700	98700	93200		317000
Lead	4550 E	1580 E	4910 E	1300 E		133
Magnesium	8510	5320	14100	3980	6570	19300
Manganese	17600	21000	9320	11600	0.73 J	93700
Mercury	1.3 E	1.1 E	2.8 E	1.3 E		0.97
Nickel	12800	22000	13100	24600		1680
Potassium	379 J	762 J	367 J	1140 J	8140	19300
Selenium	99.6	55.9	107	60.3		13.8
Silver	111	105	106	122		3.8 J
Sodium	23500	35500	30600	21400	211000	204000
Thallium	R	R	R	R		156
Vanadium	93.9	50.5	119	554		280
Zinc	4320	5460	5040	5980	8.3 J	2520
Cyanide	1 E	1.7 E		2.5 E		41.9

NOTES:
Blank Space - analyte anaylzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302316

PESTICIDES / PCB DATA

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
SOIL BORINGS

PESTICIDES/PCBs								
Sample ID No.	LT-SB-01	LT-SB-02	LT-SB-02B	LT-SB-03	LT-SB-03B	LT-SB-04	LT-SB-04B	LT-SB-05
Traffic Report No.	SB0113	SB0213	SB0235	SB0313	B03B3S	SB0413	B04B3S	SB0502
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	12.6	10.5	11	10.7	10.9	9.8	10.3	16.8
Sample Date	08/27/96	08/23/96	08/23/96	08/26/96	08/26/96	08/26/96	08/26/96	09/04/96
Sample Time	1255	1305	1310	1140	1145	1410	1415	1050
Beginning Depth	1	1	3	1	3	1	3	0
Ending Depth	3	3	5	3	5	3	5	2
Site ID	SB01	SB02	SB02B	SB03	SB03B	SB04	SB04B	SB05
Parcel	A	A	A	A	A	A	A	A
alpha-BHC								
beta-BHC								
delta-BHC								
gamma-BHC (Lindane)								
Heptachlor								
Aldrin								
Heptachlor epoxide								
Endosulfan I								
Dieldrin								
4,4'-DDE								
Endrin		R	R					
Endosulfan II								
4,4'-DDD								
Endosulfan sulfate								
4,4'-DDT								
Methoxychlor								
Endrin ketone								
Endrin aldehyde								
alpha-Chlordane								
gamma-Chlordane								
Toxaphene								
Aroclor-1016								
Aroclor-1221								
Aroclor-1232								
Aroclor-1242								
Aroclor-1248								
Aroclor-1254								
Aroclor-1260								

302318

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
SOIL BORINGS

PESTICIDES/PCBs								
Sample ID No.	LT-SB-05B	LT-SB-06	LT-SB-07	LT-SB-07B	LT-SB-08	LT-SB-09	LT-SB-09B	LT-SB-10
Traffic Report No.	B05B24	LTSB06	SB0702	B07B24	SB0802	SB0902	B09B68	SB1002
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	10	1	1
Percent Moisture	23.4	23.9	13.3	7.3	10.3	18.8	16.6	16.5
Sample Date	09/04/96	10/21/96	08/27/96	08/27/96	08/27/96	08/28/96	08/28/96	08/28/96
Sample Time	1055	1530	0823	0830	0910	1039	1131	1415
Beginning Depth	2	0	0	2	0	0	6	0
Ending Depth	4	1	2	4	2	2	8	2
Site ID	SB05B	SB06	SB07	SB07B	SB08	SB09	SB09B	SB10
Parcel	A	A	A	A	A	B	B	B
alpha-BHC								
beta-BHC								
delta-BHC								
gamma-BHC (Lindane)								
Heptachlor								
Aldrin								
Heptachlor epoxide								
Endosulfan I								
Dieldrin								
4,4'-DDE								
Endrin								R
Endosulfan II								
4,4'-DDD								R
Endosulfan sulfate								
4,4'-DDT								
Methoxychlor								
Endrin ketone								
Endrin aldehyde								
alpha-Chlordane								
gamma-Chlordane								
Toxaphene								
Aroclor-1016								
Aroclor-1221								
Aroclor-1232								
Aroclor-1242								
Aroclor-1248		890				270		56
Aroclor-1254		130				73		42
Aroclor-1260						90 E		96

302319

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
SOIL BORINGS

PESTICIDES/PCBs									
Sample ID No.	LT-SB-10B	LT-SB-11	LT-SB-11B	LT-SB-12	LT-SB-12B	LT-SB-13	LT-SB-DUP-01	LT-SB-13B	LT-SB-14
Traffic Report No.	B10B24	SB1102	11B810	SB1202	B12B24	SB1304	BDUP01	3B1416	SB1402DL
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	10	1	1	1	1	10
Percent Moisture	29.8	10.7	9.3	28.9	18.6	10.6	12.2	10.6	17.1
Sample Date	08/28/96	08/26/96	08/26/96	08/28/96	08/28/96	08/22/96	8/22/96	08/29/96	08/30/96
Sample Time	1419	1234	1455	0900	0915	1534	1534	1602	1010
Beginning Depth	2	0	8	0	2	0	0	14	0
Ending Depth	4	2	10	2	4	4	4	16	2
Site ID	SB10B	SB11	SB11B	SB12	SB12B	SB13	SB13	SB13B	SB14
Parcel	B	B	B	B	B	B	B	B	B
alpha-BHC									
beta-BHC									
delta-BHC									
gamma-BHC (Lindane)									
Heptachlor							R		
Aldrin									
Heptachlor epoxide									
Endosulfan I									
Dieldrin									
4,4'-DDE									
Endrin	R			R		R			
Endosulfan II									
4,4'-DDD	R			R					
Endosulfan sulfate									
4,4'-DDT									
Methoxychlor									
Endrin ketone									
Endrin aldehyde									
alpha-Chlordane									
gamma-Chlordane									
Toxaphene									
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242									
Aroclor-1248				56					11500 E
Aroclor-1254		180 E						49 E	4390 E
Aroclor-1260		170 E		96					

302320

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
SOIL BORINGS

PESTICIDES/PCBs									
Sample ID No.	LT-SB-14B	LT-SB-15	LT-SB-15B	LT-SB-16	LT-SB-16B	LT-SB-17	LT-SB-17B	LT-SB-18	LT-SB-19
Traffic Report No.	B14B68	SB1S02	B1SB46	SB1602	16B810	LTSB1702	B17B46	SB1802	SB1902
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	6.3	31.7	12.5	10.6	9.1	14.7	11	4.1	15.7
Sample Date	08/30/96	08/28/96	08/28/96	08/22/96	08/22/96	08/29/96	08/29/96	08/21/96	08/21/96
Sample Time	1045	1457	1516	0912	1004	0910	0911	1026	1437
Beginning Depth	6	0	4	0	8	0	4	0	0
Ending Depth	8	2	6	2	10	2	6	2	2
Site ID	SB14B	SB15	SB15B	SB16	SB16B	SB17	SB17B	SB18	SB19
Parcel	B	B	B	B	B	B	B	B	B
alpha-BHC									
beta-BHC									
delta-BHC									
gamma-BHC (Lindane)									
Heptachlor									
Aldrin									
Heptachlor epoxide									
Endosulfan I									
Dieldrin									
4,4'-DDE									
Endrin		R		R	R			5.3 E	R
Endosulfan II									
4,4'-DDD		R							
Endosulfan sulfate									
4,4'-DDT									
Methoxychlor									
Endrin ketone									
Endrin aldehyde									
alpha-Chlordane									
gamma-Chlordane									
Toxaphene									
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242									
Aroclor-1248		1500	210 E						
Aroclor-1254		450	74 E			555 E		41 JN	
Aroclor-1260		160 EN							

302321

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
SOIL BORINGS

PESTICIDES/PCBs									
Sample ID No.	LT-SB-19B	LT-SB-20	LT-SB-20B	LT-SB-21	LT-SB-22	LT-SB-23	LT-SB-23B	LT-SB-24	LT-SB-24B
Traffic Report No.	SB19B2	SB2002	SB20B4	LTSB21	LTSB22	SB2302	B23B24	SB2402DL	B24B24
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	14.9	32.1	17.2	23.3	31.2	15	13.3	14.6	13.9
Sample Date	08/21/96	8/21/96	8/21/96	10/21/96	10/21/96	09/03/96	09/03/96	09/03/96	09/03/96
Sample Time	1450	1537	1551	1245	1200	1445	1452	1405	1415
Beginning Depth	2	0	2	2	2	0	2	0	2
Ending Depth	4	2	4	4	4	2	4	2	4
Site ID	SB19B	SB20	SB20B	SB21	SB22	SB23	SB23B	SB24	SB24B
Parcel	B	B	B	C	C	C	C	C	C
alpha-BHC									
beta-BHC									
delta-BHC									
gamma-BHC (Lindane)									
Heptachlor									
Aldrin									
Heptachlor epoxide									
Endosulfan I									
Dieldrin									
4,4'-DDE									
Endrin	R	R	R						
Endosulfan II									
4,4'-DDD									
Endosulfan sulfate									
4,4'-DDT									
Methoxychlor									
Endrin ketone									
Endrin aldehyde									
alpha-Chlordane									
gamma-Chlordane									
Toxaphene									
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242									
Aroclor-1248				450 E					
Aroclor-1254				470 E					
Aroclor-1260									

302322

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
SOIL BORINGS

PESTICIDES/PCBs									
Sample ID No.	LT-SB-25	LT-SB-25B	LT-SB-26	LT-SB-26B	LT-SB-27	LT-SB-27B	LT-SB-28	LT-SB-28B	LT-SB-29
Traffic Report No.	SB2502DL	B25B24	SB2602	6B1012	SB2702	B27B46	SB2824	B28B46	LTSB29
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	10	1	1	1	1	1	1	1	1
Percent Moisture	13.3	18	9.1	11.4	18.3	22.5	12.6	11.9	10.3
Sample Date	09/03/96	09/03/96	09/24/96	09/24/96	09/24/96	09/24/96	09/25/96	09/25/96	08/27/96
Sample Time	1055	1100	1150	1249	1440	1540	1000	1019	1050
Beginning Depth	0	2	0	10	0	4	2	4	3
Ending Depth	2	4	2	12	2	6	4	6	5
Site ID	SB25	SB25B	SB26	SB26B	SB27	SB27B	SB28	SB28B	SB29
Parcel	C	C	C	C	C	C	C	C	A
alpha-BHC									
beta-BHC									
delta-BHC									
gamma-BHC (Lindane)									
Heptachlor									
Aldrin									
Heptachlor epoxide									
Endosulfan I									
Dieldrin									
4,4'-DDE									
Endrin									
Endosulfan II									
4,4'-DDD									
Endosulfan sulfate									
4,4'-DDT									
Methoxychlor									
Endrin ketone									
Endrin aldehyde									
alpha-Chlordane									
gamma-Chlordane									
Toxaphene									
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242									
Aroclor-1248									
Aroclor-1254									
Aroclor-1260									

302323

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
SOIL BORINGS

PESTICIDES/PCBs									
Sample ID No.	LT-SB-31	LT-SB-32	LT-SB-33	LT-SB-34	LT-SB-DUP-04	LT-SB-35	LT-SB-36	LT-SB-37	LT-SB-40
Traffic Report No.	LTSB31DL	LTSB32	LTSB33	LTSB34	BDUP04	LTSB35	LTSB36	LTSB37	LTSB40
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	21.5	18.8	16.1	12.2	12.7	7.2	7	14.7	18.7
Sample Date	08/28/96	08/28/96	08/28/96	08/28/96	08/28/96	08/28/96	8/27/96	8/27/96	9/16/96
Sample Time	1115	1200	0915	0845	0845	0815	1605	1530	1005
Beginning Depth	3	3	3	1	1	1	1	1	2
Ending Depth	5	5	5	3	3	3	3	3	4
Site ID	SB31	SB32	SB33	SB34	SB34	SB35	SB36	SB37	SB40
Parcel	A	A	A	A	A	A	A	A	C
alpha-BHC									
beta-BHC									
delta-BHC									
gamma-BHC (Lindane)									
Heptachlor									
Aldrin									
Heptachlor epoxide									
Endosulfan I									
Dieldrin									
4,4'-DDE									
Endrin	R		R						
Endosulfan II									
4,4'-DDD	R		R						
Endosulfan sulfate									
4,4'-DDT									
Methoxychlor									
Endrin ketone									
Endrin aldehyde									
alpha-Chlordane									
gamma-Chlordane									
Toxaphene									
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242									
Aroclor-1248									
Aroclor-1254									
Aroclor-1260									

302324

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME. MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
SOIL BORINGS

PESTICIDES/PCBs			
Sample ID No.	LT-SB-41	LT-SB-DUP10	LT-SB-42
Traffic Report No.	LTSB41	BDUP10	LTSB42
Matrix	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1
Percent Moisture	9.9	27.9	15.5
Sample Date	09/23/96	09/23/96	09/23/96
Sample Time	1339	1339	1646
Beginning Depth	4	4	4
Ending Depth	8	8	6
Site ID	SB41	SB41	SB42
Parcel	C	C	C
alpha-BHC			
beta-BHC			
delta-BHC			
gamma-BHC (Lindane)			
Heptachlor			
Aldrin			
Heptachlor epoxide			
Endosulfan I			
Dieldrin			
4,4'-DDE			
Endrin			
Endosulfan II			
4,4'-DDD			
Endosulfan sulfate			
4,4'-DDT			
Methoxychlor			
Endrin ketone			
Endrin aldehyde			
alpha-Chlordane			
gamma-Chlordane			
Toxaphene			
Aroclor-1016			
Aroclor-1221			
Aroclor-1232			
Aroclor-1242			
Aroclor-1248	28 J		
Aroclor-1254	37		
Aroclor-1260			

302325

PESTICIDE / PCB DATA
MONITORING WELL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDES/PCBs									
Sample ID No.	LT-SB-MP-2D	LT-SB-MP-4D	LT-SB-DUP-05	LT-SB-MP-4DB	LT-SB-MP-5	LT-SB-MP-5B	LT-SB-MP-6	LT-SB-MP-6B	LT-SB-MP-8D
Traffic Report No.	MP2D13	MP4D13	BDUP05	P4DB35	BMP502	5B1820	BMP602	MP6B24	MP8D02
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	14.7	7.6	7.2	6.1	10.6	20	14.5	12.9	8
Sample Date	09/26/96	08/29/96	08/29/96	08/29/96	09/05/96	09/05/96	08/28/96	08/28/96	09/18/96
Sample Time	1300	1010	1010	1020	1330	1550	1400	1410	0915
Beginning Depth	1	1	1	3	0	18	0	2	0
Ending Depth	3	3	3	5	2	20	2	4	2
Site ID	MP2D	MP4D	MP4D	MP4DB	MP5	MP5B	MP6	MP6B	MP8D
Parcel	A	C	C	C	B	B	A	A	B
alpha-BHC									R
beta-BHC									R
delta-BHC									R
gamma-BHC (Lindane)									R
Heptachlor									R
Aldrin									R
Heptachlor epoxide									R
Endosulfan I									R
Dieldrin									R
4,4'-DDE									R
Endrin									R
Endosulfan II									R
4,4'-DDD									R
Endosulfan sulfate									R
4,4'-DDT									R
Methoxychlor									R
Endrin ketone									R
Endrin aldehyde									R
alpha-Chlordane									R
gamma-Chlordane									R
Toxaphene									R
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242									
Aroclor-1248									
Aroclor-1254									
Aroclor-1260									

302326

PESTICIDE / PCB DATA
MONITORING WELL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLO

PESTICIDES/PCBs									
Sample ID No.	LT-SB-MP-8DB	LT-SB-MP-9D	LT-SB-DUP06	LT-SB-MP-9DB	LT-SB-MP-11D	LT-SB-MP-11DB	LT-SB-MP-16S	LT-SB-MP-16SB	LT-SB-MP-18
Traffic Report No.	P8DB46	MP9D02	BDUP06	B9DB24	P11D02	1DB810	P16S02	P16S24	MP1802
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	10.4	15	12.4	14.1	5.2	14.5	11.5	17	16.5
Sample Date	09/18/96	09/04/96	09/04/96	09/04/96	09/25/96	09/25/96	10/10/96	10/10/96	09/03/96
Sample Time	0940	1207	1207	1211	1601	1640	1345	1410	1515
Beginning Depth	4	0	0	2	0	8	0	2	0
Ending Depth	6	2	2	4	2	10	2	4	2
Site ID	MP8DB	MP9D	MP9D	MP9DB	MP11D	MP11DB	MP16S	MP16SB	MP18
Parcel	B	B	B	B	C	C	C	C	C
alpha-BHC	R						R	R	
beta-BHC	R						R	R	
delta-BHC	R						R	R	
gamma-BHC (Lindane)	R						R	R	
Heptachlor	R						R	R	
Aldrin	R						R	R	
Heptachlor epoxide	R						R	R	
Endosulfan I	R						R	R	
Dieldrin	R						R	R	
4,4'-DDE	R						R	R	
Endrin	R						R	R	
Endosulfan II	R						R	R	
4,4'-DDD	R						R	R	
Endosulfan sulfate	R						R	R	
4,4'-DDT	R						R	R	
Methoxychlor	R						R	R	
Endrin ketone	R						R	R	
Endrin aldehyde	R						R	R	
alpha-Chlordane	R						R	R	
gamma-Chlordane	R						R	R	
Toxaphene	R						R	R	
Aroclor-1016							R	R	
Aroclor-1221							R	R	
Aroclor-1232							R	R	
Aroclor-1242							R	R	
Aroclor-1248							R	R	
Aroclor-1254							R	R	
Aroclor-1260							R	R	

302327

PESTICIDE / PCB DATA
MONITORING WELL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLO

PESTICIDES/PCBs							
Sample ID No.	LT-SB-MP-18B	LT-SB-MP-20	LT-SB-MP-20B	LT-SB-MP-22	LT-SB-MP-22B	LT-SB-MP-22D	LT-SB-MP-22DB
Traffic Report No.	P18B24	MP2002	P20B23	MP2213	P22B35	MP22D_	MP22DB
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	1	1	1
Percent Moisture	16.5	8.4	9.4	12.8	11.8	10.5	11.2
Sample Date	09/03/96	09/09/96	09/09/96	08/21/96	08/21/96	08/13/96	08/13/96
Sample Time	1520	1345	1355	1455	1500	1230	1245
Beginning Depth	2	0	2	1	3	1	3
Ending Depth	4	2	3	3	5	3	5
Site ID	MP18D	MP20	MP20B	MP22	MP22B	MP22D	MP22DB
Parcel	C	A	A	A	A	A	A
alpha-BHC							
beta-BHC							
delta-BHC							
gamma-BHC (Lindane)							
Heptachlor							
Aldrin							
Heptachlor epoxide							
Endosulfan I							
Dieldrin							
4,4'-DDE							
Endrin				R	R		
Endosulfan II							
4,4'-DDD							
Endosulfan sulfate							
4,4'-DDT							
Methoxychlor							
Endrin ketone							
Endrin aldehyde							
alpha-Chlordane							
gamma-Chlordane							
Toxaphene							
Aroclor-1016							
Aroclor-1221							
Aroclor-1232							
Aroclor-1242							
Aroclor-1248							
Aroclor-1254							
Aroclor-1260							

302328

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
SURFACE SOIL

PESTICIDES/PCBs									
Sample ID No.	LT-SS-01	LT-SS-02	LT-SS-03	LT-SS-04	LT-SS-05	LT-SS-06	LT-SS-07	LT-SS-08	LT-SS-09
Traffic Report No.	LTSS01	LTSS02	LTSS03	LTSS04	LTSS05DL	LTSS06	LTSS07DL	LTSS08	LTSS09
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1	10	1	10	1	1
Percent Moisture	6.1	3.2	27.8	17.6	3.7	2.4	4.3	11.7	10.1
Sample Date	09/04/96	09/05/96	09/05/96	09/05/96	09/06/96	09/06/96	09/06/96	09/09/96	09/11/96
Sample Time	1211	1423	1454	1545	1125	1331	1404	1135	1345
Beginning Depth	0	0	0	0	0	0	0	0	0
Ending Depth	2	2	2	2	2	2	2	2	2
Site ID	SS01	SS02	SS03	SS04	SS05	SS06	SS07	SS08	SS09
Parcel	A	A	A	C	A	B	A	B	A
alpha-BHC									
beta-BHC									
delta-BHC									
gamma-BHC (Lindane)									
Heptachlor									
Aldrin									
Heptachlor epoxide									
Endosulfan I									
Dieldrin									
4,4'-DDE									
Endrin									
Endosulfan II									
4,4'-DDD									
Endosulfan sulfate									
4,4'-DDT									
Methoxychlor									
Endrin ketone									
Endrin aldehyde									
alpha-Chlordane									
gamma-Chlordane									
Toxaphene									
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242									
Aroclor-1248			190 J						
Aroclor-1254			150 J					99 E	
Aroclor-1260								180 E	

302329

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
SURFACE SOIL

PESTICIDES/PCBs				
Sample ID No.	LT-SS-10	LT-SS-11	LT-SS-DUP-09	LT-SS-12
Traffic Report No.	LTSS10	LTSS11	SDUP09	LTSS12
Matrix	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	1
Percent Moisture	6	38.2	35.3	38.2
Sample Date	09/11/96	09/20/96	9/20/96	09/20/96
Sample Time	1445	1058	1100	1200
Beginning Depth	0	0	0	0
Ending Depth	2	2	2	2
Site ID	SS10	SS11	SS11	SS12
Parcel	C	C	C	C
alpha-BHC		R	R	R
beta-BHC		R	R	R
delta-BHC		R	R	R
gamma-BHC (Lindane)		R	R	R
Heptachlor		R	R	R
Aldrin		R	R	R
Heptachlor epoxide		R	R	R
Endosulfan I		R	R	R
Dieldrin		R	R	R
4,4'-DDE		R	R	R
Endrin		R	R	R
Endosulfan II		R	R	R
4,4'-DDD		R	R	R
Endosulfan sulfate		R	R	R
4,4'-DDT		R	R	R
Methoxychlor		R	R	R
Endrin ketone		R	R	R
Endrin aldehyde		R	R	R
alpha-Chlordane		R	R	R
gamma-Chlordane		R	R	R
Toxaphene		R	R	R
Aroclor-1016				
Aroclor-1221				
Aroclor-1232				
Aroclor-1242				
Aroclor-1248				
Aroclor-1254				
Aroclor-1260				

302330

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

PESTICIDE / PCB DATA
TEST PITS

PESTICIDES/PCBs									
Sample ID No	LT-SB-TP-01	LT-SB-TP-DUP	LT-SB-TP-02	LT-SB-TP-03	LT-SB-TP-04	LT-SB-TP-05	LT-SB-TP-06	LT-SB-TP-07	LT-SB-TP-08
Traffic Report No.	SBTP01	SBTPDU	SBTP02	SBTP03	SBTP04	SBTP05	SBTP06	SBTP07	SBTP08
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Dilution Factor	1	1	1	10	10	1	1	1	1
Percent Moisture	22.3	19.7	12.4	17	11.2	28.9	11	9.4	13.6
Sample Date	08/13/96	08/13/96	08/14/96	08/15/96	08/15/96	08/15/96	08/14/96	08/16/96	08/20/96
Sample Time	1355	1355	0946	1350	0948	1152	1429	1046	1440
Beginning Depth	1	1	1	0	4	0	2	1	0
Ending Depth	2	2	2	1	5	1	3	2	1
Site ID	TP01	TP01	TP02	TP03	TP04	TP05	TP06	TP07	TP08
Parcel	B	B	B	B	B	B	B	B	C
alpha-BHC									
beta-BHC									
delta-BHC									
gamma-BHC (Lindane)									
Heptachlor									
Aldrin									
Heptachlor epoxide									
Endosulfan I									
Dieldrin									
4,4'-DDE									
Endrin				37	R	70 E		R	
Endosulfan II									
4,4'-DDD									
Endosulfan sulfate									
4,4'-DDT			10						
Methoxychlor									
Endrin ketone									
Endrin aldehyde									
alpha-Chlordane									
gamma-Chlordane									
Toxaphene									
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242	1990	3300 E							
Aroclor-1248									
Aroclor-1254	5500 D	9100 D	37	620		1100 E		510 E	
Aroclor-1260									

NOTES:
Blank Space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%.

302331

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RESOURCES

PESTICIDE / PCB DATA
GROUNDWATER - ROUND 1

PESTICIDES/PCBs									
Sample ID No.	LT-GW-GM-1	LT-GW-GM-2	LT-GW-GM-7	LT-GW-GM8	LT-GW-GM-9	LT-GW-GM10	LT-GW-GM11	LT-GW-GM12	LT-GW-GM-13
Traffic Report No.	GM-1	GM-2	GM7	GM8	GM9	GM10	GM11	GM12	GM13
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--	--
alpha-BHC									
beta-BHC									
delta-BHC									
gamma-BHC (Lindane)									
Heptachlor									
Aldrin									
Heptachlor epoxide									
Endosulfan I									
Dieldrin									
4,4'-DDE									
Endrin									
Endosulfan II									
4,4'-DDD									
Endosulfan sulfate									
4,4'-DDT									
Methoxychlor									
Endrin ketone									
Endrin aldehyde									
alpha-Chlordane									
gamma-Chlordane									
Toxaphene									
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242									
Aroclor-1248									
Aroclor-1254									
Aroclor-1260									

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RES

PESTICIDE / PCB DATA
GROUNDWATER - ROUND 1

PESTICIDES/PCBs								
Sample ID No.	LT-GW-GM14A	LT-GW-GM14B	LT-GW-EMW-1	LT-GW-EMW4	LT-GW-MW8S	LT-GW-MW8D	LT-GW-MW10D	LT-GW-MP-2D
Traffic Report No.	GM14A	GM14BDL	EMW1	EMW4	MW8S	MW8D	MW10D	MP-2D
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	10	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
alpha-BHC						0.05 J		
beta-BHC						R	R	
delta-BHC						R	R	
gamma-BHC (Lindane)	0.04 J						R	
Heptachlor	0.029 J					R		
Aldrin						0.066 J	R	
Heptachlor epoxide						R		
Endosulfan I	0.03 J					0.053 J	0.068 J	
Dieldrin						R	R	
4,4'-DDE	0.045 J					R		
Endrin						1.3 J		
Endosulfan II	0.08 J					0.19 J		
4,4'-DDD						0.23 J		
Endosulfan sulfate						R		
4,4'-DDT						0.093 J		
Methoxychlor						R		
Endrin ketone						R		
Endrin aldehyde						0.16 J	R	
alpha-Chlordane	0.038 J					R	R	
gamma-Chlordane	0.038 J					R	R	
Toxaphene						R		
Aroclor-1016						R		
Aroclor-1221						R		
Aroclor-1232						R		
Aroclor-1242						R		
Aroclor-1248						R		
Aroclor-1254						R		
Aroclor-1260						R		

302333

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RES

PESTICIDE / PCB DATA
GROUNDWATER - ROUND 1

PESTICIDES/PCBs								
Sample ID No.	LT-GW-MP-4	LT-GW-MP-5	LT-GW-MP-6	LT-GW-MP11D	LT-GW-MP-16S	LT-GW-MP-16D	LT-GW-MP-17	LT-GW-MP18S
Traffic Report No.	MP4	MP5	MP-6	MP11D	MP16S	MP16D	MP-17	MP18S
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	–	--	--	–	--	–	--	–
alpha-BHC						R		0.032 J
beta-BHC						R		
delta-BHC						R		
gamma-BHC (Lindane)						R		0.031 J
Heptachlor						R		0.046 J
Aldrin						R		0.05
Heptachlor epoxide						R		
Endosulfan I						R		
Dieldrin						R		
4,4'-DDE						R		
Endrin						R		
Endosulfan II						R		0.094 J
4,4'-DDD						R		
Endosulfan sulfate						R		
4,4'-DDT						R		0.054 J
Methoxychlor						R		
Endrin ketone						R		
Endrin aldehyde						R		
alpha-Chlordane						R		
gamma-Chlordane						R		
Toxaphene						R		
Aroclor-1016						R		
Aroclor-1221						R		
Aroclor-1232						R		
Aroclor-1242						R		
Aroclor-1248						R		
Aroclor-1254						R		
Aroclor-1260						R		

302334

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: LABORATORY RES

PESTICIDE / PCB DATA
GROUNDWATER - ROUND 1

PESTICIDES/PCBs							
Sample ID No.	LT-GW-MP18D	LT-GW-MP-19D	LT-GW-MP-20	LT-GW-MP-21D	LT-GW-MP-22	LT-GW-MP-22D	LT-GW-DUP-04
Traffic Report No.	MP18D	MP19D	MP-20	MP-21D	MP-22	MP-22D	DUP04
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--
alpha-BHC							
beta-BHC							
delta-BHC							
gamma-BHC (Lindane)							
Heptachlor							
Aldrin							
Heptachlor epoxide							
Endosulfan I							
Dieldrin							
4,4'-DDE							
Endrin							
Endosulfan II							
4,4'-DDD							
Endosulfan sulfate							
4,4'-DDT			R				
Methoxychlor							
Endrin ketone							
Endrin aldehyde							
alpha-Chlordane							
gamma-Chlordane							
Toxaphene							
Aroclor-1016							
Aroclor-1221							
Aroclor-1232							
Aroclor-1242							
Aroclor-1248							
Aroclor-1254							
Aroclor-1260							

NOTES:
Blank Space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%.

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

PESTICIDE / PCB DATA
GROUNDWATER - ROUND 2

Note: These samples were collected during the second round of groundwater sampling.

PESTICIDES/PCBs										
Sample ID No.	LT-GW-GM-1	LT-GW-GM-2	LT-GW-GM-7	LT-GW-GM-8	LT-GW-GM-9	LT-GW-GM-10	LT-GW-GM-11	LT-GW-GM-12	LT-GW-GM-13
Traffic Report No.	GM1	GM2	GM7	GM8	GM9	GM10	GM11	GM12	GM13
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--	--
alpha-BHC									
beta-BHC									
delta-BHC									
gamma-BHC (Lindane)									
Heptachlor					R				
Aldrin									
Heptachlor epoxide									
Endosulfan I									
Dieldrin									
4,4'-DDE									
Endrin									
Endosulfan II									
4,4'-DDD									
Endosulfan sulfate									
4,4'-DDT									
Methoxychlor									
Endrin ketone									
Endrin aldehyde									
alpha-Chlordane									
gamma-Chlordane									
Toxaphene									
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242									
Aroclor-1248									
Aroclor-1254									
Aroclor-1260									

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

PESTICIDE / PCB DATA
GROUNDWATER - ROUND 2

PESTICIDES/PCBs								
Sample ID No.	LT-GW-GM-14A	LT-GW-GM-14B	LT-GW-GM-15	LT-GW-EMW-1	LT-GW-EMW-4	LT-GW-MW-8S	LT-GW-MW-8D	LT-GW-MW-10D
Traffic Report No.	GM14A	GM14BDL	GM15	EMW1	EMW4	MW8S	MW8D	MW10D
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	5	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
alpha-BHC							R	R
beta-BHC							0.048 JN	R
delta-BHC								R
gamma-BHC (Lindane)	0.033 J							R
Heptachlor							0.03 JN	R
Aldrin	0.042 J						0.042 J	0.059 EN
Heptachlor epoxide								R
Endosulfan I	R							R
Dieldrin	0.058 J							0.32 EN
4,4'-DDE	R							R
Endrin							0.44 EN	R
Endosulfan II								R
4,4'-DDD								R
Endosulfan sulfate	0.081 J							R
4,4'-DDT								R
Methoxychlor								R
Endrin ketone								R
Endrin aldehyde								R
alpha-Chlordane								R
gamma-Chlordane								R
Toxaphene								R
Aroclor-1016								R
Aroclor-1221								R
Aroclor-1232								R
Aroclor-1242								R
Aroclor-1248								R
Aroclor-1254								R
Aroclor-1260								R

302337

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

PESTICIDE / PCB DATA
GROUNDWATER - ROUND 2

PESTICIDES/PCBs									
Sample ID No.	LT-GW-MP-2D	LT-GW-MP-4	LT-GW-MP-5	LT-GW-MP-6	LT-GW-MP-11D	LT-GW-MP-16S	LT-GW-MP-16D	LT-GW-MP-17	LT-GW-MP-18S
Traffic Report No.	MP2D	MP4	MP5	MP6	MP11D	MP16S	MP16D	MP17	MP18S
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--	--
alpha-BHC									
beta-BHC									R
delta-BHC									
gamma-BHC (Lindane)									R
Heptachlor									
Aldrin									R
Heptachlor epoxide									
Endosulfan I									
Dieldrin									
4,4'-DDE									
Endrin									
Endosulfan II									
4,4'-DDD									
Endosulfan sulfate									
4,4'-DDT									
Methoxychlor									
Endrin ketone									
Endrin aldehyde									
alpha-Chlordane									
gamma-Chlordane									
Toxaphene									
Aroclor-1016									
Aroclor-1221									
Aroclor-1232									
Aroclor-1242									
Aroclor-1248									
Aroclor-1254									
Aroclor-1260									

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: ITS

PESTICIDE / PCB DATA
GROUNDWATER - ROUND 2

PESTICIDES/PCBs								
Sample ID No.	LT-GW-MP-18D	LT-GW-MP-19D	LT-GW-MP-20	LT-GW-MP-21D	LT-GW-MP-22	LT-GW-MP-22D	LT-GW-DUP05	LT-GW-DUP-06
Traffic Report No.	MP18D	MP19D	MP20	MP21D	MP22	MP22D	DUP05	DUP06
Matrix	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Dilution Factor	1	1	1	1	1	1	1	1
Percent Moisture	--	--	--	--	--	--	--	--
alpha-BHC								
beta-BHC								
delta-BHC								
gamma-BHC (Lindane)								
Heptachlor								
Aldrin								
Heptachlor epoxide								
Endosulfan I								
Dieldrin								
4,4'-DDE								
Endrin								
Endosulfan II								
4,4'-DDD								
Endosulfan sulfate								
4,4'-DDT								
Methoxychlor								
Endrin ketone								
Endrin aldehyde								
alpha-Chlordane								
gamma-Chlordane								
Toxaphene								
Aroclor-1016								
Aroclor-1221								
Aroclor-1232								
Aroclor-1242								
Aroclor-1248								
Aroclor-1254								
Aroclor-1260								

NOTES:
Blank Space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL
R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%.

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO : NA
LAB NAME: ITS

PESTICIDE / PCB DATA
ORE SAMPLES

PESTICIDES/PCBs		ORE-01 DUP			
Sample ID No.	LT-DW-ORE-01	LT-DW-ORE-DUP	LT-DW-ORE-02	LT-DW-ORE-03	LT-KONICA-01
Traffic Report No.	DWORE01	DWOREDUP	DWORE02	DWORE03	KONICA01
Matrix	SOIL	SOIL	SOIL	SOIL	WATER
Units	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
Dilution Factor	1	1	1	1	1
Percent Moisture	29	29	34	27	--
alpha-BHC					
beta-BHC					
delta-BHC					
gamma-BHC (Lindane)					
Heptachlor					
Aldrin					
Heptachlor epoxide	R		11 E		
Endosulfan I	R	R	R	R	
Dieldrin	7.8 E	10 E	R	11 E	
4,4'-DDE	R	15 E	R	18 EN	
Endrin			R		
Endosulfan II					
4,4'-DDD			R		
Endosulfan sulfate					
4,4'-DDT	24	25	120	R	
Methoxychlor					
Endrin ketone					
Endrin aldehyde	12	10	34	10	
alpha-Chlordane	R	R	3.3	R	
gamma-Chlordane	R	6 E	11 E	6 EN	
Toxaphene					
Aroclor-1016					
Aroclor-1221					
Aroclor-1232					
Aroclor-1242					
Aroclor-1248	890 D	1800 D		2000 D	
Aroclor-1254			1300 D		
Aroclor-1260	320 D	190	570	130	

NOTES:

Blank Space - compound analyzed for, but not detected
B - compound found in lab blank as well as sample, indicates possible/probable blank contamination
E - estimated value
J - estimated value, compound present below CRQL but above IDL

R - analysis did not pass EPA QA/QC
N - presumptive evidence of the presence of the material
NR - analysis not required
Detection limits elevated if Dilution Factor > 1 and/or percent moisture > 0%.

302340

RADIOLOGICAL DATA

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-01	LT-SB-02	LT-SB-02B	LT-SB-03	LT-SB-03B
Lab Number	961846-0005	961845-0002	961845-0003	961839-0001	961839-0002
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	0.30 +/- 0.05	0.40 +/- 0.08	0.50 +/- 0.11	1.3 +/- 0.28	0.6 +/- 0.13
Radium 226	1.2 +/- 0.31	0.63 +/- 0.18	1.0 +/- 0.18	1.2 +/- 0.34	1.8 +/- 0.34
Radium 228	0.84 +/- 0.35	1.1 +/- 0.34	< 0.33	1.2 +/- 0.36	1.4 +/- 0.41
Thorium 230	< 0.29	0.38 +/- 0.20	0.25 +/- 0.20	1.0 +/- 0.30	0.69 +/- 0.20
Thorium 232	0.49 +/- 0.28	0.64 +/- 0.14	0.43 +/- 0.19	1.1 +/- 0.21	0.63 +/- 0.15
TOC (%)	0.32	0.31	0.12	0.29	0.17
pH (pH units)	11.5	7.85	10.2	8.31	9.66

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302342

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-04	LT-SB-04B	LT-SB-05	LT-SB-05B	LT-SB-06
Lab Number	961839-0006	961839-0007	961906-0001	961906-0002	962278-0003
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	0.50 +/- 0.11	0.50 +/- 0.11	2.7 +/- 0.60	3.7 +/- 0.77	1.4 +/- 0.30
Radium 226	1.0 +/- 0.22	0.55 +/- 0.17	2.3 +/- 0.39	3.3 +/- 0.55	2.0 +/- 0.37
Radium 228	1.2 +/- 0.36	< 0.22	2.6 +/- 0.74	2.1 +/- 0.61	2.5 +/- 0.58
Thorium 230	0.49 +/- 0.20	0.45 +/- 0.20	2.1 +/- 0.90	2.2 +/- 1.1	1.7 +/- 0.60
Thorium 232	0.67 +/- 0.15	0.41 +/- 0.12	1.6 +/- 0.70	3.7 +/- 1.6	1.7 +/- 0.57
TOC (%)	0.06	0.11	2.87	1.41	
pH (pH units)	11.1	11.1	8.67	8.14	

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302343

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-07	LT-SB-07B	LT-SB-08	LT-SB-09	LT-SB-09B
Lab Number	961846-0001	961846-0002	961846-0003	961857-0007	961857-0008
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	0.60 +/- 0.14	< 0.3	0.30 +/- 0.07	0.3 +/- 0.06	1.2 +/- 0.26
Radium 226	0.58 +/- 0.20	0.73 +/- 0.35	0.87 +/- 0.25	1.7 +/- 0.66	2.2 +/- 0.62
Radium 228	0.97 +/- 0.45	0.95 +/- 0.45	0.75 +/- 0.47	2.7 +/- 0.76	2.3 +/- 0.69
Thorium 230	0.49 +/- 0.36 E	0.29 +/- 0.27	< 0.33	0.63 +/- 0.30	0.73 +/- 0.40
Thorium 232	0.30 +/- 0.20 E	0.26 +/- 0.19	0.79 +/- 0.42	0.79 +/- 0.31	0.89 +/- 0.40
TOC (%)	0.33	0.51	0.37	1.64	0.48
pH (pH units)			8.39	6.33	6.9

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302344

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-10	LT-SB-10B	LT-SB-11	LT-SB-11B	LT-SB-12
Lab Number	961857-0013	961857-0014	961839-0004	961846-0007	961857-0009
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	29 +/- 6.1	0.6 +/- 0.13	2.1 +/- 0.43	< 0.3	0.75 +/- 0.16
Radium 226	14 +/- 1.30	2.7 +/- 0.48	2.3 +/- 0.39	0.68 +/- 0.15	2.9 +/- 0.55
Radium 228	3.5 +/- 1.20	1.6 +/- 0.63	1.5 +/- 0.43	1.0 +/- 0.27	2.0 +/- 0.90
Thorium 230	22 +/- 4.20	2.3 +/- 0.77	2.0 +/- 0.86	< 0.3	1.8 +/- 0.75 E
Thorium 232	2.2 +/- 0.59	0.98 +/- 0.41	1.4 +/- 0.64	1.1 +/- 0.50	0.76 +/- 0.40 E
TOC (%)	0.28	1.15	1.07	0.07	1.56
pH (pH units)	5.65	6.39	8.23	7.76	6.86

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302345

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-SB-12B 961857-0010 SOIL pCi/g	LT-SB-13 961843-0004 SOIL pCi/g	LT-SB-13B 961877-0005 SOIL pCi/g	LT-SB-14 961886-0001 SOIL pCi/g	LT-SB-14B 961886-0002 SOIL pCi/g
Uranium 238	0.73 +/- 0.15	0.60 +/- 0.12	0.10 +/- 0.10	1.4 +/- 0.29	0.50 +/- 0.11
Radium 226	2.0 +/- 0.39	1.1 +/- 0.33	1.2 +/- 0.33	3.7 +/- 1.0	2.9 +/- 0.61
Radium 228	1.6 +/- 0.43	1.4 +/- 0.44	1.0 +/- 0.44	18 +/- 2.1	19 +/- 1.9
Thorium 230	0.85 +/- 0.40	0.8 +/- 0.61 E	0.99 +/- 0.50 E	9.3 +/- 1.9	5.3 +/- 1.2
Thorium 232	1.2 +/- 0.40	0.95 +/- 0.62 E	1.1 +/- 0.53 E	16 +/- 3.0	13 +/- 2.6
TOC (%)	0.14	0.4	0.03	0.59/0.18	0.1
pH (pH units)	7.1	5.74	7.36	7.82/6.18	7.2

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302346

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES						
Sample ID No.	LT-SB-15	LT-SB-15B	LT-SB-16	LT-SB-16B	LT-SB-17	
Lab Number	961857-0015	961857-0017	961843-0001	961843-0002	961877-0001	
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	
Uranium 238	180 +/- 38	2.8 +/- 0.59	1.2 +/- 0.26	< 0.3	26 +/- 5.5	
Radium 226	140 +/- 8.0	2.5 +/- 0.55	1.6 +/- 0.32	1.1 +/- 0.40	14 +/- 1.2	
Radium 228	30 +/- 4.8	2.3 +/- 0.97	1.9 +/- 0.57	0.91 +/- 0.48	6.5 +/- 1.4	
Thorium 230	170 +/- 41	1.7 +/- 0.53	0.72 +/- 0.36	1.1 +/- 0.54	32 +/- 10	E
Thorium 232	26 +/- 6.5	1.2 +/- 0.39	1.1 +/- 0.45	1.1 +/- 0.49	7.1 +/- 2.5	E
TOC (%)	0.44	0.3	0.28	0.14		
pH (pH units)	7.91	6.97	4.28	5.5		

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302347

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-17B	LT-SB-18	LT-SB-19	LT-SB-19B	LT-SB-20
Lab Number	961877-0006	961799-0004	961799-0005	961799-0006	961799-0007
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	15 +/- 3.2	0.30 +/- 0.06	2.3 +/- 0.48	1.9 +/- 0.40	2.3 +/- 0.48
Radium 226	10 +/- 0.88	1.2 +/- 0.35	2.3 +/- 0.44	1.6 +/- 0.31	2.5 +/- 0.44
Radium 228	5.0 +/- 0.92	1.2 +/- 0.40	4.1 +/- 0.60	1.8 +/- 0.49	5.8 +/- 0.76
Thorium 230	22 +/- 7.5 E	0.92 +/- 0.20	2.7 +/- 0.40	1.2 +/- 0.30 E	4.0 +/- 1.6 E
Thorium 232	3.9 +/- 1.5 E	0.85 +/- 0.16	3.8 +/- 0.48	1.5 +/- 0.27 E	5.6 +/- 2.1 E
TOC (%)	0.16	0.21	0.42	0.06	0.27
pH (pH units)	8.48	8.37	3.64	3.8	5.28

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302348

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-20B	LT-SB-21	LT-SB-22	LT-SB-23	LT-SB-23B
Lab Number	961799-0008	962278-0002	962278-0001	961901-0006	961901-0007
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	1.1 +/- 0.24	2.0 +/- 0.43	2.8 +/- 0.60	1.2 +/- 0.25	0.40 +/- 0.08
Radium 226	1.7 +/- 0.37	1.8 +/- 0.42	2.5 +/- 0.42	1.2 +/- 0.33	1.4 +/- 0.45
Radium 228	1.7 +/- 0.40	1.9 +/- 0.55	2.4 +/- 0.56	0.91 +/- 0.45	0.87 +/- 0.41
Thorium 230	1.2 +/- 0.30	1.9 +/- 0.61	2.6 +/- 0.77	0.94 +/- 0.50 E	1.1 +/- 0.64 E
Thorium 232	1.3 +/- 0.24	1.0 +/- 0.36	1.3 +/- 0.44	0.50 +/- 0.32 E	0.93 +/- 0.56 E
TOC (%)	0.22			0.88 E	0.73 E
pH (pH units)	3.88			6.76 E	9.19 E

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302349

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-SB-24 961901-0004 SOIL pCi/g	LT-SB-24B 961901-0005 SOIL pCi/g	LT-SB-25 961901-0001 SOIL pCi/g	LT-SB-25B 961901-0002 SOIL pCi/g	LT-SB-26 962071-0002 SOIL pCi/g
Uranium 238	1.2 +/- 0.26	0.60 +/- 0.13	0.50 +/- 0.10	0.60 +/- 0.12	0.87 +/- 0.18
Radium 226	1.9 +/- 0.44	1.3 +/- 0.18	2.4 +/- 0.42	1.3 +/- 0.14	0.85 +/- 0.33
Radium 228	2.0 +/- 0.55	1.1 +/- 0.50	1.0 +/- 0.56	2.0 +/- 0.28	1.2 +/- 0.39
Thorium 230	1.4 +/- 0.82 E	1.1 +/- 0.72 E	1.7 +/- 0.57	0.98 +/- 0.52	< 0.23
Thorium 232	1.1 +/- 0.65 E	1.1 +/- 0.66 E	3.3 +/- 0.97	1.2 +/- 0.58	0.75 +/- 0.31
TOC (%)	0.6 E	0.26 E	1.01 E	0.18 E	1.38
pH (pH units)	3.68 E	5.33 E	2.44 E	4.19 E	7.69

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302350

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-26B	LT-SB-27	LT-SB-27B	LT-SB-28	LT-SB-28B
Lab Number	962071-0001	962071-0003	962071-0005	962088-0001	962088-0002
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	1.1 +/- 0.20	1.2 +/- 0.30	0.60 +/- 0.10	0.60 +/- 0.10	8.5 +/- 1.8
Radium 226	0.76 +/- 0.16	1.8 +/- 0.21	0.90 +/- 0.22	4.2 +/- 0.50	10 +/- 0.79
Radium 228	0.80 +/- 0.24	0.51 +/- 0.23	0.81 +/- 0.33	3.5 +/- 0.62	6.7 +/- 0.83
Thorium 230	0.41 +/- 0.27	1.1 +/- 0.58 E	0.20 +/- 0.20	2.0 +/- 0.88	9.7 +/- 2.7
Thorium 232	0.88 +/- 0.36	0.70 +/- 0.40 E	0.41 +/- 0.19	2.0 +/- 0.86	5.1 +/- 1.5
TOC (%)	1.14		0.15	0.26	0.3
pH (pH units)	8.12		2.97	2.7	3.67

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302351

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES						
Sample ID No.	LT-SB-29	LT-SB-31	LT-SB-32	LT-SB-33	LT-SB-34	LT-SB-35
Lab Number	961846-0004	961857-0005	961857-0006	961857-0004	961857-0001	961857-0003
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	< 0.3	0.97 +/- 0.20	0.5 +/- 0.11	0.3 +/- 0.06	ND	<0.30
Radium 226	0.85 +/- 0.25	3.7 +/- 0.52	2.2 +/- 0.64	ND	0.85 +/- 0.22	0.80 +/- 0.28
Radium 228	< 0.29	2.2 +/- 0.88	2.9 +/- 0.88	1.2 +/- 0.66	0.79 +/- 0.32	0.96 +/- 0.39
Thorium 230	0.87 +/- 0.45	1.8 +/- 0.56	2.3 +/- 0.74	0.55 +/- 0.36	0.82 +/- 0.60 E	1.3 +/- 0.65 E
Thorium 232	0.58 +/- 0.32	1.7 +/- 0.50	2.3 +/- 0.70	0.82 +/- 0.41	1.3 +/- 0.60 E	0.71 +/- 0.41 E
TOC (%)	0.71	0.74	1.64	0.9	0.52	0.33
pH (pH units)	10.8	6.9	7.66	7.58	9.2	11.16

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302352

RADIOLOGICAL DATA
SOIL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-36	LT-SB-37	LT-SB-40	LT-SB-41	LT-SB-42
Lab Number	961846-0009	961846-0008	961933-0003	962070-0001	962070-0003
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	< 0.3	ND	1.6 +/- 0.30	0.60 +/- 0.10	0.60 +/-0.10
Radium 226	1.1 +/- 0.32	1.2 +/- 0.41	0.97 +/- 0.31	0.77 +/- 0.23	0.76 +/- 0.18
Radium 228	ND	1.1 +/- 0.48	0.78 +/- 0.49	0.77 +/- 0.44	0.93 +/- 0.36
Thorium 230	0.43 +/- 0.29	< 0.22	0.82 +/- 0.38	< 0.23	0.31 +/- 0.22
Thorium 232	0.65 +/- 0.31	0.32 +/- 0.18	0.55 +/- 0.27	0.27 +/- 0.20	0.61 +/- 0.26
TOC (%)	0.4	0.52	0.91	0.11	0.13
pH (pH units)		9.77	3.77	5.98	9.39

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302353

RADIOLOGICAL DATA
SOIL BORINGS - FIELD BLANKS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-FB-01	LT-SB-FB-03	LT-SB-FB-04	LT-SB-FB-05	LT-SB-FB-06
Lab Number	961746-0001	961746-0003	961751-0002	961798-0001	961798-0002
Matrix	WATER	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	ND	ND	< 0.50	< 0.28	< 0.20
Radium 226	ND	ND	ND	ND	ND
Radium 228	ND	ND	ND	ND	ND
Thorium 230	ND	ND	ND	ND	ND
Thorium 232	< 0.14	< 0.42	ND	ND	< 1.0

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302354

RADIOLOGICAL DATA
SOIL BORINGS - FIELD BLANKS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES									
Sample ID No.	LT-SB-FB-07		LT-SB-FB-08		LT-SB-FB-09		LT-SB-FB-10		LT-SB-FB-11
Lab Number	961842-0001		961844-0001		961838-0001		961847-0001		961856-0001
Matrix	WATER		WATER		WATER		WATER		WATER
Units	pCi/l		pCi/l		pCi/l		pCi/l		pCi/l
Uranium 238	< 0.23		< 0.21		< 0.24		< 0.28		< 0.27
Radium 226	ND		ND		< 0.43		ND		< 0.43
Radium 228	ND		ND		< 0.93		ND		< 0.93
Thorium 230	ND		ND		ND		< 0.70		ND
Thorium 232	ND		< 0.19		0.20 +/- 0.10	E	3.5 +/- 0.90	E	< 0.14

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302355

RADIOLOGICAL DATA
SOIL BORINGS - FIELD BLANKS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-FB-12	LT-SB-FB-13	LT-SB-FB-14	LT-SB-FB-15	LT-SB-FB-16
Lab Number	961876-0001	961876-0002	961876-0003	961900-0001	961900-0002
Matrix	WATER	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	< 0.26	ND	< 0.11	ND	< 0.11
Radium 226	ND	ND	ND	ND	< 0.43
Radium 228	ND	ND	ND	ND	ND
Thorium 230	ND	ND	ND	ND	ND
Thorium 232	< 0.11	< 0.22	ND	ND	ND

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

RADIOLOGICAL DATA
SOIL BORINGS - FIELD BLANKS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-FB-17	LT-SB-FB-18	LT-SB-FB-19	LT-SB-FB-21	LT-SB-FB-22
Lab Number	961905-0001	961905-0002	961932-0001	961905-0003	961944-0001
Matrix	WATER	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	ND	ND	ND	< 0.44	ND
Radium 226	0.40 +/- 0.20	ND	ND	0.60 +/- 0.20	ND
Radium 228	< 0.88	1.1 +/- 0.40	< 0.91	< 0.88	< 0.91
Thorium 230	ND	ND	ND	ND	< 0.45
Thorium 232	< 0.44	ND	< 0.42	< 0.30	< 0.28

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302357

RADIOLOGICAL DATA
SOIL BORINGS - FIELD BLANKS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-FB-23	LT-SB-FB-24	LT-SB-FB-25	LT-SB-FB-26	LT-SB-FB-27
Lab Number	961997-0001	962022-0002	962069-0001	962087-0001	962101-0001
Matrix	WATER	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	ND	ND	< 0.38	< 0.32	ND
Radium 226	0.20 +/- 0.10	< 0.14	< 0.14	ND	ND
Radium 228	ND	ND	ND	< 0.91	ND
Thorium 230	< 0.49	< 0.56	< 1.0	< 1.0	< 1.0
Thorium 232	< 0.41	ND	< 1.0	< 1.0	< 1.0

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

RADIOLOGICAL DATA
SOIL BORINGS - FIELD BLANKS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-FB-28	LT-SB-FB-29	LT-SB-FB-30	LT-SB-FB-31	LT-SB-FB-32
Lab Number	962205-0001	961974-0001	961967-0001	962022-0003	962028-0001
Matrix	WATER	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	< 0.36	ND	ND	ND	< 0.36
Radium 226	ND	ND	ND	ND	0.20 +/- 0.10
Radium 228	1.0 +/- 0.50	ND	ND	< 0.91	ND
Thorium 230	ND	< 0.54	ND	< 0.61	< 0.51
Thorium 232	< 0.27	ND	ND	ND	ND

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302359

RADIOLOGICAL DATA
SOIL BORINGS - FIELD BLANKS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES		
Sample ID No.	LT-SB-FB-34	LT-TAP
Lab Number	961957-0001	962022-0001
Matrix	WATER	WATER
Units	pCi/l	pCi/l
Uranium 238	ND	< 0.32
Radium 226	ND	0.60 +/- 0.10
Radium 228	ND	< 0.91
Thorium 230	ND	< 0.51
Thorium 232	ND	< 0.37

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302360

RADIOLOGICAL DATA
MONITORING WELL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-MP-2D	LT-SB-MP-4D	LT-SB-MP-4DB	LT-SB-MP-5	LT-SB-MP-5B
Lab Number	962102-0010	961877-0002	961877-0004	961926-0003	961926-0004
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	1.4 +/- 0.30	0.10 +/- 0.10	ND	0.50 +/- 0.10	0.40 +/- 0.10
Radium 226	1.2 +/- 0.23	0.68 +/- 0.22	0.58 +/- 0.18	1.4 +/- 0.37	0.75 +/- 0.53
Radium 228	0.88 +/- 0.30	< 0.29	0.93 +/- 0.30	ND	1.6 +/- 0.54
Thorium 230	ND	0.74 +/- 0.49 E	0.49 +/- 0.39 E	1.1 +/- 0.59 E	1.6 +/- 0.66
Thorium 232	0.70 +/- 0.27	0.95 +/- 0.53 E	0.71 +/- 0.43 E	1.1 +/- 0.56 E	1.1 +/- 0.48
TOC (%)	0.3	0.06 E	0.09	0.91	0.03
pH (pH units)	10.34	10.55	8.67	5.25	6.04

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302361

RADIOLOGICAL DATA
MONITORING WELL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SP-MP-6	LT-SB-MP-6B	LT-SB-MP-8D	LT-SB-MP-8DB	LT-SB-MP-9D
Lab Number	961857-0011	961857-0012	962023-0001	962023-0003	961906-0004
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	0.5 +/- 0.11	0.6 +/- 0.12	0.60 +/- 0.10	0.60 +/- 0.10	0.40 +/- 0.10
Radium 226	1.4 +/- 0.36	1.3 +/- 0.35	0.87 +/- 0.35	0.73 +/- 0.30	1.6 +/- 0.41 E
Radium 228	1.8 +/- 0.74	1.8 +/- 0.74	0.98 +/- 0.52	< 0.39	1.1 +/- 0.40
Thorium 230	0.63 +/- 0.40	0.64 +/- 0.40 E	0.71 +/- 0.44	0.53 +/- 0.34	0.52 +/- 0.38 E
Thorium 232	1.1 +/- 0.40	1.4 +/- 0.53 E	0.91 +/- 0.46 E	0.90 +/- 0.42 E	0.77 +/- 0.43 E
TOC (%)	0.98	0.6	0.21	0.16	0.42
pH (pH units)	6.46	6.08	6	5.39	7.36

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302362

RADIOLOGICAL DATA
MONITORING WELL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-MP-9DB	LT-SB-MP-11D	LT-SB-MP-11DB	LT-SB-MP-16S	LT-SB-MP-16SB
Lab Number	961906-0006	962102-0001	962102-0003	962206-0001	962206-0002
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	< 0.3	< 0.30	0.71 +/- 0.15	0.50 +/- 0.10	0.80 +/- 0.17
Radium 226	0.66 +/- 0.28	0.81 +/- 0.17	0.99 +/- 0.26	0.77 +/- 0.21	0.99 +/- 0.15
Radium 228	0.64 +/- 0.37	0.81 +/- 0.29	0.32 +/- 0.30	1.2 +/- 0.38	0.89 +/- 0.20
Thorium 230	0.73 +/- 0.36	< 0.23	0.99 +/- 0.41	< 0.21	ND
Thorium 232	0.66 +/- 0.31	0.34 +/- 0.19	0.58 +/- 0.27	0.36 +/- 0.18	0.55 +/- 0.23
TOC (%)	0.1	0.09	0.11	0.28	0.45
pH (pH units)	7.23	4.84	4.13	7.87	6.91

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302363

RADIOLOGICAL DATA
MONITORING WELL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES										
Sample ID No.	LT-SB-MP-18		LT-SB-MP-18B		LT-SB-MP-20		LT-SB-MP-20B		LT-SB-MP-22	
Lab Number	961901-0008		961901-0009		961945-0004				961799-0001	
Matrix	SOIL		SOIL		SOIL		SOIL		SOIL	
Units	pCi/g		pCi/g		pCi/g		pCi/g		pCi/g	
Uranium 238	0.40 +/- 0.08		0.40 +/- 0.08		0.50 +/- 0.10				0.60 +/- 0.13	
Radium 226	1.4 +/- 0.29		1.7 +/- 0.47		1.3 +/- 0.30		DATA NOT YET		0.76 +/- 0.21	
Radium 228	1.1 +/- 0.40		1.8 +/- 0.65		0.71 +/- 0.34		COMPLETE		0.66 +/- 0.29	
Thorium 230	0.76 +/- 0.45	E	0.79 +/- 0.45	E	0.66 +/- 0.41	E			0.69 +/- 0.20	
Thorium 232	0.82 +/- 0.44	E	1.1 +/- 0.52	E	0.48 +/- 0.30	E			0.61 +/- 0.16	
TOC (%)	0.2	E	0.16	E	0.44		0.26		0.43	
pH (pH units)	4.04	E	5.18	E	12.05		11.47		7.63	

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302364

RADIOLOGICAL DATA
MONITORING WELL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES			
Sample ID No.	LT-SB-MP-22B	LT-SB-MP-22D	LT-SB-MP-22DB
Lab Number	961799-0002	961747-0004	961747-0003
Matrix	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g
Uranium 238	1.1 +/- 0.24	0.60 +/- 0.13	0.50 +/- 0.10
Radium 226	0.75 +/- 0.24	0.92 +/- 0.24	0.69 +/- 0.29
Radium 228	1.1 +/- 0.38	< 0.29	0.95 +/- 0.37
Thorium 230	0.54 +/- 0.20	< 0.24	0.43 +/- 0.25
Thorium 232	0.66 +/- 0.14	0.37 +/- 0.20	0.44 +/- 0.22
TOC (%)	0.37	5.6	0.44
pH (pH units)	8.56	8.49	6.6

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302365

RADIOLOGICAL DATA
RADIOLOGICAL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES										
Sample ID No.	LT-RT-01		LT-RT-01B		LT-RT-02		LT-RT-02B		LT-RT-03	
Lab Number	961596-0001		961956-0002		961956-0005		961956-0006		961975-0005	
Matrix	SOIL		SOIL		SOIL		SOIL		SOIL	
Units	pCi/g		pCi/g		pCi/g		pCi/g		pCi/g	
Uranium 238	18 +/- 3.8		25 +/- 5.3		140 +/- 30		38 +/- 8.0		230 +/- 48	
Radium 226	6.8 +/- 0.85		23 +/- 3.0		68 +/- 4.2		7.0 +/- 0.72		150 +/- 8.3	
Radium 228	12 +/- 1.5		93 +/- 6.8		18 +/- 2.9		4.3 +/- 0.69		17 +/- 3.5	
Thorium 230	3.2 +/- 1.2	E	22 +/- 7.2	E	130 +/- 56	E	26 +/- 13	E	R	
Thorium 232	3.1 +/- 1.2	E	32 +/- 10	E	17 +/- 7.7	E	3.5 +/- 1.9	E	R	

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302366

RADIOLOGICAL DATA
RADIOLOGICAL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-RT-03B	LT-RT-04	LT-RT-04B	LT-RT-05	LT-RT-05B
Lab Number	961975-0006	961968-0001	961968-0002	962021-0001	962021-0002
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	1.5 +/- 0.30	0.92 +/- 0.20	0.71 /- 0.10	0.89 +/- 0.20	0.86 +/- 0.20
Radium 226	1.3 +/- 0.40	1.3 +/- 0.50	2.4 +/- 0.40	2.4 +/- 1.7	1.4 +/- 0.37
Radium 228	0.61 +/- 0.35	1.6 +/- 0.57	< 0.74	290 +/- 16	1.9 +/- 0.50
Thorium 230	1.9 +/- 0.69	1.5 +/- 0.64	0.96 +/- 0.46	R	0.68 +/- 0.38
Thorium 232	0.68 +/- 0.32	1.8 +/- 0.72 E	1.7 +/- 0.66 E	R	1.3 +/- 0.55 E

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302367

RADIOLOGICAL DATA
RADIOLOGICAL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-RT-06	LT-RT-06B	LT-RT-07	LT-RT-07B	LT-RT-08
Lab Number	962023-0004	962023-0005	961956-0008	961956-0009	961975-0007
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	2.0 +/- 0.40	1.2 +/- 0.30	260 +/- 56	97 +/- 20	86 +/- 18
Radium 226	2.4 +/- 0.55	ND	220 +/- 12	48 +/- 3.1	59 +/- 4.6
Radium 228	6.4 +/- 1.1	1.5 +/- 0.52	53 +/- 5.9	17 +/- 3.4	21 +/- 4.0
Thorium 230	2.9 +/- 0.99	0.55 +/- 0.30	260 +/- 77 E	130 +/- 49 E	57 +/- 25 E
Thorium 232	6.1 +/- 1.9 E	0.76 +/- 0.33 E	30 +/- 9.5 E	25 +/- 10 E	12 +/- 5.3 E

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302368

RADIOLOGICAL DATA
RADIOLOGICAL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-RT-08B	LT-RT-09	LT-RT-09B	LT-RT-10	LT-RT-10B
Lab Number	961988-0001	961945-0001	961945-0002	961998-0002	961998-0003
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	2.2 +/- 0.47	0.85 +/- 0.20	0.20 +/- 0.10	0.88 +/- 0.20	1.1 +/- 0.20
Radium 226	2.0 +/- 0.41	1.7 +/- 0.31	0.41 +/- 0.14	1.3 +/- 0.36	1.1 +/- 0.46
Radium 228	3.7 +/- 0.80	1.3 +/- 0.38	0.54 +/- 0.27	1.8 +/- 0.77	1.2 +/- 0.70
Thorium 230	3.1 +/- 0.86	2.2 +/- 1.3 E	0.66 +/- 0.44 E	0.60 +/- 0.37	0.33 +/- 0.28
Thorium 232	3.5 +/- 0.91	1.5 +/- 0.90 E	0.79 +/- 0.45 E	1.4 +/- 0.60 E	1.0 +/- 0.47 E

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302369

RADIOLOGICAL DATA
RADIOLOGICAL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-RT-11	LT-RT-11B	LT-RT-12	LT-RT-12B	LT-RT-13
Lab Number	961906-0007	961906-0008	961956-0004	961956-0007	961975-0001
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	0.60 +/- 0.10	0.94 +/- 0.20	4.3 +/- 0.91	0.5 +/- 0.1	0.91 +/- 0.2
Radium 226	1.1 +/- 0.43	1.2 +/- 0.59	5.6 +/- 2.9	1.5 +/- 0.45	2.0 +/- 0.73
Radium 228	56 +/- 3.7	22 +/- 2.1	350 +/-20	24 +/- 1.8	18 +/- 1.9
Thorium 230	7.6 +/- 2.1	2.1 +/- 0.83	37 +/- 13 E	2.8 +/- 0.94	3.7 +/- 1.4 E
Thorium 232	62 +/- 13	18 +/- 5.8	190 +/- 53 E	15 +/- 4.3	16 +/- 5.3 E

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302370

RADIOLOGICAL DATA
RADIOLOGICAL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-RT-13B 961975-0002 SOIL pCi/g	LT-RT-14 961968-0003 SOIL pCi/g	LT-RT-14B 961968-0004 SOIL pCi/g	LT-RT-15 961945-0006 SOIL pCi/g	LT-RT-15B 961945-0007 SOIL pCi/g
Uranium 238	1.3 +/- 0.3	0.81 +/- 0.20	0.92 +/- 0.20	0.20 +/- 0.10	0.50 +/- 0.10
Radium 226	1.8 +/- 0.40	1.5 +/- 0.43	1.4 +/- 0.47	2.0 +/- 0.38	ND
Radium 228	2.7 +/- 0.66	1.4 +/- 0.47	1.5 +/- 0.61	1.8 +/- 0.47	1.3 +/- 0.38
Thorium 230	1.3 +/- 0.47	0.59 +/- 0.31	0.64 +/- 0.36	1.6 +/- 0.71 E	1.4 +/- 0.82 E
Thorium 232	3.5 +/- 1.0	1.0 +/- 0.39 E	2.8 +/- 0.99 E	1.2 +/- 0.55	1.0 +/- 0.61 E

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

RADIOLOGICAL DATA
RADIOLOGICAL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-RT-16	LT-RT-16B	LT-RT-17	LT-RT-17B	LT-RT-18
Lab Number	961998-0004	961998-0005	961988-0002	961998-0001	961975-0003
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	0.60 +/- 0.10	0.60 +/- 0.10	0.50 +/- 0.49	0.6 +/- 0.1	3.2 +/- 0.7
Radium 226	1.3 +/- 0.40	0.88 +/- 0.26	1.4 +/- 0.39	0.56 +/- 0.28	2.0 +/- 0.54
Radium 228	ND	0.46 +/- 0.25	1.3 +/- 0.60	0.78 +/- 0.42	1.1 +/- 0.49
Thorium 230	< 0.32	0.48 +/- 0.32	1.1 +/- 0.56 E	< 0.30	4.6 +/- 2.1 E
Thorium 232	0.62 +/- 0.34 E	0.63 +/- 0.33 E	0.84 +/- 0.40 E	0.32 +/- 0.20 E	< 0.47

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302372

RADIOLOGICAL DATA
RADIOLOGICAL BORINGS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-RT-18B 961975-0004 SOIL pCi/g	LT-RT-19 962029-0001 SOIL pCi/g	LT-RT-19B 962029-0002 SOIL pCi/g	LT-RT-20 962029-0003 SOIL pCi/g	LT-RT-20B 962029-0004 SOIL pCi/g
Uranium 238	2.4 +/- 0.50	1.4 +/- 0.30	2.7 +/- 0.60	4.0 +/- 0.85	0.78 +/- 0.20
Radium 226	1.1 +/- 0.33	1.3 +/- 0.70	6.1 +/- 0.77	2.0 +/- 0.47	1.3 +/- 0.41
Radium 228	1.3 +/- 0.52	37 +/- 3.0	3.2 +/- 0.78	2.0 +/- 0.68	1.5 +/- 0.66
Thorium 230	1.2 +/- 0.54	2.1 +/- 0.75	1.1 +/- 0.40	3.2 +/- 1.1	0.56 +/- 0.30
Thorium 232	0.84 +/- 0.41	24 +/- 5.8	1.5 +/- 0.48	1.7 +/- 0.66	1.0 +/- 0.39

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302373

RADIOLOGICAL DATA
SURFACE SOIL

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SS-01	LT-SS-02	LT-SS-03	LT-SS-04	LT-SS-05
Lab Number	961906-0003	961926-0001	961926-0002	961926-0005	961933-0001
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	110 +/- 24	1.6 +/- 0.30	33 +/- 7.0	470 +/- 99	0.72 +/- 0.20
Radium 226	41 +/- 2.8	0.90 +/- 0.30	38 +/- 2.9	250 +/- 13	9.0 +/- 3.8
Radium 228	70 +/- 5.1	1.3 +/- 0.43	160 +/- 10	340 +/- 18	530 +/- 29
Thorium 230	58 +/- 10	0.82 +/- 0.68 E	31.6 +/- 9.5	R	5.1 +/- 2.9
Thorium 232	48 +/- 8.7	0.92 +/- 0.70 E	93 +/- 25	R	10 +/- 4.1

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302374

RADIOLOGICAL DATA
SURFACE SOIL

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SS-05-PRIME	LT-SS-06	LT-SS-07	LT-SS-08	LT-SS-09
Lab Number	961933-0002	961933-0005	961933-0006	961945-0003	961968-0005
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	0.50 +/- 0.10	3.7 +/- 0.79	1.0 +/- 0.20	1.4 +/- 0.30	0.76 +/- 0.20
Radium 226	R	5.0 +/- 1.0	2.0 +/- 1.1	2.0 +/- 0.37	1.1 +/- 0.49
Radium 228	R	48 +/- 3.7	95 +/- 6.5	1.3 +/- 0.37	< 0.52
Thorium 230	R	7.8 +/- 2.5	8.8 +/- 3.9	2.7 +/- 1.1 E	0.51 +/- 0.31
Thorium 232	R	16 +/- 5.0	57 +/- 20	1.2 +/- 0.55	0.91 +/- 0.40 E

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302375

RADIOLOGICAL DATA
SURFACE SOIL

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SS-10	LT-SS-11	LT-SS-12	LT-SS-13	LT-SS-14
Lab Number	961968-0006	962036-0001	962036-0003	962102-0004	962102-0005
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	18 +/- 3.8	24 +/- 5.1	37 +/- 7.8	0.85 +/- 0.18	0.76 +/- 0.16
Radium 226	9.7 +/- 0.93	6.3 +/- 0.86	86 +/- 5.4	< 0.30	0.74 +/- 0.15
Radium 228	7.7 +/- 1.2	3.2 +/- 1.4	171 +/- 10	0.95 +/- 0.32	0.76 +/- 0.22
Thorium 230	13 +/- 3.6	12 +/- 3.3	310 +/- 75	< 0.24	ND
Thorium 232	7.8 +/- 2.2 E	2.4 +/- 0.88	220 +/- 55	0.61 +/- 0.28	0.65 +/- 0.33

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302376

RADIOLOGICAL DATA
SURFACE SOIL

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SS-15	LT-SS-16	LT-SS-17	LT-SS-18	
Lab Number	962102-0006	962102-0007	962102-0008	962102-0009	
Matrix	SOIL	SOIL	SOIL	SOIL	
Units	pCi/g	pCi/g	pCi/g	pCi/g	
Uranium 238	0.85 +/- 0.18	0.90 +/- 0.19	0.76 +/- 0.16	0.91 +/- 0.19	
Radium 226	1.0 +/- 0.24	0.77 +/- 0.22	0.95 +/- 0.20	0.83 +/- 0.21	
Radium 228	1.1 +/- 0.38	0.99 +/- 0.29	1.1 +/- 0.23	1.2 +/- 0.23	
Thorium 230	< 0.23	< 0.24	ND	0.82 +/- 0.50	E
Thorium 232	0.49 +/- 0.24	0.66 +/- 0.30	0.44 +/- 0.22	1.2 +/- 0.60	E

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302377

RADIOLOGICAL DATA
TEST PITS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SB-TP-01	LT-SB-TP-02	LT-SB-TP-03	LT-SB-TP-04	LT-SB-TP-05
Lab Number	961747-0002	961752-0001	962769-0004	961769-0002	961769-0003
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	1.7 +/- 0.35 E	0.71 +/- 0.15	1.4 +/- 0.29	5.4 +/- 1.1	27 +/- 5.7
Radium 226	2.0 +/- 0.50	1.2 +/- 0.30	2.6 +/- 0.42	1.4 +/- 0.60	23 +/- 1.9
Radium 228	6.1 +/- 1.1	1.1 +/- 0.38	3.1 +/- 0.63	2.2 +/- 0.69	420 +/- 21
Thorium 230	3.8 +/- 1.3 E	0.67 +/- 0.36	3.3 +/- 0.95	3.6 +/- 1.0	33 +/- 14
Thorium 232	8.6 +/- 2.7	0.93 +/- 0.40	3.2 +/- 0.92	3.0 +/- 0.86	150 +/- 49
TOC (%)	1.26	0.74	0.66	0.02	
pH (pH units)	6.6	6.02	7.18	7.86	7.59

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302378

RADIOLOGICAL DATA
TEST PITS

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES			
Sample ID No.	LT-SB-TP-06	LT-SB-TP-07	LT-SB-TP-08
Lab Number	961752-0002	961777-0001	961797-0002
Matrix	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g
Uranium 238	1.1 +/- 0.23	0.40 +/- 0.09	0.50 +/- 0.10
Radium 226	1.4 +/- 0.22	0.54 +/- 0.29	1.1 +/- 0.35
Radium 228	1.7 +/- 0.47	0.79 +/- 0.45	1.3 +/- 0.57
Thorium 230	1.3 +/- 0.58	0.41 +/- 0.30	0.58 +/- 0.31
Thorium 232	1.5 +/- 0.62	0.72 +/- 0.27	0.77 +/- 0.33
TOC (%)	0.13	0.94	0.04
pH (pH units)	5.12	7.23	2.88

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302379

LI TUNGSTEN SUPERFUND SITE
GLEN COVE, NEW YORK
REMEDIAL INVESTIGATION
BUILDING MATERIALS RADIONUCLIDES SAMPLING

Sample ID No. Lab Number Matrix	Units	LT-BM-01 962258-0001 building material	LT-BM-02 962258-0002 building material	LT-BM-03 962258-0003 building material	LT-BM-04 962258-0004 building material	LT-BM-05 962258-0005 building material	LT-BM-06 962258-0006 building material
Radium-226	pCi/g	1.4 +/- 0.23	2.2 +/- 0.31	2.1 +/- 0.30	2.3 +/- 0.30	1.3 +/- 0.31	1.0 +/- 0.33
Thorium-232	pCi/g	0.82 +/- 0.29	23 +/- 9.7	7.4 +/- 2.3	2.5 +/- 0.94	2.2 +/- 0.85	0.48 +/- 0.28
Gamma exposure rate*	µR/h	30 - 40	200 - 300	200 - 300	10 - 15	10 - 15	8
Surface alpha total *	CPM	0	100 - 700	0	50	50 - 70	0

NOTES:
* = measurements taken at time of sample collection with ZnS detector.

LI TUNGSTEN SUPERFUND SITE
GLEN COVE, NEW YORK
REMEDIAL INVESTIGATION
BUILDING MATERIALS RADIONUCLIDES SAMPLING

Sample ID No. Lab Number Matrix	Units	LT-BM-07 962258-0007 building material	LT-BM-08 962258-0008 building material	LT-BM-09 962258-0009 building material	LT-BM-10 962258-0010 building material	LT-BM-DUP 962258-0011 building material
Radium-226	pCi/g	2.0 +/- 0.33	3.0 +/- 0.42	3.8 +/- 0.64	1.1 +/- 0.19	2.3 +/- 0.36
Thorium-232	pCi/g	0.67 +/- 0.27	6.9 +/- 2.0	1.9 +/- 0.65	0.36 +/- 0.18	6.0 +/- 1.9
Gamma exposure rate*	µR/h	18	80 - 100	20	8	see LT-BM-3
Surface alpha total *	CPM	0	20 - 100	0	0	see LT-BM-3

NOTES:
* = measurements taken at time of sampl

302381

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-DW-ORE-01 970373-0001 SOIL pCi/g		LT-DW-ORE-02 970373-0002 SOIL pCi/g		LT-DW-ORE-03 970373-0003 SOIL pCi/g		LT-DW-ORE-DUP 970373-0004 SOIL pCi/g		LT-GW-KONICA-01 970372-0002 WATER pCi/l
Uranium 238	54 +/- 11	E	46 +/- 9.6		8.5 +/- 1.8		42 +/- 8.8	E	4.6 +/- 1.0
Radium 226	20 +/- 1.4		10 +/- 0.84		2.7 +/- 0.36		16 +/- 1.2		10 +/- 0.63
Radium 228	15 +/- 1.4		11 +/- 1.3		5.2 +/- 0.65		13 +/- 1.5		4.8 +/- 0.60
Thorium 230	35 +/- 9.4	E	21 +/- 8.0	E	6.6 +/- 2.1	E	27 +/- 8.0	E	< 1.4
Throium 232	16 +/- 4.4		9.6 +/- 3.8		5.7 +/- 1.8		14 +/- 4.4		< 0.99

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

RADIOLOGICAL DATA
SURFACE WATER / SEDIMENT

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SW-01	LT-SW-04	LT-SW-05	LT-SW-08	LT-SW-09
Lab Number	962259-0001	962259-0002	962259-0003	962259-0007	962267-0001
Matrix	WATER	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	< 1	4.8 +/- 1.0	0.32 +/- 0.23	< 0.44	< 0.23
Radium 226	ND	1.3 +/- 0.23	< 0.23	4.5 +/- 0.39	ND
Radium 228	ND	< 1.0	ND	2.4 +/- 0.60	ND
Thorium 230	ND	0.64 +/- 0.43	ND	< 0.46	ND
Thorium 232	ND	< 0.41	< 0.56	< 0.28	ND
TOC (%)	NA	NA	NA	NA	NA
pH (pH units)	NA	NA	NA	NA	NA

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302383

RADIOLOGICAL DATA
SURFACE WATER / SEDIMENT

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SW-10	LT-SW-11	LT-SED-02	LT-SED-03	LT-SED-04
Lab Number	962259-0006	962259-0005	962268-0005	962268-0006	962268-0007
Matrix	WATER	WATER	SOIL	SOIL	SOIL
Units	pCi/l	pCi/l	pCi/g	pCi/g	pCi/g
Uranium 238	1.2 +/- 0.45	< 0.43	4.5 +/- 0.95	4.7 +/- 0.99	46 +/- 9.7
Radium 226	0.45 +/- 0.20	0.77 +/- 0.20	2.2 +/- 0.41	9.7 +/- 0.62	6.6 +/- 0.75
Radium 228	ND	ND	2.0 +/- 0.54	5.4 +/- 0.86	5.0 +/- 0.95
Thorium 230	ND	ND	1.8 +/- 0.71	7.3 +/- 2.3	29 +/- 7.9
Thorium 232	< 0.29	< 0.23	2.1 +/- 0.77	5.3 +/- 1.7	5.7 +/- 1.7
TOC (%)	NA	NA	0.64	1.76	1.79
pH (pH units)	NA	NA	3.67	2.81	6.85

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

3023384

RADIOLOGICAL DATA
SURFACE WATER / SEDIMENT

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-SED-05	LT-SED-08	LT-SED-09	LT-SED-10	LT-SED-11
Lab Number	962272-0001	962268-0001	962268-0002	962268-0003	962268-0004
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	15 +/- 3.1	0.90 +/- 0.19	0.89 +/- 0.19	0.58 +/- 0.12	1.7 +/- 0.36
Radium 226	3.2 +/- 0.42	1.1 +/- 0.21	1.0 +/- 0.29	0.94 +/- 0.21	2.2 +/- 0.32
Radium 228	11 +/- 1.1	1.2 +/- 0.29	ND	0.91 +/- 0.25	1.8 +/- 0.57
Thorium 230	5.8 +/- 1.6	0.32 +/- 0.21	< 0.24	0.20 +/- 0.20	1.3 +/- 0.44
Thorium 232	6.6 +/- 1.8	0.78 +/- 0.29	0.52 +/- 0.25	0.56 +/- 0.24	1.5 +/- 0.47
TOC (%)	2.69	1.39	2.28	0.46	2.45
pH (pH units)	7.47	6.81	6.53	3.21	4.91

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302385

RADIOLOGICAL DATA
SURFACE WATER / SEDIMENT

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES				
Sample ID No.	LT-SED-DP-02	LT-SED-DP-03	LT-SED-DP-05	LT-SED-DP-29
Lab Number	962301-0001	962272-0003	962272-0002	962301-0003
Matrix	SOIL	SOIL	SOIL	SOIL
Units	pCi/g	pCi/g	pCi/g	pCi/g
Uranium 238	2.9 +/- 0.60	29 +/- 6.0	15 +/- 3.1	1.7 +/- 0.37
Radium 226	2.6 +/- 0.49	6.6 +/- 0.62	5.4 +/- 0.50	1.9 +/- 0.36
Radium 228	7.2 +/- 0.93	11 +/- 0.84	3.2 +/- 0.61	1.6 +/- 0.41
Thorium 230	5.0 +/- 1.6	21 +/- 5.2	12 +/- 3.0	3.4 +/- 1.1
Thorium 232	6.6 +/- 2.1	15 +/- 3.8	4.3 +/- 1.2	1.1 +/- 0.45
TOC (%)	1.55	7.5	5.06	1.06
pH (pH units)	6.94	6.33	7.71	7.27

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect

302386

RADIOLOGICAL DATA
GROUNDWATER - ROUND 1

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES				
Sample ID No.	LT-GW-GM-1	LT-GW-GM-2	LT-GW-GM-7	LT-GW-GM-8
Lab Number	962526-0002	962529-0002	962558-0003	962565-0001
Matrix	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	3.2 +/- 0.91	2.1 +/- 0.63	< 0.32	3.3 +/- 0.84
Radium 226	5.3 +/- 0.53	1.4 +/- 0.32	2.3 +/- 0.38	3.8 +/- 0.35
Radium 228	4.9 +/- 0.68	2.5 +/- 0.56	1.3 +/- 0.48	2.2 +/- 0.60
Thorium 230	ND	ND	ND	1.1 +/- 0.63
Thorium 232	0.44 +/- 0.30	< 0.40	< 0.20	0.64 +/- 0.41
TDS (mg/L)	660	980	320	180

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302387

RADIOLOGICAL DATA
GROUNDWATER - ROUND 1

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES					
Sample ID No.	LT-GW-GM-9	LT-GW-GM-10	LT-GW-GM-11	LT-GW-GM-12	
Lab Number	962558-0001	962602-0001	962571-0003	962571-0001	
Matrix	WATER	WATER	WATER	WATER	
Units	pCi/l	pCi/l	pCi/l	pCi/l	
Uranium 238	0.75 +/- 0.36	1.0 +/- 0.42	2.6 +/- 0.92	2.4 +/- 0.71	E
Radium 226	2.5 +/- 0.39	3.9 +/- 0.36	5.7 +/- 0.43	3.9 +/- 0.36	E
Radium 228	1.6 +/- 0.50	1.8 +/- 0.60	4.3 +/- 0.70	2.4 +/- 0.60	
Thorium 230	ND	ND	< 0.41	< 0.41	
Thorium 232	< 0.35	0.50 +/- 0.29	0.43 +/- 0.28	0.63 +/- 0.33	
TDS (mg/L)	320	150	90	380	

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302388

RADIOLOGICAL DATA
GROUNDWATER - ROUND 1

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES				
Sample ID No.	LT-GW-GM-13	LT-GW-GM-14A	LT-GW-GM-14B	LT-GW-GM-15
Lab Number	962565-0004	962584-0001	962584-0002	962536-0004
Matrix	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	0.62 +/- 0.31	2.1 +/- 0.68	67 +/- 15 E	5.0 +/- 1.1
Radium 226	1.8 +/- 0.25	1.2 +/- 0.21	1.5 +/- 0.23	0.94 +/- 0.28
Radium 228	< 1.1	ND	1.6 +/- 0.50	1.6 +/- 0.50
Thorium 230	1.5 +/- 0.77	2.0 +/- 0.84	R	ND
Thorium 232	1.1 +/- 0.56	2.6 +/- 0.98	R	0.33 +/- 0.27
TDS (mg/L)	930	770	25500	640

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302389

RADIOLOGICAL DATA
GROUNDWATER - ROUND 1

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES				
Sample ID No.	LT-GW-EMW-1	LT-GW-EMW-4	LT-GW-MW-8S	LT-GW-MW-8D
Lab Number	962565-0005	962610-0002	962602-0002	962602-0003
Matrix	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	1.1 +/- 0.41	0.31 +/- 0.23	2.5 +/- 0.68	ND
Radium 226	1.1 +/- 0.20	0.23 +/- 0.12	1.7 +/- 0.24	0.29 +/- 0.13
Radium 228	ND	ND	< 1.1	ND
Thorium 230	ND	<0.48	< 0.44	ND
Thorium 232	0.43 +/- 0.27	< 0.26	< 0.33	< 0.23
TDS (mg/L)	390	1500	260	690

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302390

RADIOLOGICAL DATA
GROUNDWATER - ROUND 1

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES				
Sample ID No.	LT-GW-MW-10D	LT-GW-MP-2D	LT-GW-MP-4	LT-GW-MP-5
Lab Number	962602-0004	962529-0003	962547-0001	962547-0002
Matrix	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	59 +/- 9.7	1.8 +/- 0.61	0.55 +/- 0.32	0.29 +/- 0.22
Radium 226	3.6 +/- 0.34	2.8 +/- 0.41	0.58 +/- 0.25	ND
Radium 228	1.8 +/- 0.60	2.9 +/- 0.58	1.6 +/- 0.50	< 0.94
Thorium 230	0.37 +/- 0.32	1.5 +/- 0.62	ND	ND
Thorium 232	0.59 +/- 0.29	1.3 +/- 0.52	< 0.40	< 0.50
TDS (mg/L)	930	4570	270	290

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302391

RADIOLOGICAL DATA
GROUNDWATER - ROUND 1

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-GW-MP-6 962526-0004 WATER pCi/l	LT-GW-MP-11D 962571-0004 WATER pCi/l	LT-GW-MP-16S 962565-0003 WATER pCi/l	LT-GW-MP-16D 962558-0002 WATER pCi/l
Uranium 238	0.58 +/- 0.32	4.1 +/- 0.98	< 0.25	5.9 +/- 1.5
Radium 226	1.1 +/- 0.29	6.4 +/- 0.45	0.46 +/- 0.15	11 +/- 0.75
Radium 228	< 0.94	5.2 +/- 0.70	ND	10 +/- 0.88
Thorium 230	ND	1.2 +/- 0.56	ND	< 0.41
Thorium 232	< 0.33	1.7 +/- 0.63	< 0.30	0.77 +/- 0.37
TDS (mg/L)	560	190	120	740

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302392

RADIOLOGICAL DATA
GROUNDWATER - ROUND 1

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES				
Sample ID No.	LT-GW-MP-17	LT-GW-MP-18S	LT-GW-MP-18D	LT-GW-MP-19D
Lab Number	962536-0003	962585-0001	962585-0002	962565-0002
Matrix	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	2.9 +/- 0.89	2.1 +/- 0.58	9.6 +/- 3.1 E	< 0.32
Radium 226	1.8 +/- 0.35	0.67 +/- 0.17	3.6 +/- 0.35	ND
Radium 228	3.0 +/- 0.58	1.2 +/- 0.50	< 1.1	ND
Thorium 230	1.1 +/- 0.61	< 0.43	9.4 +/- 2.9	ND
Thorium 232	0.66 +/- 0.39	0.69 +/- 0.36	7.0 +/- 2.2	ND
TDS (mg/L)	1090	3100	11700	310

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302393

RADIOLOGICAL DATA
GROUNDWATER - ROUND 1

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-GW-MP-20 962526-0003 WATER pCi/l	LT-GW-MP-21D 962536-0001 WATER pCi/l	LT-GW-MP-22 962529-0001 WATER pCi/l	LT-GW-MP-22D 962529-0004 WATER pCi/l
Uranium 238	< 0.26	< 0.28	1.3 +/- 0.49	42 +/- 7.9
Radium 226	ND	ND	0.77 +/- 0.27	3.0 +/- 0.42
Radium 228	< 0.94	0.95 +/- 0.46	1.1 +/- 0.47	3.1 +/- 0.59
Thorium 230	ND	ND	< 0.48	< 0.41
Thorium 232	ND	< 0.40	0.41 +/- 0.30	0.71 +/- 0.36
TDS (mg/L)	320	420	360	2700

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302394

RADIOLOGICAL DATA
GROUNDWATER - ROUND 2

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

Note: These samples were collected during the second round of groundwater sampling.

RADIONUCLIDES					
Sample ID No.	LT-GW-GM-1	LT-GW-GM-2	LT-GW-GM-7	LT-GW-GM-8	LT-GW-GM-9
Lab Number	970097-0002	970097-0009	970111-0002	970097-0018	970111-0001
Matrix	WATER	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	4.1 +/- 1.3 E	0.58 +/- 0.35	1.5 +/- 0.62	2.8 +/- 0.73	5.6 +/- 1.2
Radium 226	3.6 +/- 0.47	1.5 +/- 0.32	6.3 +/- 0.59	6.0 +/- 0.59	9.0 +/- 0.70
Radium 228	1.4 +/- 0.5	1.1 +/- 0.50	4.0 +/- 0.60	3.1 +/- 0.60	6.4 +/- 0.70
Thorium 230	1.4 +/- 0.72	< 0.29	1.3 +/- 0.65	< 0.43	< 0.42
Thorium 232	0.58 +/- 0.40	0.23 +/- 0.18	0.68 +/- 0.40	< 0.34	< 0.43
TDS (mg/L)	520	1120	380	260	310

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302395

RADIOLOGICAL DATA
GROUNDWATER - ROUND 2

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-GW-GM-10 970118-0007 WATER pCi/l	LT-GW-GM-11 970118-0002 WATER pCi/l	LT-GW-GM-12 970118-0003 WATER pCi/l	LT-GW-GM-13 970111-0006 WATER pCi/l	LT-GW-GM-14A 970097-0004 WATER pCi/l
Uranium 238	< 0.24	2.0 +/- 0.59	1.4 +/- 0.51	0.81 +/- 0.37	2.5 +/- 0.97 E
Radium 226	7.2 +/- 0.63	7.0 +/- 0.62	2.8 +/- 0.41	2.0 +/- 0.35	1.5 +/- 0.32
Radium 228	5.3 +/- 0.70	3.3 +/- 0.60 E	2.1 +/- 0.50	< 0.95	< 1.0
Thorium 230	< 0.39	< 0.25	0.93 +/- 0.55	1.4 +/- 0.70	0.79 +/- 0.50
Thorium 232	0.66 +/- 0.32	< 0.36	0.47 +/- 0.32	1.3 +/- 0.64	1.2 +/- 0.52
TDS (mg/L)	270	130	390	860	1410

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302396

RADIOLOGICAL DATA
GROUNDWATER - ROUND 2

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES						
Sample ID No.	LT-GW-GM-14B	LT-GW-GM-15	LT-GW-EMW-1	LT-GW-EMW-4	LT-GW-MW-8S	
Lab Number	970097-0005	970097-0016	970111-0007	970118-0009	970118-0006	
Matrix	WATER	WATER	WATER	WATER	WATER	
Units	pCi/l	pCi/l	pCi/l	pCi/l	pCi/l	
Uranium 238	80 +/- 15	E	7.5 +/- 1.7	0.92 +/- 0.41	< 0.23	0.37 +/- 0.24
Radium 226	2.7 +/- 0.41		3.7 +/- 0.47	1.1 +/- 0.28	< 0.35	< 0.35
Radium 228	1.4 +/- 0.50		1.0 +/- 0.50	< 0.95	< 0.95	< 0.95
Thorium 230	6.0 +/- 5.9	E	0.96 +/- 0.54	< 0.22	< 0.54	< 0.39
Thorium 232	6.8 +/- 6.1	E	0.68 +/- 0.37	< 0.22	< 0.20	< 0.41
TDS (mg/L)	31200		440	390	1600	270

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302397

RADIOLOGICAL DATA
GROUNDWATER - ROUND 2

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES				
Sample ID No.	LT-GW-MW-8D	LT-GW-MW-10D	LT-GW-MP-2D	LT-GW-MP-4
Lab Number	970118-0010	970118-0005	970097-0010	970097-0014
Matrix	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	< 0.23	31 +/- 4.9	1.9 +/- 0.59	0.57 +/- 0.29
Radium 226	< 0.35	3.3 +/- 0.44	4.3 +/- 0.51	1.1 +/- 0.30
Radium 228	< 0.95	1.6 +/- 0.50	< 1.0	< 1.0
Thorium 230	< 0.39	< 0.46	9.2 +/- 3.6 E	< 0.22
Thorium 232	< 0.56	0.50 +/- 0.32	3.8 +/- 1.7 E	0.23 +/- 0.17
TDS (mg/L)	530	840	3190	220

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302398

RADIOLOGICAL DATA
GROUNDWATER - ROUND 2

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-GW-MP-5 970111-0005 WATER pCi/l	LT-GW-MP-6 970097-0017 WATER pCi/l	LT-GW-MP-11D 970118-0008 WATER pCi/l	LT-GW-MP-16S 970111-0003 WATER pCi/l
Uranium 238	1.6 +/- 0.61	0.29 +/- 0.23	< 0.46	0.41 +/- 0.25
Radium 226	1.6 +/- 0.33	0.60 +/- 0.20	< 0.35	0.50 +/- 0.22
Radium 228	1.5 +/- 0.50	< 1.0	< 0.95	< 0.95
Thorium 230	< 0.22	< 0.37	< 0.29	< 0.30
Thorium 232	0.29 +/- 0.20	< 0.44	< 0.38	< 0.41
TDS (mg/L)	280	560	240	110

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302399

RADIOLOGICAL DATA
GROUNDWATER - ROUND 2

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES				
Sample ID No.	LT-GW-MP-16D	LT-GW-MP-17	LT-GW-MP-18S	LT-GW-MP-18D
Lab Number	970111-0004	970097-0013	970097-0003	970097-0006
Matrix	WATER	WATER	WATER	WATER
Units	pCi/l	pCi/l	pCi/l	pCi/l
Uranium 238	2.1 +/- 0.59	< 0.31	3.9 +/- 0.86	1.9 +/- 0.79
Radium 226	11 +/- 0.75	< 0.31	1.0 +/- 0.30	3.3 +/- 0.45
Radium 228	8.5 +/- 0.80	< 1.0	1.0 +/- 0.50	3.4 +/- 0.60
Thorium 230	0.67 +/- 0.54	< 0.91	3.7 +/- 1.4	2.7 +/- 1.2
Thorium 232	0.98 +/- 0.55	< 1.2	1.6 +/- 0.77	2.2 +/- 0.92
TDS (mg/L)	450	1140	3190	13600

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302400

RADIOLOGICAL DATA
GROUNDWATER - ROUND 2

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-GW-MP-19D 970118-0001 WATER pCi/l	LT-GW-MP-20 970097-0001 WATER pCi/l	LT-GW-MP-21D 970097-0012 WATER pCi/l	LT-GW-MP-22 970097-0008 WATER pCi/l
Uranium 238	< 0.33	2.0 +/- 0.64	< 0.37	4.1 +/- 0.98
Radium 226	< 0.35	2.3 +/- 0.38	0.32 +/- 0.20	4.0 +/- 0.49
Radium 228	< 0.95	1.8 +/- 0.6	< 1.0	2.0 +/- 0.60
Thorium 230	< 0.50	< 0.46	< 0.29	< 0.40
Thorium 232	< 0.46	0.41 +/- 0.30	< 0.32	0.45 +/- 0.30
TDS (mg/L)	420	330	530	420

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302401

RADIOLOGICAL DATA
GROUNDWATER - ROUND 2

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: CORE LABORATORIES

RADIONUCLIDES Sample ID No. Lab Number Matrix Units	LT-GW-MP-22D 970097-0011 WATER pCi/l	LT-GW-DUP-5 970097-0015 WATER pCi/l	LT-GW-DUP-6 970118-0004 WATER pCi/l
Uranium 238	< 0.25	0.55 +/- 0.29	1.9 +/- 0.59
Radium 226	1.3 +/- 0.30	1.5 +/- 0.32	7.5 +/- 0.64
Radium 228	< 1.0	< 1.0	6.0 +/- 0.70 E
Thorium 230	< 0.26	< 0.30	< 0.47
Thorium 232	< 0.31	0.29 +/- 0.20 E	< 0.34
TDS (mg/L)	2820	190	150

NOTES:
E - estimated value
R - analysis did not pass EPA QA/QC
NR - analysis not required
ND - Non-Detect
NA - Not Analyzed

302402

TCLP DATA

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

TCLP DATA
INORGANICS

INORGANICS Sample ID No. Lab Number Matrix Units	LT-SB-03B 961839-0002 SOIL mg/L	LT-SB-17 962416-3 SOIL mg/L	LT-SB-27 962671-7 SOIL mg/L	LT-SB-40 962468-2 SOIL mg/L	LT-SB-41 962070-0001 SOIL mg/L	LT-SB-DUP03 962368-4 SOIL mg/L
Arsenic				0.56 E		
Barium	0.5					
Cadmium		0.01		0.02	0.01	
Chromium	0.01	0.01				0.01
Lead				0.2 E		0.06
Selenium						
Silver			0.05			
Mercury						

NOTES:
Blank Space - analyte analyzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302404

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

TCLP DATA
INORGANICS

INORGANICS Sample ID No. Lab Number Matrix Units	LT-SB-DUP7 962468-3 SOIL mg/L	LT-SB-DUP10 962671-2 SOIL mg/L	LT-SB-TP-05 962266-2 SOIL mg/L	LT-SB-TP-07 961777-0001 SOIL mg/L	LT-SB-FB-03 962235-2 WATER mg/L	LT-SB-FB-5 962336-1 WATER mg/L
Arsenic	0.41 E		0.06 E			
Barium			4.1 E	0.7		
Cadmium	0.02	0.01	0.04 E	0.11 E		
Chromium			0.03 E		R	
Lead	0.17 E		R	0.06	R	
Selenium			0.1 E		R	
Silver			R		R	
Mercury			R			

NOTES:
Blank Space - analyte analyzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302405

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

TCLP DATA
INORGANICS

INORGANICS Sample ID No. Lab Number Matrix Units	LT-SB-FB-7 962255-2 WATER mg/L	LT-SB-FB-8 962337-1 WATER mg/L	LT-SB-FB-9 962368-1 WATER mg/L	LT-SB-FB-12 962416-1 WATER mg/L	LT-SB-FB-14 962416-2 WATER mg/L	LT-SB-FB-15 962438-1 WATER mg/L
Arsenic						
Barium						
Cadmium						
Chromium						
Lead						
Selenium						
Silver					0.04	
Mercury						

NOTES:
Blank Space - analyte analyzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302406

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: MAXIM TECHNOLOGIES

TCLP DATA
INORGANICS

INORGANICS Sample ID No. Lab Number Matrix Units	LT-SB-FB-17 962454-1 WATER mg/L	LT-SB-FB-18 962454-2 WATER mg/L	LT-SB-FB-19 962468-1 WATER mg/L	LT-SB-FB-23 962566-1 WATER mg/L	LT-SB-FB-25 962671-4 WATER mg/L
Arsenic					
Barium					
Cadmium					
Chromium					
Lead					
Selenium					
Silver					
Mercury					

NOTES:
Blank Space - analyte analyzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302407

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Core

TCLP DATA
ORGANICS

ORGANICS						
Sample ID No.	LT-SB-03B	LT-SB-17	LT-SB-27	LT-SB-40	LT-SB-41	LT-SB-DUP03
Lab Number	962368-3	962416-3	962671-7	962468-2	962671-1	962368-4
Matrix	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
chlordane						
endrin						
heptachlor						
heptachlor epoxide						
gamma-BHC						
methoxychlor						
toxaphene						
2,4-D						
2,4,5-TP						
1,4-dichlorobenzene						
2,4-dinitrotoluene						
hexachlorobenzene						
hexachlorobutadiene						
hexachloroethane						
nitrobenzene						
pyridine						
2-methylphenol						
3 & 4 methylphenol						
pentachlorophenol						
2,4,5-trichlorophenol						
2,4,6-trichlorophenol						
benzene						
carbon tetrachloride						
chlorobenzene						
chloroform						
1,1-dichloroethane						
1,2-dichloroethane						

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Core

TCLP DATA
ORGANICS

ORGANICS Sample ID No. Lab Number Matrix Units	LT-SB-03B 962368-3 SOIL ug/L	LT-SB-17 962416-3 SOIL ug/L	LT-SB-27 962671-7 SOIL ug/L	LT-SB-40 962468-2 SOIL ug/L	LT-SB-41 962671-1 SOIL ug/L	LT-SB-DUP03 962368-4 SOIL ug/L
1,2-dichloropropane						
1,1-dichloroethene						
cis-1,2-dichloroethene						
methyl ethyl ketone						
tetrachloroethene						
1,1,1-trichloroethane						
trichloroethene						
trichlorofluoromethane						
vinyl chloride						

NOTES:
Blank Space - analyte analyzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302409

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Core

TCLP DATA
ORGANICS

ORGANICS				
Sample ID No.	LT-SB-DUP07	LT-SB-DUP10	LT-SB-TP-05	LT-SB-TP-07
Lab Number	962468-3	962671-2	962266-2	962276-1
Matrix	SOIL	SOIL	SOIL	SOIL
Units	ug/L	ug/L	ug/L	ug/L
chlordane				
endrin				
heptachlor				
heptachlor epoxide				
gamma-BHC				
methoxychlor				
toxaphene				
2,4-D				
2,4,5-TP				
1,4-dichlorobenzene				
2,4-dinitrotoluene				
hexachlorobenzene				
hexachlorobutadiene				
hexachloroethane				
nitrobenzene				
pyridine				
2-methylphenol				
3 & 4 methylphenol				
pentachlorophenol				
2,4,5-trichlorophenol				
2,4,6-trichlorophenol				
benzene				
carbon tetrachloride				
chlorobenzene				
chloroform				
1,1-dichloroethane			NA	NA
1,2-dichloroethane				

SITE NAME: LI TUNGSTEN
PROJECT #: 8001-202
EPA CASE NO.: NA
LAB NAME: Core

TCLP DATA
ORGANICS

ORGANICS				
Sample ID No.	LT-SB-DUP07	LT-SB-DUP10	LT-SB-TP-05	LT-SB-TP-07
Lab Number	962468-3	962671-2	962266-2	962276-1
Matrix	SOIL	SOIL	SOIL	SOIL
Units	ug/L	ug/L	ug/L	ug/L
1,2-dichloropropane			NA	NA
1,1-dichloroethene				
cis-1,2-dichloroethene			NA	NA
methyl ethyl ketone				
tetrachloroethene				
1,1,1-trichloroethane			NA	NA
trichloroethene				
trichlorofluoromethane			NA	NA
vinyl chloride				

NOTES:
Blank Space - analyte analyzed for, but not detected
E - estimated value
J - estimated value, analyte present below CRDL but above IDL
R - analysis did not pass EPA QA/QC
NR - analysis not required

302411

APPENDIX O

302412

Appendix O

Risk Assessment Tables

APPENDIX O
HUMAN HEALTH EVALUATION

- Data Utilization
- Respirable Particulate Models
- Home-Grown Produce Model
- Concentration-Toxicity Screen and Chemicals of Potential of Concern Selection
- Essential Nutrient Screen
- Indoor Shower Model
- Radiological Risk - RAGS Exposure and Risk Summaries
- Radiological Risk - RES-RAD Exposure and Risk Summaries
- Chemical Risk - Exposure and Risk Summaries
- Toxicological Profiles

DATA UTILIZATION

Before calculating 95% upper confidence limits (UCL) on the arithmetic average concentrations of the chemicals of potential concern, the Shapiro and Wilk W test (for sample sizes ≥ 10 and ≤ 50) or D'Agostino's D test (for samples sizes > 50) were run on the data to determine if the data sets are consistent with a normal or lognormal distribution (Gilbert, 1987).

If the data set was found to be consistent with the lognormal distribution, the 95% UCL concentration was calculated from the following equation (USEPA, 1992):

$$UCL = e^{\{x + 0.5s^2 + sH/(n-1)^{1/2}\}}$$

where:

UCL	=	95% upper confidence limit on the arithmetic average
e	=	constant (base of the natural log)
x	=	the arithmetic average of the transformed data
s	=	the standard deviation of the transformed data
H	=	statistic for a one-sided 95% confidence limit on a lognormal average
n	=	sample size

If the data set was found to be consistent with the normal distribution, the 95% UCL was calculated from the following equation (USEPA, 1992):

$$UCL = x + t(s/n^{1/2})$$

where:

x	=	the arithmetic average of the data
s	=	the standard deviation of the data
t	=	Student-t statistic
n	=	sample size

The results of the W or D tests, the maximum detected concentration, the appropriate 95% UCL concentration, and the exposure point concentration for each chemical of potential concern with a sample size ≥ 10 in each medium are presented on the following pages.

References

Gilbert, R.O. 1987. Statistical Methods for Environmental Pollution Monitoring. New York, NY: Van Nostrand Reinhold. 320 p.

U.S. Environmental Protection Agency. 1992. Supplemental Guidance to RAGS: Calculating the Concentration Term. Publication 9285.7-08. Washington, DC: Office of Solid Waste and Emergency Response.

DISTRIBUTION ANALYSES - W-TEST RESULTS
SURFACE SOIL AREA A

RADIONUCLIDE/ CHEMICAL	SAMPLE SIZE	W-stat	CRITICAL VALUE $W_{0.05}$	DISTRIBUTION	95% UCL CONCENTRATION mg/kg	MAXIMUM DETECTED CONCENTRATION mg/kg	EXPOSURE POINT CONCENTRATION mg/kg
SOIL							
Uranium 238	22	0.32	0.911	NOT Normal	8.43E+00	1.10E+02	8.43E+00 UCLlog
Radium 226	22	0.41	0.911	NOT Normal	6.75E+00	4.10E+01	6.75E+00 UCLlog
Radium 228	22	0.39	0.911	NOT Normal	1.51E+02	5.30E+02	1.51E+02 UCLlog
Thorium 230	22	0.42	0.911	NOT Normal	1.04E+01	5.80E+01	1.04E+01 UCLlog
Thorium 232	22	0.47	0.911	NOT Normal	2.35E+01	9.30E+01	2.35E+01 UCLlog
Benzene	21	0.5900	0.908	NOT Normal	6.63E-03	1.00E-03	1.00E-03 MAX
Benzo(g,h,i)perylene	22	0.5000	0.911	NOT Normal	8.84E-01	4.70E+00	8.84E-01 UCLlog
Phenanthrene	22	0.7228	0.911	NOT Normal	2.00E+00	3.80E+00	2.00E+00 UCLlog
Benzo(a)pyrene	22	0.5800	0.911	NOT Normal	1.27E+00	3.90E+00	1.27E+00 UCLlog
Dibenz(a,h)anthracene	22	0.5500	0.911	NOT Normal	4.35E-01	1.30E+00	4.35E-01 UCLlog
PCBs	22	0.0549	0.911	NOT Normal	1.71E-01	1.02E+00	1.71E-01 UCLlog
Antimony	22	0.5900	0.911	NOT Normal	8.55E+00	2.19E+01	8.55E+00 UCLlog
Arsenic	14	0.6400	0.874	NOT Normal	3.68E+02	5.23E+02	3.68E+02 UCLlog
Barium	22	0.2769	0.911	NOT Normal	4.41E+02	6.40E+03	4.41E+02 UCLlog
Cobalt	22	0.4664	0.911	NOT Normal	6.63E+02	1.56E+03	6.63E+02 UCLlog
Copper	22	0.5750	0.911	NOT Normal	8.65E+02	1.63E+03	8.65E+02 UCLlog
Iron	22	0.5845	0.911	NOT Normal	3.22E+04	1.24E+05	3.22E+04 UCLlog
Lead	19	0.6949	0.901	NOT Normal	3.14E+02	6.88E+02	3.14E+02 UCLlog
Mercury	22	0.6702	0.911	NOT Normal	1.69E+00	3.50E+00	1.69E+00 UCLlog
Nickel	22	0.5417	0.911	NOT Normal	3.90E+02	1.10E+03	3.90E+02 UCLlog
Selenium	19	0.3782	0.901	NOT Normal	3.08E+01	1.49E+02	3.08E+01 UCLlog
Silver	16	0.6140	0.887	NOT Normal	1.27E+02	3.43E+01	3.43E+01 MAX

302416

DISTRIBUTION ANALYSES - W-TEST RESULTS
SURFACE SOIL AREA B&C

RADIONUCLIDE/ CHEMICAL	SAMPLE SIZE	W-stat	CRITICAL VALUE $W_{0.05}$	DISTRIBUTION	95% UCL CONCENTRATION mg/kg	MAXIMUM DETECTED CONCENTRATION mg/kg	EXPOSURE POINT CONCENTRATION mg/kg	
SOIL								
Uranium 238	34	0.52	0.933	NOT Normal	3.07E+02	4.70E+02	3.07E+02	UCLlog
Radium 226	34	0.55	0.933	NOT Normal	8.49E+01	2.50E+02	8.49E+01	UCLlog
Radium 228	34	0.53	0.933	NOT Normal	2.49E+02	4.20E+02	2.49E+02	UCLlog
Thorium 230	31	0.52	0.929	NOT Normal	2.14E+02	3.10E+02	2.14E+02	UCLlog
Thorium 232	31	0.50	0.929	NOT Normal	8.81E+01	2.20E+02	8.81E+01	UCLlog
Benzo(g,h,i)perylene	19	0.9242	0.901	Normal	2.19E+02	3.10E-01	2.19E-01	UCLnorm
Phenanthrene	19	0.9327	0.901	Normal	2.47E+02	4.00E-01	2.47E-01	UCLnorm
PCBs	18	0.4767	0.897	NOT Normal	9.42E+00	1.59E+01	9.42E+00	UCLlog
Antimony	19	0.2732	0.901	NOT Normal	4.34E+03	5.61E+03	4.34E+03	UCLlog
Arsenic	17	0.5266	0.892	NOT Normal	3.08E+05	6.30E+03	6.30E+03	MAX
Cobalt	19	0.5434	0.901	NOT Normal	1.31E+04	4.62E+03	4.62E+03	MAX
Copper	19	0.7974	0.901	NOT Normal	3.40E+04	4.61E+03	4.61E+03	MAX
Iron	19	0.7780	0.901	NOT Normal	1.85E+05	3.13E+05	1.85E+05	UCLlog
Lead	19	0.5154	0.901	NOT Normal	2.97E+08	1.96E+04	1.96E+04	MAX
Manganese	18	0.5878	0.897	NOT Normal	2.44E+05	9.00E+04	9.00E+04	MAX
Mercury	19	0.6420	0.901	NOT Normal	8.23E+00	8.40E+00	8.23E+00	UCLlog
Nickel	19	0.3307	0.901	NOT Normal	2.69E+04	2.20E+04	2.20E+04	MAX
Silver	18	0.8375	0.901	NOT Normal	1.18E+04	1.14E+02	1.14E+02	MAX
Thallium	19	0.4888	0.901	NOT Normal	4.94E+00	2.27E+01	4.94E+00	UCLlog

302417

DISTRIBUTION ANALYSES - W-TEST RESULTS
ALL SOILS AREA A

RADIONUCLIDE/ CHEMICAL	SAMPLE SIZE	W-stat	CRITICAL VALUE $W_{0.05}$	DISTRIBUTION	95% UCL CONCENTRATION mg/kg	MAXIMUM DETECTED CONCENTRATION mg/kg	EXPOSURE POINT CONCENTRATION mg/kg
SOIL							
Uranium 238	34	0.26	0.911	NOT Normal	3.39E+00	1.10E+02	3.39E+00 UCLlog
Radium 226	34	0.51	0.933	NOT Normal	3.89E+00	4.10E+01	3.89E+00 UCLlog
Radium 228	34	0.31	0.933	NOT Normal	2.59E+01	5.30E+02	2.59E+01 UCLlog
Thorium 230	34	0.35	0.933	NOT Normal	4.08E+00	5.80E+01	4.08E+00 UCLlog
Thorium 232	34	0.38	0.933	NOT Normal	7.40E+00	9.30E+01	7.40E+00 UCLlog
Benzene	34	0.58	0.933	NOT Normal	6.26E-03	1.00E-03	1.00E-03 MAX
Benzo(g,h,i)perylene	35	0.45	0.934	NOT Normal	8.69E-01	6.90E+00	8.69E-01 UCLlog
Phenanthrene	35	0.30	0.934	NOT Normal	2.63E+00	3.30E+01	2.63E+00 UCLlog
Benzo(a)anthracene	35	0.36	0.934	NOT Normal	7.65E-01	9.90E+00	7.65E-01 UCLlog
Benzo(a)pyrene	35	0.60	0.934	NOT Normal	1.02E-01	3.90E+00	1.02E+00 UCLlog
Benzo(b)fluoranthene	35	0.48	0.934	NOT Normal	2.38E+00	1.40E+01	2.38E+00 UCLlog
Dibenz(a,h)anthracene	35	0.36	0.934	NOT Normal	4.40E-01	1.30E+00	4.40E-01 UCLlog
Indeno(1,2,3-cd)pyrene	35	0.49	0.934	NOT Normal	8.78E-01	6.30E+00	8.78E-01 UCLlog
PCBs	35	0.35	0.934	NOT Normal	9.51E-02	1.02E+00	9.51E-02 UCLlog
Antimony	35	0.55	0.934	NOT Normal	5.85E+00	2.19E+01	5.85E+00 UCLlog
Arsenic	24	0.57	0.916	NOT Normal	1.68E+02	5.23E+02	1.68E+02 UCLlog
Barium	35	0.23	0.934	NOT Normal	2.03E+02	6.40E+03	2.03E+02 UCLlog
Cobalt	35	0.37	0.934	NOT Normal	1.58E+02	1.56E+03	1.58E+02 UCLlog
Copper	35	0.49	0.934	NOT Normal	2.88E+02	1.63E+03	2.88E+02 UCLlog
Iron	35	0.55	0.934	NOT Normal	2.33E+04	1.24E+05	2.33E+04 UCLlog
Lead	28	0.70	0.924	NOT Normal	2.34E+02	6.88E+02	2.34E+02 UCLlog
Mercury	35	0.61	0.934	NOT Normal	7.79E-01	3.50E+00	7.79E-01 UCLlog
Nickel	35	0.45	0.934	NOT Normal	1.41E+02	1.10E+03	1.41E+02 UCLlog
Selenium	30	0.35	0.927	NOT Normal	1.61E+01	1.49E+02	1.61E+01 UCLlog
Silver	23	0.51	0.914	NOT Normal	2.02E+01	3.43E+01	2.02E+01 UCLlog

DISTRIBUTION ANALYSES - W-TEST RESULTS
ALL SOILS AREA B

RADIONUCLIDE/ CHEMICAL	SAMPLE SIZE	W-stat	CRITICAL VALUE $W_{0.05}$	DISTRIBUTION	95% UCL CONCENTRATION mg/kg	MAXIMUM DETECTED CONCENTRATION mg/kg	EXPOSURE POINT CONCENTRATION mg/kg
SOIL							
Uranium 238	16	0.84	0.887	NOT Normal	2.00E+00	3.70E+00	2.00E+00 UCLlog
Radium 226	16	0.83	0.887	NOT Normal	2.47E+00	5.00E+00	2.47E+00 UCLlog
Radium 228	16	0.36	0.887	NOT Normal	6.89E+00	4.80E+01	6.89E+00 UCLlog
Thorium 230	16	0.70	0.887	NOT Normal	2.95E+00	7.80E+00	2.95E+00 UCLlog
Thorium 232	16	0.50	0.887	NOT Normal	3.85E+00	1.60E+01	3.85E+00 UCLlog
Benzene	12	0.9034	0.859	Normal	6.07E-03	4.00E-03	4.00E-03 MAX
Benzo(g,h,i)perylene	12	0.7288	0.859	NOT Normal	2.53E-01	8.30E-02	8.30E-02 MAX
Phenanthrene	12	0.7988	0.859	NOT Normal	2.58E-01	8.60E-02	8.60E-02 MAX
Antimony	12	0.4377	0.859	NOT Normal	9.85E+02	4.16E+02	4.16E+02 UCLlog
Arsenic	12	0.6062	0.859	NOT Normal	4.62E+03	1.79E+03	1.79E+03 MAX
Cobalt	12	0.3520	0.859	NOT Normal	5.58E+03	4.66E+03	4.66E+03 MAX
Copper	12	0.6467	0.859	NOT Normal	6.99E+03	2.16E+03	2.16E+03 MAX
Lead	12	0.5599	0.859	NOT Normal	1.99E+04	3.71E+03	3.71E+03 MAX
Manganese	12	0.5337	0.859	NOT Normal	2.25E+03	5.68E+03	2.25E+03 UCLlog
Mercury	12	0.6708	0.859	NOT Normal	2.18E+00	1.80E+00	1.80E+00 MAX
Nickel	12	0.3339	0.859	NOT Normal	5.70E+04	2.89E+04	2.89E+04 MAX
Silver	8	0.6994	0.818	NOT Normal	2.62E+04	1.03E+02	1.03E+02 MAX

DISTRIBUTION ANALYSES - W-TEST RESULTS
ALL SOILS AREA B&C

RADIONUCLIDE/ CHEMICAL	SAMPLE SIZE	W-stat	D-stat	CRITICAL VALUE $W_{0.05}$	$Y_{0.025}$	$Y_{0.975}$		DISTRIBUTION	95% UCL CONCENTRATION mg/kg	MAXIMUM DETECTED CONCENTRATION mg/kg	EXPOSURE POINT CONCENTRATION mg/kg	
SOIL												
Uranium 238	67		-35.07		-2.67	1.152	FALSE	Not Normal	3.93E+01	4.70E+02	3.93E+01	UCLlog
Radium 226	67		-33.67		-2.67	1.158	FALSE	Not Normal	2.00E+01	2.50E+02	2.00E+01	UCLlog
Radium 228	67		-34.51		-2.67	1.158	FALSE	Not Normal	4.33E+01	4.20E+02	4.33E+01	UCLlog
Thorium 230	67		-33.95		-2.68	1.139	FALSE	Not Normal	3.77E+01	3.10E+02	3.77E+01	UCLlog
Thorium 232	67		-38.31		-2.68	1.139	FALSE	Not Normal	1.92E+01	2.20E+02	1.92E+01	UCLlog
Benzo(g,h,i)perylene	37	0.3382		0.936				NOT Normal	2.66E-01	3.10E-01	2.66E-01	UCLlog
Phenanthracene	37	0.4078		0.936				NOT Normal	3.00E-01	4.60E-01	3.00E-01	UCLlog
PCBs	35	0.3415		0.934				NOT Normal	1.26E+00	1.59E+01	1.26E+00	UCLlog
Antimony	37	0.2523		0.936				NOT Normal	1.12E+03	5.61E+03	1.12E+05	UCLlog
Arsenic	34	0.4881		0.933				NOT Normal	4.12E+04	6.30E+03	6.30E+03	MAX
Cobalt	37	0.3939		0.936				NOT Normal	1.05E+03	4.62E+03	1.05E+03	UCLlog
Copper	36	0.6641		0.935				NOT Normal	5.65E+03	4.61E+03	4.61E+03	MAX
Iron	37	0.6517		0.936				NOT Normal	8.33E+04	3.13E+05	8.33E+04	UCLlog
Lead	37	0.4001		0.936				NOT Normal	5.67E+05	1.96E+04	1.96E+04	MAX
Manganese	35	0.4296		0.934				NOT Normal	1.99E+04	9.00E+04	1.99E+04	UCLlog
Mercury	37	0.5410		0.936				NOT Normal	2.98E+00	8.40E+00	2.98E+00	UCLlog
Nickel	37	0.2352		0.936				NOT Normal	1.57E+03	2.20E+04	1.57E+03	UCLlog
Silver	36	0.6926		0.935				NOT Normal	5.71E+02	1.14E+02	1.14E+02	MAX

DISTRIBUTION ANALYSES - W-TEST RESULTS
ALL SOILS AREA C

RADIONUCLIDE/ CHEMICAL	SAMPLE SIZE	W-stat	CRITICAL VALUE $W_{0.05}$	DISTRIBUTION	95% UCL CONCENTRATION mg/kg	MAXIMUM DETECTED CONCENTRATION mg/kg	EXPOSURE POINT CONCENTRATION mg/kg
SOIL							
Uranium 238	21	0.53	0.908	NOT Normal	7.40E+00	2.70E+01	7.40E+00 UCLlog
Radium 226	21	0.65	0.908	NOT Normal	3.83E+00	9.70E+00	3.83E+00 UCLlog
Radium 228	21	0.38	0.908	NOT Normal	4.91E+00	3.70E+01	4.91E+00 UCLlog
Thorium 230	21	0.64	0.908	NOT Normal	4.41E+00	1.30E+01	4.41E+00 UCLlog
Thorium 232	21	0.46	0.908	NOT Normal	4.09E+00	2.40E+01	4.09E+00 UCLlog
Benzene	13	0.7419	0.866	NOT Normal	7.08E-03	2.00E-03	2.00E-03 MAX
Benzo(g,h,i)perylene	15	0.4993	0.881	NOT Normal	7.95E+00	3.20E-01	3.20E-01 MAX
Phenanthracene	15	0.4984	0.881	NOT Normal	7.16E+00	3.20E-01	3.20E-01 MAX
PCBs	15	0.5286	0.881	NOT Normal	1.12E+00	2.89E+00	1.12E+00 UCLlog
Antimony	15	0.8769	0.881	NOT Normal	1.56E+05	3.49E+03	3.49E+03 MAX
Arsenic	14	0.7977	0.874	NOT Normal	9.92E+03	2.95E+03	2.95E+03 MAX
Barium	15	0.7337	0.881	NOT Normal	8.52E+02	1.35E+03	8.52E+02 UCLlog
Beryllium	15	0.3095	0.881	NOT Normal	1.33E+00	1.10E+01	1.33E+00 UCLlog
Cobalt	15	0.5962	0.881	NOT Normal	1.44E+03	7.64E+02	7.64E+02 MAX
Copper	15	0.6631	0.881	NOT Normal	1.96E+04	6.74E+03	6.74E+03 MAX
Iron	15	0.9056	0.881	Normal	6.93E+04	1.44E+05	6.93E+04 UCLnorm
Lead	15	0.8174	0.881	NOT Normal	1.69E+04	5.14E+03	5.14E+03 MAX
Manganese	13	0.7096	0.866	NOT Normal	2.79E+03	2.93E+03	2.79E+03 UCLlog
Mercury	15	0.5889	0.881	NOT Normal	3.61E+01	2.95E+01	2.95E+01 MAX
Silver	15	0.7708	0.881	NOT Normal	9.44E+02	1.10E+02	1.10E+02 MAX

302421

DISTRIBUTION ANALYSES - W-TEST RESULTS (n</=50) D'Agostino TEST RESULTS (n>50)
GROUNDWATER

RADIONUCLIDE/ CHEMICAL	SAMPLE SIZE	W-stat	D-stat	CRITICAL VALUE $W_{0.05}$	$Y_{0.025}$	$Y_{0.975}$		DISRTIBUTION	95% UCL CONCENTRATION mg/l	MAXIMUM DETECTED CONCENTRATION mg/l	EXPOSURE POINT CONCENTRATION mg/l	
GROUNDWATER												
Uranium 238	60		-31.9467		-2.70	1.1	FALSE	Not Normal	8.30E+00	8.00E+01	8.30E+00	UCLlog
Radium 226	60		-6.6503		-2.70	1.1	FALSE	Not Normal	4.02E+00	1.10E+01	4.02E+00	UCLlog
Radium 228	60		-15.5470		-2.70	1.1	FALSE	Not Normal	2.42E+00	1.00E+01	2.42E+00	UCLlog
Thorium 230	59		-29.1210		-2.70	1.1	FALSE	Not Normal	1.14E+00	9.40E+00	1.14E+00	UCLlog
Thorium 232	59		-27.7752		-2.70	1.1	FALSE	Not Normal	9.53E-01	7.00E+00	9.53E-01	UCLlog
Benzene	59		-41.3469		-2.70	1.1	FALSE	Not Normal	9.87E-02	5.40E-01	9.87E-02	UCLlog
1,1-Dichloroethene	59		-39.6917		-2.70	1.1	FALSE	Not Normal	9.72E-02	6.50E-01	9.72E-02	UCLlog
1,2-Dichloroethene(total)	59		-38.5984		-2.70	1.1	FALSE	Not Normal	1.86E+01	1.50E+02	1.86E+01	UCLlog
Methylene Chloride	59		-49.3938		-2.70	1.1	FALSE	Not Normal	6.92E-01	1.20E+02	6.92E-01	UCLlog
Tetrachloroethene	59		-32.4041		-2.70	1.1	FALSE	Not Normal	1.45E+00	7.80E+00	1.45E+00	UCLlog
Trichloroethene	59		-37.4445		-2.70	1.1	FALSE	Not Normal	3.08E+00	3.10E+01	3.08E+00	UCLlog
1,1,1-Trichloroethane	59		-35.1163		-2.70	1.1	FALSE	Not Normal	9.08E-01	1.60E+01	9.08E-01	UCLlog
Vinyl Chloride	59		-38.4568		-2.70	1.1	FALSE	Not Normal	1.21E-01	9.60E-02	1.21E-01	UCLlog
Phenanthrene	59		-44.4871		-2.70	1.1	FALSE	Not Normal	1.08E-02	3.00E-03	1.08E-02	UCLlog
Antimony	60		-43.0237		-2.70	1.1	FALSE	Not Normal	3.89E-01	1.11E+01	3.89E-01	UCLlog
Arsenic	41	0.21		0.9410				Not Normal	4.95E-01	1.09E+01	4.95E-01	UCLlog
Cadmium	60		-44.2186		-2.70	1.1	FALSE	Not Normal	5.08E-02	1.16E+00	5.08E-02	UCLlog
Calcium	60		-10.3481		-2.70	1.1	FALSE	Not Normal	1.72E+02	5.54E+02	1.72E+02	UCLlog
Copper	60		-42.5234		-2.70	1.1	FALSE	Not Normal	3.47E+00	3.69E+01	3.47E+00	UCLlog
Lead	60		-17.3265		-2.70	1.1	FALSE	Not Normal	5.07E-01	8.36E-01	5.07E-01	UCLlog
Magnesium	60		-22.7202		-2.70	1.1	FALSE	Not Normal	4.19E+01	2.47E+02	4.19E+01	UCLlog
Mercury	57		-36.6855		-2.72	1.1	FALSE	Not Normal	1.02E-03	1.48E-02	1.02E-03	UCLlog
Nickel	60		-47.7800		-2.70	1.1	FALSE	Not Normal	1.87E+00	1.10E+02	1.87E+00	UCLlog
Sodium	59		-41.2518		-2.70	1.1	FALSE	Not Normal	3.58E+02	8.40E+03	3.58E+02	UCLlog

DISTRIBUTION ANALYSES - W-TEST RESULTS (n</=50) D'Agostino TEST RESULTS (n>50)
WHOLE SITE SURFACE SOIL[1]

RADIONUCLIDE/ CHEMICAL	SAMPLE SIZE	W-stat	D-stat	CRITICAL VALUE $W_{0.05}$	$Y_{0.025}$	$Y_{0.975}$		DISRTIBUTION	95% UCL CONCENTRATION mg/kg	MAXIMUM DETECTE CONCENTRATION mg/kg	EXPOSURE POINT CONCENTRATION mg/kg
							SOIL				
Benzo(b)flouranthene	58		-31.7227		-2.7106	1.1	FALSE	Not Normal	9.66E-01	1.00E+01	9.66-1 UCLlog
Pyrene	58		-29.4054		-2.7106	1.1	FALSE	Not Normal	1.03E+00	7.30E+00	1.03E+00 UCLlog
Endrin	45	0.426495		0.945				NOT Normal	6.49E-03	7.00E-02	6.49E-03 UCLlog
Total PCBs	57		-39.3119		-2.7164	1.1	FALSE	Not Normal	7.64E-01	1.59E+01	7.64E-01 UCLlog
Aluminum	58		-21.5317		-2.7106	1.1	FALSE	Not Normal	1.01E+04	5.66E+04	1.01E+04 UCLlog
Antimony	58		-37.9233		-2.7106	1.1	FALSE	Not Normal	1.26E+03	5.61E+03	1.26E+03 UCLlog
Arsenic	47	0.431211		0.946				NOT Normal	2.88E+03	6.30E+03	2.88E+03 UCLlog
Barium	58		-36.4914		-2.7106	1.1	FALSE	Not Normal	4.29E+02	6.40E+03	4.29E+02 UCLlog
Beryllium	58		-35.4227		-2.7106	1.1	FALSE	Not Normal	8.93E-01	1.10E+01	8.93E-01 UCLlog
Cadmium	58		-11.3939		-2.7106	1.1	FALSE	Not Normal	9.77E+00	2.39E+01	9.77E+00 UCLlog
Cobalt	58		-29.2248		-2.7106	1.1	FALSE	Not Normal	8.59E+02	4.66E+03	8.59E+02 UCLlog
Copper	58		-13.8358		-2.7106	1.1	FALSE	Not Normal	2.88E+03	4.61E+03	2.88E+03 UCLlog
Iron	58		-16.3352		-2.7106	1.1	FALSE	Not Normal	6.46E+04	3.13E+05	6.46E+04 UCLlog
Lead	55		-29.8927		-2.728	1.1	FALSE	Not Normal	2.57E+04	1.96E+04	1.96E+04 UCLlog
Magnesium	58		-34.0368		-2.7106	1.1	FALSE	Not Normal	6.87E+03	9.40E+04	6.87E+03 UCLlog
Manganese	56		-35.3848		-2.7222	1.1	FALSE	Not Normal	6.91E+03	9.00E+04	6.91E+03 UCLlog
Mercury	58		-17.0985		-2.7106	1.1	FALSE	Not Normal	2.47E+00	8.40E+00	2.47E+00 UCLlog
Nickel	58		-44.6659		-2.7106	1.1	FALSE	Not Normal	1.17E+03	2.89E+04	1.17E+03 UCLlog
Selenium	53		-22.3744		-2.7106	1.1	FALSE	Not Normal	6.47E+01	2.62E+02	6.47E+01 UCLlog
Silver	49	0.721098		0.947			FALSE	NOT Normal	3.77E+02	1.14E+02	1.14E+02 UCLlog
Thallium	58		-35.1383		-2.7106	1.1	FALSE	Not Normal	1.56E+00	2.27E+01	1.56E+00 UCLlog
Vanadium	58		-17.3254		-2.7106	1.1	FALSE	Not Normal	3.89E+01	1.65E+02	3.89E+01 UCLlog
Zinc	58		-14.1748		-2.7106	1.1	FALSE	Not Normal	6.80E+02	2.90E+03	6.80E+02 UCLlog

1: UCL Values Used in the Ecological Risk Assessment

302423

RESPIRABLE PARTICULATES MODELS

Current Off-Site Residents

Exposed areas at the site have the potential to emit fugitive dust due to the action of the wind. This process of wind erosion can result in the transport of the contaminated dust particles downwind. Dust particles with an aerodynamic diameter below PM_{10} can be inhaled. In order to determine the fate of these inhalable particles, it is necessary to estimate the ambient air concentrations at downwind locations due to the wind-driven transport. The downwind air concentrations of PM_{10} due to this process were determined using a USEPA-approved atmospheric dispersion model and modeling techniques. The model was used to estimate annual average PM_{10} air concentrations at nearby residential lots due to the wind erosion of contaminated surface soil from the site.

Analyses at off-site residential locations were performed to determine the ambient air concentrations of respirable particulates due to the emissions of fugitive dust from wind erosion. The analyses yielded two parameters: the emission flux due to wind erosion and the normalized ambient air PM_{10} impact.

Since different exposure point concentrations were developed for different areas of the site due to different levels of contamination, the model considers the emissions from multiple ground level area sources, and the resulting impact at five receptor locations. For sites with such multiple sources, the USEPA recommends the Industrial Source Complex model (ISC3). ISC3 (USEPA, 1995a) is capable of predicting impacts for sites with multiple sources and source types, using actual meteorological data. The short-term version, ISCST3 (Version 96113), which can predict 1-hour to annual average impacts, was used to predict annual average PM_{10} concentrations at five nearby residential locations. The area sources and receptor locations are shown on Figure O-1.

The ISCST3 model requires four types of model input:

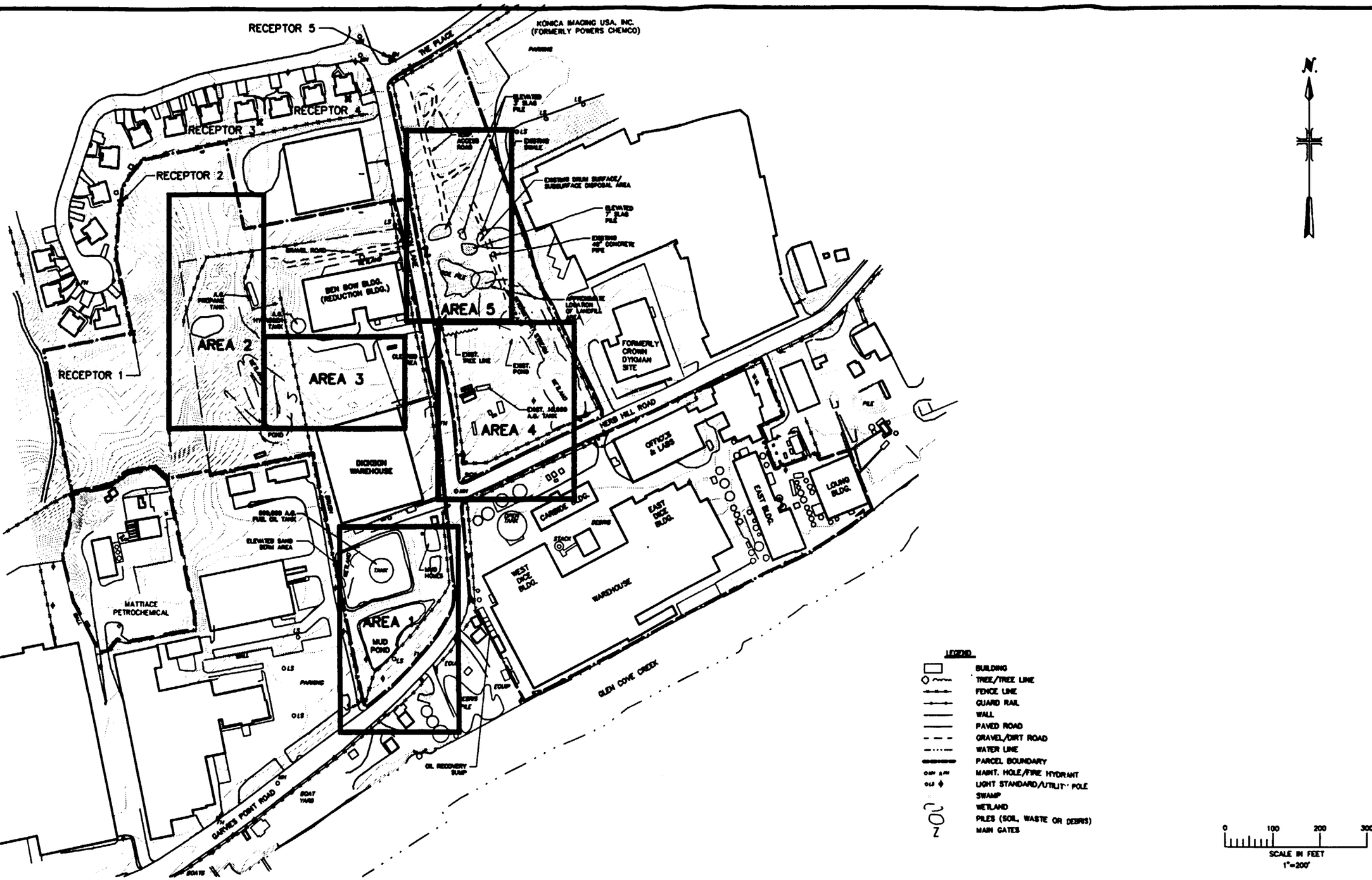
- source parameters (source type, size, emission characteristics, etc.)
- receptors (location with respect to sources, elevation)
- meteorology
- model options.

Source parameters The site was broken up into five rectangular area sources (see Figure A-1), each characterized by different soil data sets.

Receptors Five receptor locations representing the nearby residential community were selected for the analysis. The receptor locations were at ground level. The ISCST3 model does not consider the effects of terrain for area sources; therefore, terrain was not included in the analysis.

Meteorology Since ISCST3 has the ability to use actual meteorological data to predict impacts, actual historical hourly surface meteorological data collected from 1987 to 1991, from the National Weather Service station at LaGuardia Airport, Queens N.Y., were used in the analysis. Upper air data for the same five years were from Atlantic City, N.J.

302424



MALCOLM PIRNIE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

LI TUNGSTEN REMEDIAL INVESTIGATION
GLEN COVE, NEW YORK
USEPA REGION II ARCS
CONTRACT NO. 68-W9-0051; W.A. NO. 025-2L4L

DATE: MAY 1998

SCHEMATIC OF MODEL SET-UP

PROJECT NO.: 8001202

FIGURE 0-1

7308

I:\ACAD\PROJ\80012020\GSFILES\REPORT\LTFIGO-1 Date: 05/06/1998 Time: 11:29

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Model Options The analysis was run in the rural mode based on a review of aerial photographs of the site. The model was used in the concentration mode, to obtain annual average concentrations from each of the five sources at each of the five receptor locations for each of the five years of meteorological data. The maximum annual average impacts, (over the five years of data) regardless of meteorology, at each receptor were used in the human health evaluation.

Emission flux Area sources require emission input in units of mass emission rate per unit area, i.e., emission flux. Wind-generated emission fluxes were based upon a methodology developed for the USEPA for Superfund sites (USEPA, 1992). Based upon the site-specific soil data, the equations for an "unlimited reservoir" scenario were used for each area source. The emission flux equation (from USEPA, 1992) is:

$$E_{10} = 0.036\,(1-V)\,[\,u/u_t\,]^3\,F(x)$$

where E_{10} = PM_{10} annual emission flux, g/m^2-h
V = fraction of contaminated surface with continuous vegetative cover (0 for bare soil)
u = mean annual wind speed, m/s
u_t = equivalent threshold windspeed at 7 m anemometer height, m/s
where $u_t = 18.1\ u^*_t/100$
u^*_t = 37.5 cm/s
$F(x)$ = function of x, where $x = 0.886\ u_t/u$.

The mean annual wind speed, 5.8 m/s, was based upon monitored data from LaGuardia Airport. The equivalent threshold speed, u_t, was determined to be 6.79 m/s. F(x) was found to be 1.56 (USEPA, 1992). Since each of the five source areas have varying degrees of vegetation which can inhibit the erosion of the soil, emission flux was calculated for each area. Based upon visual characterizations of the areas, areas 1,4, and 5, which have large amounts of bare soil, were conservatively assumed to have no vegetative cover (i.e., V = 0). Area 3 was assumed to have 25% coverage (V = 0.25), while Area 2 was assumed to have 50% vegetative coverage (V = 0.5).

The emission fluxes for each of the areas is shown in Table O-1. Each area source was modeled at a unitized emission flux, resulting in a normalized model output in units of ug/m^3 per $g/s\text{-}m^2$.

In order to determine the annual average PM_{10} concentrations from each source at each of the receptor locations, the emission flux at each source area is then multiplied by the maximum normalized annual average PM_{10} impacts. The results of the modeling are presented in Table O-1. The table shows the annual average PM_{10} air concentrations at each of the five receptors for each of the five source areas. The annual average PM_{10} impacts ranged from 0.345 $\mu g/m^3$ to 6.19 $\mu g/m^3$.

The concentrations of radionuclides and chemicals of potential concern in surface soil at each source area are then loaded onto the annual average PM_{10} concentration for each receptor. Exposure

Table O-1

Fugitive Dust Generation for Li Tungsten

Unlimited Reservoir Formula - Maximum Annual Average PM_{10} Impacts

Source: EPA450/1-92-002

Source No.	Source Area (m^2)	V	Emission Flux ($g/h\text{-}m^2$)	Emission Flux ($g/s\text{-}m^2$)	Maximum Normalized Annual Average PM_{10} Impacts * (ug/m^3 per $g/s\text{-}m^2$)					Annual Average PM_{10} Impacts (ug/m^3)				
					Receptor 1	Receptor 2	Receptor 3	Receptor 4	Receptor 5	Receptor 1	Receptor 2	Receptor 3	Receptor 4	Receptor 5
1	9677	0	3.50E-02	9.73E-06	6.16E+04	5.66E+04	1.11E+05	1.57E+05	1.38E+05	6.00E-01	5.51E-01	1.08E+00	1.53E+00	1.34E+00
2	8388	0.5	1.75E-02	4.87E-06	1.04E+06	3.85E+05	8.35E+05	4.08E+05	2.86E+05	5.08E+00	1.87E+00	4.06E+00	1.99E+00	1.39E+00
3	5616	0.25	2.63E-02	7.30E-06	8.96E+04	5.73E+04	2.10E+05	2.51E+05	1.91E+05	6.54E-01	4.18E-01	1.53E+00	1.83E+00	1.39E+00
4	10260	0	3.50E-02	9.73E-06	5.56E+04	3.55E+04	8.55E+04	1.77E+05	2.09E+05	5.41E-01	3.45E-01	8.32E-01	1.73E+00	2.03E+00
5	8044	0	3.50E-02	9.73E-06	1.32E+05	6.90E+04	1.06E+05	3.54E+05	6.36E+05	1.29E+00	6.72E-01	1.04E+00	3.44E+00	6.19E+00

Notes:

* From 5-year meteorological database

$E_{10} = 0.036 * (1-V) * (u/u_t)^3 * F(x)$ (unlimited reservoir, annual average emission flux)

Parameter	Value	Definition	Units	Source
E_{10}	calculated	PM10 annual emission flux	$g/h\text{-}m^2$	EPA450/1-92-002
V	site-specific	Fraction of vegetative cover		J Guerriero comments
u	5.80	Mean annual wind speed at 10m	m/s	LaGuardia Data corrected for 10m
u_t	6.79	Equivalent threshold windspeed at 7m = 18.1 $(u^*_t)/100$	m/s	EPA450/1-92-002
u'_t	25.00	Figure 1a	cm/s	EPA450/1-92-002/J. Guerriero
u^*_t	37.50	u'_t x Correction Factor	cm/s	EPA450/1-92-002
L	0.10	Default	dimensionless	EPA450/1-92-002
Corr. Facto	1.50	Assumes L = 0.10	dimensionless	EPA450/1-92-002
x	1.04	$0.886 \times u_t / u$	dimensionless	EPA450/1-92-002
F(x)	1.56	Function in Figure 2	dimensionless	EPA450/1-92-002

302427

point concentrations for surface soil at Areas B, B&C, and C are used. Area A is omitted because the majority of Area A is covered with cement and asphalt. The radionuclide and chemical specific PM_{10} concentrations are then summed for each receptor location and the maximum is used in the human health evaluation.

Future Construction Worker

The methodology to evaluate the potential exposure of workers to respirable particulates emitted during the course of excavating soil during construction or utility maintenance activities is described below. The modeling required determination of an emission rate, an emission flux, and the concentration of respirable particulates in the ambient air at the excavation.

Emission Rate and Emission Flux

The emission rate calculation considered the digging of an 1.5 m wide x 5.0 m long x 2.0 m deep excavation by a bulldozer. A bulldozer was assumed for this analysis since an emission rate equation is available for a bulldozer and not a backhoe. Only emissions from the digging of the excavation were calculated; the soil removed from the excavation was assumed to be placed on the side of the excavation and covered to prevent wind-generated respirable particulates.

The following equation (USEPA, 1989) was used to derive an emission rate (in g/s) for respirable particulates:

$$[0.45\ (s)^{1.5}\ (M)^{-1.4}]$$

where:

s = silt content of the soil in weight %
M = moisture content of the soil in weight %

Since the exposure point concentrations in soil are for all surface and subsurface soil, silt content and moisture content data obtained during the RI for all surface and subsurface soil are used. A silt content of 25.91 % is used; this value represents the average of the data that pass through the 200 sieve. All samples collected for grain size analysis were used to calculate the average. A moisture content of 14.71 % is used; this value represents the average moisture content, as reported for the pesticides/PCBs analyses, of all the surface and subsurface soil data for Areas A, B, B&C, and C. Solving the above equation resulted in a respirable particulate emission rate of 0.38 g/s, as presented below:

$= [0.45\ (25.9)^{1.5}\ (14.7)^{-1.4}]$
$= [0.45\ (132)\ (0.023)]$
$= 1.37$ kg/hour
$= 0.38$ g/s

An emission flux of 0.05 g/s-m^2 was derived by dividing the emission rate by the surface area of the excavation (0.38 g/s ÷ 7.5 m^2).

Air Concentrations

Ambient air concentrations for workers exposed to the enhanced excavation emissions were determined using the USEPA-approved Point, Area and Line source (PAL2.1) model, version 89272, (USEPA, 1987) assuming that the excavation represents an area source of emissions. Unlike other area source models, such as the Industrial Source Complex (ISC) model and SCREEN3, PAL2.1 has the capability of determining impacts above area sources, as well as downwind of a source. PAL2.1 is a diverse model that can be used to estimate dispersion for point, area and line sources using Gaussian-plume steady-state assumptions. Simultaneous modeling of multiple sources and source types can be performed to calculate impacts of non-reactive chemicals at a large number of receptors. Also, user-specified meteorological options allow for input of site-specific conditions that are representative of the site being modeled.

For this analysis, the source was modeled as a 1.5 m x 5.0 m flat area source. A total of nine receptors were used in the analysis. Eight receptors were placed along the edge of the excavation; one at each of the four corners, and one at the center of each side. In addition, one receptor was placed over the center of the excavation. All receptors were placed at a height of 1.8 m to simulate the height of a worker. The meteorological data consisted of an array of 54 meteorological conditions as used in the USEPA-approved screening level model, SCREEN3 (USEPA, 1995b). These conditions represented 54 combinations of stability classes (1 to 6) and wind speeds (1 m/s to 20 m/s) that could occur in the atmosphere. The wind directions were set so that the wind would blow directly towards each of the receptors. Model options selected for the analysis included: a typical anemometer height of 6.1 meters, a mixing height of 5000 m, and an average temperature of 293 °K. The wind was assumed to be constant below 10 meters (as fixed by PAL2.1). The analysis was performed for both the rural and urban land use classifications. The emission rate of the area source was set at 1 g/s-m^2. Output was then in the form of g/m^3 per g/s-m^2.

Results

The rural and urban modeling analyses predicted maximum 1-hour average unitized impacts of 0.0268 and 0.1302 g/m^3 per g/s-m^2, respectively, at the corners of the excavation. The maximum 1-hour average respirable particulate concentration (in kg/m^3) in the ambient air at the excavation was calculated from the following equation.

C = [1-hour unitized impact in g/m^3 per g/s-m^2] x [emission flux in g/s-m^2] x [0.001 kg/g]

Based on the rural land use classification, the maximum 1-hour average respirable particulate concentration is 1.34E-06 kg/m^3, as presented below.

$= [0.0268\ g/m^3 \text{ per } g/s\text{-}m^2] * [0.05\ g/s\text{-}m^2] * [0.001\ kg/g]$
$= 0.00000134\ kg/m^3$

Concentrations of the non-volatile chemicals of potential concern associated with this respirable particulate concentration are calculated in the Human Health Evaluation.

References

U.S. Environmental Protection Agency. 1995a. SCREEN3 Model User's Guide. EPA-454/B-95-004. Research Triangle Park, NC: U.S. Environmental Protection Agency.

U.S. Environmental Protection Agency. 1995b. User's Guide for the Industrial Source Complex (ISC3) Dispersion Models. EPA 454/B-95-003b.

U.S. Environmental Protection Agency. 1992. Guideline for Predictive Baseline Emissions Estimation Procedures for Superfund Sites. Air/Superfund NTGS Series. EPA-450/1-92-002.

U.S. Environmental Protection Agency. 1989. Estimation of Air Emissions from Clean-up Activities at Superfund Sites, Report ASF-3. Air Superfund National Technical Guidance Study Series. Volume. 3. Research Triangle Park, NC: U.S. Environmental Protection Agency.

U.S. Environmental Protection Agency. 1987. User's Guide for PAL 2.0. EPA-600/8-87/009. Research Triangle Park, NC: U. S. Environmental Protection Agency.

HOME-GROWN PRODUCE MODEL

Root Vegetables

The carrot serves as a surrogate for root vegetables grown in home gardens. Carrots are assumed to accumulate radionuclides of potential concern only through uptake from soil. It is further assumed that the carrots are washed before eaten, so that soil adherence to the carrots will not contribute to the chemical intake. To calculate chemical concentrations in carrots, the 95% UCL concentration or the maximum concentration in soil is multiplied by a radionuclide-specific root uptake factor (RUF).

RUFS for the radionulclides are based upon transfer coefficients developed by Baes et al. (1984) for tuber crops. The values presented in Table O-2 have been adjusted to reflect the wet weight of each vegetable or fruit. For carrots, the moisture content accounts for approximately 88% of the total wet weight (Baes et al., 1984). Therefore the transfer coefficient is multiplied by 12%. Additional factors affect the bioavailabilty of radionuclides and the extent of root uptake including characteristics of the plant (species, age) and the soil properties (pH, organic content, cation exchange capacity, concentration of other metals, temperature, and aeration). Thus, in the absence of information regarding site-specific soil characteristics, the calculated RUFS should be considered as best approximations.

Above-Ground Vegetables

To evaluate the potential exposure from eating "above-ground" vegetables and fruits (i.e., lettuce and tomatoes), the accumulation of radionuclides in the edible parts of the plant must be considered. The effective uptake of radionuclides from the soil depends upon the efficiency of root absorption and translocation to the edible portions. The radionuclide concentration in the edible portions of lettuce and tomato plants can be estimated by multiplying the 95% UCL concentrations or the maximum concentrations of each chemical of potential concern in soil by a plant uptake factor (PUF). Similarly to the roots, the potential for radionuclide translocation to the above-ground plant parts depends largely upon the characteristics of the radionuclide and the plant.

The PUFs for the uptake and translocation of the radionuclides to above-ground plant parts are based on transfer coefficients developed by Baes et al. (1984), similarly to those applied in evaluating carrots. Presented PUFs for radionuclides in lettuce are based upon transfer coefficients developed for vegetative plant parts (leaves and stems). The values presented in Table O-2 incorporate a dry-wet weight conversion factor assuming that lettuce typically has a 95% moisture content (Baes et al., 1984). For tomatoes, transfer coefficients developed for fruits were used in the intake estimates, assuming that the typical tomato has a 94% moisture content (Baes et al., 1984).

302431

TABLE O-2 ROOT AND PLANT UPTAKE FACTORS			
RADIONUCLIDE	PUF LETTUCE	RUF CARROTS	PUF TOMATOES
Uranium-238	4.25E-04	4.80E-04	5.10-04
Uranium-234	4.25E-04	4.80E-04	5.10-04
Thorium-230	4.25E-05	1.02E-05	5.10-05
Radium-226	7.50E-04	1.56E-04	9.00E-04
Lead-210	2.25E-03	1.08E-03	2.70E-03
Thorium-232	4.25E-05	1.02E-05	5.10-05
Radium-226	7.50E-04	1.56E-04	9.00E-04
Thorium-228	4.25E-05	1.02E-05	5.10-05

References

Baes, C.F., III, R.D. Sharp, A.L. Sjoreen and R.W. Shor. 1984. A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radio nuclides through Agriculture. ORNL-5786. Oak Ridge, TN: Oak Ridge National Laboratory.

CONCENTRATION-TOXICITY SCREEN AND CHEMICALS OF POTENTIAL CONCERN SELECTION

A concentration-toxicity screen was performed in accordance with USEPA guidance (USEPA, 1989). The purpose of the screen is to identify chemicals in a particular medium that most likely contribute significantly to the risk estimates. The screen is based on the maximum detected concentrations and USEPA toxicity criteria as represented by reference doses for non-carcinogenic effects and slope factors for carcinogenic effects. Individual chemical scores or risk factors are calculated by dividing the maximum detected concentration by the reference dose or multiplying by the slope factor. The individual risk factors are summed for a total risk factor and then the ratio of the individual risk factors to the total risk factor approximates the relative risk of each individual chemical. Chemicals with relative risk greater than 1% (0.01) are selected as chemicals of potential concern (COPC). Chemicals with relative risks less than 1% are eliminated from the human health evaluation.

The screen was performed using only oral toxicity criteria since no air quality data were collected. However, since inhalation of respirable particulates is a pathway of concern, for those chemicals with inhalation toxicity criteria a second concentration/toxicity screen was performed, but not presented here, to determine if chemicals in a particular medium may be likely to contribute significantly to the risk estimates for the inhalation pathway.

Chemicals with relative risks greater than 1% at any one area and that passed through the screen at greater concentrations at other areas are also selected as COPCs.

Chemicals without toxicity criteria were selected as CPOC if they could not be eliminated based on the other criteria (i.e., frequency of detection, background concentration, or nutrient screening concentration); they are evaluated qualitatively in the human health evaluation.

The results of the screen, including the reason for selection or elimination as COPC where not based solely on the screen, are presented on the following pages.

References

U.S. Environmental Protection Agency. 1989. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002. Washington, DC: Office of Emergency and Remedial Response.

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SURFACE SOIL AREA A

CHEMICAL	Frequency of Detection	Detected Concentrations Range mg/kg	Detected Concentrations Average mg/kg	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen Average Concentration mg/kg	Background Screen 2X Average mg/kg	Nutrient Screen mg/kg	Other Reason for Selection or Elimination
Acetone	3 / 22	0.055 - 0.19		1.00E-01	1.90	0.00	NO	--	D	0.00	0.00	NO				
Benzene	1 / 21	0.001		3.00E-03	0.33	0.00	NO	2.9E-02	A	0.00	0.00	NO				YES; A carcinogen
2-Butanone	5 / 21	0.007 - 0.052		6.00E-01	0.09	0.00	NO	--	D	0.00	0.00	NO				
Carbon Disulfide	2 / 21	0.001 - 0.007		1.00E-01	0.07	0.00	NO	--	--	0.00	0.00	NO				
Chloroform	1 / 21	0.003		1E-02	0.30	0.00	NO	6.1E-03	B2	0.00	0.00	NO				
1,2-Dichloroethane	1 / 21	0.002		3.00E-02	0.07	0.00	NO	9.10E-02	B2	0.00	0.00	NO				
1,1-Dichloroethene	1 / 21	0.006		9.00E-03	0.67	0.00	NO	6.00E-01	C	0.00	0.00	NO				
1,2-Dichloroethene (total)	1 / 21	0.004		9.00E-03	0.44	0.00	NO	--	--	0.00	0.00	NO				
Ethylbenzene	1 / 21	0.008		1.00E-01	0.08	0.00	NO	--	D	0.00	0.00	NO				
2-Hexanone	1 / 21	0.007		4.00E-02	0.18	0.00	NO	--	--	0.00	0.00	NO				
4-Methyl-2-Pentanone	1 / 21	0.003		8.00E-02	0.04	0.00	NO	--	--	0.00	0.00	NO				
Methylene Chloride	8 / 22	0.001 - 0.022		6E-02	0.37	0.00	NO	7.50E-03	B2	0.00	0.00	NO				
Tetrachloroethene	4 / 21	0.001 - 0.039		1E-02	3.90	0.00	NO	5.20E-02	WD	0.00	0.00	NO				
Toluene	1 / 21	0.005		2.00E-01	0.03	0.00	NO	--	D	0.00	0.00	NO				
1,1,1-Trichloroethane	1 / 21	0.006		2.00E-02	0.30	0.00	NO	--	D	0.00	0.00	NO				
Trichloroethene	1 / 21	0.003		6.00E-03	0.50	0.00	NO	1.10E-02	pending	0.00	0.00	NO				
Acenaphthene	6 / 22	0.064 - 0.64		6E-02	10.67	0.00	NO	--	D	0.00	0.00	NO				
Acenaphthylene	1 / 22	0.05		--	0.00	0.00	NO	--	D	0.00	0.00	NO				NO; no toxcrit, low f/d
Anthracene	10 / 22	0.022 - 0.7		3.00E-01	2.33	0.00	NO	--	D	0.00	0.00	NO				
Benzo(g,h,i)perylene	14 / 22	0.081 - 4.7		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit, f/d
Fluoranthene	20 / 22	0.048 - 10		4E-02	250	0.00	NO	--	D	0.00	0.00	NO				
Fluorene	5 / 22	0.074 - 0.57		4.00E-02	14.25	0.00	NO	--	D	0.00	0.00	NO				
Phenanthrene	16 / 22	0.071 - 3.8		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit, f/d
Pyrene	20 / 22	0.052 - 7.3		3E-02	243	0.00	NO	--	D	0.00	0.00	NO				
Benzo(a)anthracene	15 / 22	0.068 - 3.1		--	0.00	0.00	NO	7.30E-01	B2	2.26	0.00	NO				
Benzo(a)pyrene	16 / 22	0.043 - 3.9		--	0.00	0.00	NO	7.30E+00	B2	28.47	0.04	YES				
Benzo(b)fluoranthene	17 / 22	0.058 - 10		--	0.00	0.00	NO	7.30E-01	B2	7.30	0.01	YES				
Benzo(k)fluoranthene	8 / 22	0.081 - 1.5		--	0.00	0.00	NO	7.30E-02	B2	0.11	0.00	NO				
Chrysene	16 / 22	0.09 - 4		--	0.00	0.00	NO	7.30E-03	B2	0.03	0.00	NO				
Dibenz(a,h)anthracene	7 / 22	0.065 - 1.3		--	0.00	0.00	NO	7.30E+00	B2	9.49	0.01	YES				
Indeno(1,2,3-cd)pyrene	13 / 22	0.075 - 3.8		--	0.00	0.00	NO	7.30E-01	B2	2.77	0.00	NO				
bis(2-ethylhexyl)phthalate	10 / 22	0.051 - 16		2.00E-02	800	0.00	NO	1.40E-02	B2	0.22	0.00	NO				
Carbazole	4 / 22	0.09 - 1		--	0.00	0.00	NO	2.00E-02	B2	0.02	0.00	NO				
Dibenzofuran	5 / 22	0.046 - 0.83		4.00E-03	208	0.00	NO	--	D	0.00	0.00	NO				
Diethylphthalate	2 / 22	0.1 - 0.5		8.00E-01	0.63	0.00	NO	--	D	0.00	0.00	NO				
Dimethylphthalate	1 / 22	0.036		--	0.00	0.00	NO	--	D	0.00	0.00	NO				NO; no toxcrit, low f/d
2-Methylnaphthalene	5 / 22	0.048 - 0.61		4.00E-02	15.25	0.00	NO	--	D	0.00	0.00	NO				
Naphthalene	2 / 22	0.047 - 0.19		4.00E-02	4.75	0.00	NO	--	D	0.00	0.00	NO				
Pentachlorophenol	1 / 22	3.6		3E-02	120	0.00	NO	1.2E-01	B2	0.43	0.00	NO				
total PCBs	2 / 22	- 1.02		2.00E-05	51000	0.02	YES	2.00E+00	B2	2.04	0.00	NO				
Aluminum	22 / 22	2140 - 16900	6403	1.00E+00	16900	0.01	YES	--	--	0.00	0.00	NO	9790	19580		NO; < 2X
Antimony	6 / 22	2.3 - 21.9	14	4.00E-04	54750	0.02	YES	--	--	0.00	0.00	NO	1.6	3.2		
Arsenic	14 / 14	6.4 - 523	96	3.00E-04	1743333	0.57	YES	1.50E+00	A	784.50	0.99	YES	6.3	12.6		
Barium	22 / 22	11.3 - 6400	383	7E-02	91429	0.03	YES	--	--	0.00	0.00	NO	49.0	98.1		

302434

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SURFACE SOIL AREA A

CHEMICAL	Frequency of Detection	Detected Concentrations Range mg/kg	Average mg/kg	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen Average Concentration mg/kg	Background Screen 2X Average mg/kg	Nutrient Screen mg/kg	Other Reason for Selection or Elimination
Beryllium	12 / 22	0.22 - 1.1	0.49	5.00E-03	220	0.00	NO	4.30E+00	B2	4.73	0.01	YES	0.85	1.7		NO; < 2X
Cadmium	9 / 22	0.86 - 10.2	4.42	1.00E-03	10200	0.00	NO	--	B1	0.00	0.00	NO	ND	ND		
Calcium	22 / 22	1040 - 145000	22844	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1070.3	2140.6	>1E+06	NO; < nsc
Chromium	21 / 21	7.8 - 109	27	1E+00	109	0.00	NO	--	--	0.00	0.00	NO	18.3	36.7		
Cobalt	22 / 22	3.1 - 1560	206	6.00E-02	26000	0.01	YES	--	ND	0.00	0.00	NO	7.3	14.5		
Copper	22 / 22	5.8 - 1630	220	3.7E-02	44054	0.01	YES	--	D	0.00	0.00	NO	16.0	32.0		
Iron	22 / 22	7610 - 124000	23931	3.00E-01	413333	0.13	YES	--	--	0.00	0.00	NO	20591.4	41182.9	100,000	NO; < 2X
Lead	19 / 19	14.6 - 688	139	--	0.00	0.00	NO	--	B2	0.00	0.00	NO	24.3	48.6		YES; no toxcrit, >2X
Manganese	21 / 21	72.5 - 11600	1025	2.30E-02	504348	0.16	YES	--	D	0.00	0.00	NO	2147.1	4294.3		NO; < 2X
Magnesium	22 / 22	633 - 38200	7098	--	0.00	0.00	NO	--	--	0.00	0.00	NO	676.6	1353.1	>1E+06	NO; < nsc
Mercury	20 / 22	0.05 - 3.5	0.60	--	0.00	0.00	NO	--	D	0.00	0.00	NO	0.085	0.17		YES; no toxcrit, >2X
Nickel	22 / 22	5.8 - 1100	147	2E-02	55000	0.02	YES	--	--	0.00	0.00	NO	12.7	25.5		
Potassium	22 / 22	331 - 1340	794	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1427.3	2854.6	>1E+06	NO; < 2X
Selenium	14 / 19	1.5 - 149	17	5.00E-03	29800	0.01	YES	--	D	0.00	0.00	NO	2.00	4.00		
Silver	9 / 16	0.39 - 34.3	10	5E-03	6860	0.00	NO	--	D	0.00	0.00	NO	0.47	0.94		YES; inhalation risk, >2X
Sodium	22 / 22	35.3 - 3060	439	--	0.00	0.00	NO	--	--	0.00	0.00	NO	75.0	149.9	>1E+06	NO; < nsc
Vanadium	22 / 22	9.9 - 92.5	24	7.00E-03	13214	0.00	NO	--	ND	0.00	0.00	NO	25.2	50.4		
Zinc	22 / 22	17.9 - 816	216	3.00E-01	2720	0.00	NO	--	D	0.00	0.00	NO	43.9	87.8		
Cyanide	5 / 22	0.33 - 1.5	0.61	2.00E-02	75	0.00	NO	--	D	0.00	0.00	NO	0.23	0.46		
			Total Relative Risk:		3065023			Total Relative Risk:		789.23						

no toxcrit = Oral toxicity information is not available.
2X = Two times average background.
nsc = Nutrient screening concentration.
inhalation risk = Chemical does not pass a similar inhalation concentration/toxicity screen.
f/d = Frequency of detection.

302435

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
ALL SOIL AREA A

CHEMICAL	Frequency of Detection	Detected Concentrations		Oral Reference Dose	Risk Factor	Relative Risk	Screen	Oral Slope Factor	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen		Nutrient Screen	Other Reason for Selection or Elimination
		Range mg/kg	Average mg/kg	mg/kg-day				$(mg/kg\text{-}day)^{-1}$					Average Concentration mg/kg	2X Average mg/kg		
Acetone	5 / 34	0.06 - 0.19		1.00E-01	1.90	0.00	NO	--	D	0.00	0.00	NO				
Benzene	1 / 34	0.001		3.00E-03	0.33	0.00	NO	2.9E-02	A	0.00	0.00	NO				YES; A carcinogen
2-Butanone	9 / 34	0.01 - 0.052		6.00E-01	0.09	0.00	NO	--	D	0.00	0.00	NO				
Carbon Disulfide	5 / 34	0 - 0.007		1.00E-01	0.07	0.00	NO	--	--	0.00	0.00	NO				
Chloroform	1 / 34	0.003		1E-02	0.30	0.00	NO	6.1E-03	B2	0.00	0.00	NO				
1,2-Dichloroethane	1 / 34	0.002		3.00E-02	0.07	0.00	NO	9.10E-02	B2	0.00	0.00	NO				
1,1-Dichloroethene	1 / 34	0.006		9.00E-03	0.67	0.00	NO	6.00E-01	C	0.00	0.00	NO				
1,2-Dichloroethene (total)	3 / 34	0 - 0.014		9.00E-03	1.56	0.00	NO	--	--	0.00	0.00	NO				
Ethylbenzene	2 / 34	0.01 - 0.01		1.00E-01	0.10	0.00	NO	--	D	0.00	0.00	NO				
2-Hexanone	2 / 34	0.01 - 0.008		4.00E-02	0.20	0.00	NO	--	--	0.00	0.00	NO				
4-Methyl-2-Pentanone	1 / 34	0.003		8.00E-02	0.04	0.00	NO	--	--	0.00	0.00	NO				
Methylene Chloride	9 / 35	0 - 0.022		6E-02	0.37	0.00	NO	7.50E-03	B2	0.00	0.00	NO				
Tetrachloroethene	5 / 34	0 - 0.045		1E-02	4.50	0.00	NO	5.20E-02	WD	0.00	0.00	NO				
Toluene	1 / 34	0.005		2.00E-01	0.03	0.00	NO	--	D	0.00	0.00	NO				
1,1,1-Trichloroethane	2 / 34	0.01 - 0.006		2.00E-02	0.30	0.00	NO	--	D	0.00	0.00	NO				
Trichloroethene	1 / 34	0.003		6.00E-03	0.50	0.00	NO	1.10E-02	pending	0.00	0.00	NO				
Acenaphthene	11 / 35	0.06 - 3.8		6E-02	63.33	0.00	NO	--	D	0.00	0.00	NO				
Acenaphthylene	1 / 35	0.05		--	0.00	0.00	NO	--	D	0.00	0.00	NO				NO; no toxcrit, low f/d
Anthracene	15 / 35	0.02 - 2.4		3.00E-01	8.00	0.00	NO	--	D	0.00	0.00	NO				
Benzo(g,h,i)perylene	23 / 35	0.04 - 6.9		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit, f/d
Fluoranthene	32 / 35	0.03 - 26		4E-02	650	0.00	NO	--	D	0.00	0.00	NO				
Fluorene	10 / 35	0.07 - 3.1		4.00E-02	77.5	0.00	NO	--	D	0.00	0.00	NO				
Phenanthrene	26 / 35	0.03 - 33		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit, f/d
Pyrene	32 / 35	0.03 - 28		3E-02	933	0.00	NO	--	D	0.00	0.00	NO				
Benzo(a)anthracene	22 / 35	0.07 - 9.9		--	0.00	0.00	NO	7.30E-01	B2	7.23	0.01	YES				
Benzo(a)pyrene	26 / 35	0.04 - 3.9		--	0.00	0.00	NO	7.30E+00	B2	28.47	0.04	YES				
Benzo(b)fluoranthene	28 / 35	0.03 - 14		--	0.00	0.00	NO	7.30E-01	B2	10.22	0.01	YES				
Benzo(k)fluoranthene	11 / 35	0.08 - 1.5		--	0.00	0.00	NO	7.30E-02	B2	0.11	0.00	NO				
Chrysene	27 / 35	0.02 - 11		--	0.00	0.00	NO	7.30E-03	B2	0.08	0.00	NO				
Dibenz(a,h)anthracene	10 / 35	0.07 - 1.3		--	0.00	0.00	NO	7.30E+00	B2	9.49	0.01	YES				
Indeno(1,2,3-cd)pyrene	21 / 35	0.02 - 6.3		--	0.00	0.00	NO	7.30E-01	B2	4.60	0.01	YES				
bis(2-ethylhexyl)phthalate	12 / 35	0.05 - 16		2.00E-02	800	0.00	NO	1.40E-02	B2	0.22	0.00	NO				
Butylbenzylphthalate	1 / 35	0.38		2.00E-01	1.90	0.00	NO	--	C	0.00	0.00	NO				
Carbazole	7 / 35	0.06 - 1		--	0.00	0.00	NO	2.00E-02	B2	0.02	0.00	NO				
Dibenzofuran	9 / 35	0.05 - 0.83		4.00E-03	208	0.00	NO	--	D	0.00	0.00	NO				
Di-n-butylphthalate	1 / 35	0.38		1.00E-01	3.80	0.00	NO	--	D	0.00	0.00	NO				
Di-n-octylphthalate	1 / 35	0.38		2.00E-02	19	0.00	NO	--	--	0.00	0.00	NO				
3,3'-Dichlorobenzidine	1 / 35	0.38		--	0.00	0.00	NO	4.5E-01	B2	0.17	0.00	NO				
Diethylphthalate	2 / 35	0.1 - 0.5		8.00E-01	0.63	0.00	NO	--	D	0.00	0.00	NO				
Dimethylphthalate	1 / 35	0.036		--	0.00	0.00	NO	--	D	0.00	0.00	NO				NO; no toxcrit, low f/d
2-Methylnaphthalene	7 / 35	0.05 - 4.6		4.00E-02	115	0.00	NO	--	D	0.00	0.00	NO				
Naphthalene	7 / 35	0.05 - 0.74		4.00E-02	18.5	0.00	NO	--	D	0.00	0.00	NO				
Pentachlorophenol	1 / 34	3.6		3E-02	120	0.00	NO	1.2E-01	B2	0.43	0.00	NO				
total PCBs	2 / 35	0.34 - 1.02		2.00E-05	51000	0.02	YES	2.00E+00	B2	2.04	0.00	NO				

302436

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
ALL SOIL AREA A

CHEMICAL	Frequency of Detection	Detected Concentrations Range mg/kg	Detected Concentrations Average mg/kg	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen Average Concentration mg/kg	Background Screen 2X Average mg/kg	Nutrient Screen	Other Reason for Selection or Elimination
Aluminum	35 / 35	1050 - 20300	6022	1.00E+00	20300	0.01	YES	--	--	0.00	0.00	NO	9790	19580		NO; < 2X
Antimony	9 / 35	2.3 - 21.9	13.5	4.00E-04	54750	0.02	YES	--	--	0.00	0.00	NO	1.6	3.2		
Arsenic	24 / 24	2.2 - 523	71.3	3.00E-04	1743333	0.57	YES	1.50E+00	A	785	0.99	YES	6.3	12.6		
Barium	35 / 35	11.3 - 6400	259	7E-02	91429	0.03	YES	--	--	0.00	0.00	NO	49.0	98.1		
Beryllium	16 / 35	0.22 - 1.1	0.47	5.00E-03	220	0.00	NO	4.30E+00	B2	4.73	0.01	YES	0.85	1.7		NO; < 2X
Cadmium	15 / 35	0.63 - 10.2	4.06	1.00E-03	10200	0.00	NO	--	B1	0.00	0.00	NO	ND	ND		
Calcium	35 / 35	812 - 145000	16908	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1070	2141	>1E+06	NO; < nsc
Chromium	33 / 33	7.8 - 109	25.9	1E+00	109	0.00	NO	--	--	0.00	0.00	NO	18.3	36.7		
Cobalt	35 / 35	3.1 - 1560	135	6.00E-02	26000	0.01	YES	--	ND	0.00	0.00	NO	7.3	14.5		
Copper	35 / 35	5.8 - 1630	157	3.7E-02	44054	0.01	YES	--	D	0.00	0.00	NO	16.0	32.0		
Iron	35 / 35	4600 - 124000	19449	3.00E-01	413333	0.13	YES	--	--	0.00	0.00	NO	20591	41183	100,000	NO; < 2X
Lead	28 / 28	9.2 - 688	122	--	0.00	0.00	NO	--	B2	0.00	0.00	NO	24.3	48.6		YES; no toxcrit, >2X
Manganese	34 / 34	46.9 - 11600	688	2.30E-02	504348	0.16	YES	--	D	0.00	0.00	NO	2147	4294		NO; < 2X
Magnesium	35 / 35	633 - 38200	5584	--	0.00	0.00	NO	--	--	0.00	0.00	NO	677	1353	>1E+06	NO; < nsc
Mercury	30 / 35	0.05 - 3.5	0.48	--	0.00	0.00	NO	--	D	0.00	0.00	NO	0.085	0.17		YES; no toxcrit, >2X
Nickel	35 / 35	5.8 - 1100	102	2E-02	55000	0.02	YES	--	--	0.00	0.00	NO	12.7	25.5		
Potassium	35 / 35	331 - 6070	928	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1427	2855	>1E+06	NO; < 2X
Selenium	22 / 30	1.1 - 149	13.1	5.00E-03	29800	0.01	YES	--	D	0.00	0.00	NO	2	4		
Silver	11 / 23	0.39 - 34.3	8.36	5E-03	6860	0.00	NO	--	D	0.00	0.00	NO	0.47	0.94		YES; inhalation risk, >2X
Sodium	35 / 35	32 - 3060	331	--	0.00	0.00	NO	--	--	0.00	0.00	NO	75.0	150	>1E+06	NO; < nsc
Vanadium	35 / 35	8.1 - 92.5	22.1	7.00E-03	13214	0.00	NO	--	ND	0.00	0.00	NO	25.2	50.4		
Zinc	35 / 35	14.3 - 816	181	3.00E-01	2720	0.00	NO	--	D	0.00	0.00	NO	43.9	87.8		
Cyanide	7 / 35	0.31 - 1.5	0.52	2.00E-02	75	0.00	NO	--	D	0.00	0.00	NO	0.23	0.46		
			Total Relative Risk: 3069775					Total Relative Risk: 789.2								

no toxcrit = Oral toxicity information is not available.
2X = Two times average background.
nsc = Nutrient screening concentration.
inhalation risk = Chemical does not pass a similar inhalation concentration/toxicity screen.
f/d = Frequency of detection.

302437

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SURFACE SOIL AREA B

CHEMICAL	Frequency of Detection	Detected Concentrations		Oral Reference Dose	Risk Factor	Relative Risk	Screen	Oral Slope Factor	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen		Nutrient Screen	Other Reason for Selection or Elimination
		Range mg/kg	Average mg/kg	mg/kg-day				$(mg/kg\text{-}day)^{-1}$					Average Concentration mg/kg	2X Average mg/kg		
Acetone	2 / 9	0.01 - 0.056		1.00E-01	0.56	0.00	NO	--	D	0.00	0.00	NO				
Benzene	1 / 9	0.004		3.00E-03	1.33	0.00	NO	2.9E-02	A	0.00	0.00	NO				YES; A carcinogen
2-Butanone	2 / 9	0.004 - 0.014		6.00E-01	0.02	0.00	NO	--	D	0.00	0.00	NO				
4-Methyl-2-Pentanone	1 / 9	0.017		8.00E-02	0.21	0.00	NO	--	--	0.00	0.00	NO				
Methylene Chloride	2 / 9	0.003 - 0.016		6E-02	0.27	0.00	NO	7.50E-03	B2	0.00	0.00	NO				
Benzo(g,h,i)perylene	1 / 9	0.083		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit
Fluoranthene	2 / 9	0.064 - 0.24		4E-02	6.00	0.00	NO	--	D	0.00	0.00	NO				
Phenanthrene	1 / 9	0.072		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit
Pyrene	2 / 9	0.086 - 0.21		3E-02	7.00	0.00	NO	--	D	0.00	0.00	NO				
Benzo(a)anthracene	1 / 9	0.092		--	0.00	0.00	NO	7.30E-01	B2	0.07	0.00	NO				
Benzo(a)pyrene	1 / 9	0.12		--	0.00	0.00	NO	7.30E+00	B2	0.88	0.00	NO				
Benzo(b)fluoranthene	1 / 9	0.5		--	0.00	0.00	NO	7.30E-01	B2	0.37	0.00	NO				
Benzo(k)fluoranthene	1 / 9	0.12		--	0.00	0.00	NO	7.30E-02	B2	0.01	0.00	NO				
Chrysene	1 / 9	0.19		--	0.00	0.00	NO	7.30E-03	B2	0.00	0.00	NO				
Indeno(1,2,3-cd)pyrene	1 / 9	0.11		--	0.00	0.00	NO	7.30E-01	B2	0.08	0.00	NO				
bis(2-ethylhexyl)phthalate	1 / 9	0.1		2.00E-02	5.00	0.00	NO	1.40E-02	B2	0.00	0.00	NO				
Butylbenzylphthalate	1 / 9	0.051		2.00E-01	0.26	0.00	NO	--	C	0.00	0.00	NO				
Di-n-butylphthalate	1 / 9	0.017		1.00E-01	0.17	0.00	NO	--	D	0.00	0.00	NO				
total PCBs	4 / 9	0.037 - 0.51		2.00E-05	25500	0.00	NO	2.00E+00	B2	1.02	0.00	NO				
4,4'-DDT	1 / 9	0.01		5.00E-04	20	0.00	NO	3.40E-01	B2	0.00	0.00	NO				
Endrin	1 / 6	0.005		3.00E-04	17.67	0.00	NO	--	D	0.00	0.00	NO				
Aluminum	9 / 9	3690 - 56600	12792	1.00E+00	56600	0.01	YES	--	--	0.00	0.00	NO	9790	19580		NO; < 2X
Antimony	8 / 9	1.4 - 416	70.95	4.00E-04	1040000	0.11	YES	--	--	0.00	0.00	NO	1.6	3.2		
Arsenic	9 / 9	10 - 1790	378	3.00E-04	5966667	0.62	YES	1.50E+00	A	2685	1.00	YES	6.3	12.6		
Barium	9 / 9	22.3 - 313	109	7E-02	4471	0.00	NO	--	--	0.00	0.00	NO	49.0	98.1		
Beryllium	5 / 9	0.29 - 0.82	0.52	5.00E-03	164	0.00	NO	4.30E+00	B2	3.53	0.00	NO	0.85	1.7		
Cadmium	6 / 9	1.3 - 8	4.57	1.00E-03	8000	0.00	NO	--	B1	0.00	0.00	NO	ND	ND		
Calcium	9 / 9	285 - 11200	3960	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1070	2141	>1E+06	NO; < nsc
Chromium	9 / 9	9.3 - 93.7	28.22	1E+00	93.7	0.00	NO	--	--	0.00	0.00	NO	18.3	36.7		
Cobalt	9 / 9	4.2 - 4660	555	6.00E-02	77667	0.01	YES	--	ND	0.00	0.00	NO	7.3	14.5		
Copper	9 / 9	14.8 - 2160	544	3.7E-02	58378	0.01	YES	--	D	0.00	0.00	NO	16.0	32.0		
Iron	9 / 9	16800 - 2E+05	44944	3.00E-01	643333	0.07	YES	--	--	0.00	0.00	NO	20591	41183	100,000	
Lead	9 / 9	30.6 - 3710	753	--	0.00	0.00	NO	--	B2	0.00	0.00	NO	24.3	48.6		YES; >2X
Manganese	9 / 9	155 - 5680	13421	2.30E-02	246957	0.03	YES	--	D	0.00	0.00	NO	2147	4294		
Magnesium	9 / 9	1400 - 94000	1185	--	0.00	0.00	NO	--	--	0.00	0.00	NO	677	1353	>1E+06	NO; < 2X
Mercury	7 / 9	0.17 - 1.8	0.62	--	0.00	0.00	NO	--	D	0.00	0.00	NO	0.085	0.17		YES; no toxcrit, >2X
Nickel	9 / 9	6.9 - 28900	3262	2E-02	1445000	0.15	YES	--	--	0.00	0.00	NO	12.7	25.5		

302438

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SURFACE SOIL AREA B

CHEMICAL	Frequency of Detection	Detected Concentrations		Oral Reference Dose	Risk Factor	Relative Risk	Screen	Oral Slope Factor	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen		Nutrient Screen	Other Reason for Selection or Elimination
		Range mg/kg	Average mg/kg	mg/kg-day				$(mg/kg\text{-}day)^{-1}$					Average Concentration mg/kg	2X Average mg/kg		
Potassium	9 / 9	419 - 1800	852	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1427	2855	>1E+06	NO; < 2X
Selenium	9 / 9	1.5 - 33.1	6.98	5.00E-03	6620	0.00	NO	--	D	0.00	0.00	NO	2	4		
Silver	7 / 7	0.69 - 103	26	5E-03	20600	0.00	NO	--	D	0.00	0.00	NO	0.47	0.94		YES; inhalation risk, >2X
Sodium	8 / 9	35.7 - 36500	4657	--	0.00	0.00	NO	--	--	0.00	0.00	NO	74.96	149.92	>1E+06	NO; < nsc
Vanadium	9 / 9	14.2 - 52.8	29.51	7.00E-03	7543	0.00	NO	--	ND	0.00	0.00	NO	25.2	50.4		
Zinc	9 / 9	39.8 - 1270	305	3.00E-01	4233	0.00	NO	--	D	0.00	0.00	NO	43.89	87.771429		
Cyanide	2 / 9	0.46 - 0.56	0.51	2.00E-02	28	0.00	NO	--	D	0.00	0.00	NO	0.23	0.46		
			Total Relative Risk: 9611913					Total Relative Risk: 2689								

no toxcrit = Oral toxicity information is not available.
2X = Two times average background.
nsc = Nutrient screening concentration.
inhalation risk = Chemical does not pass a similar inhalation concentration/toxicity screen.
f/d = Frequency of detection

302439

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
ALL SOIL AREA B

CHEMICAL	Frequency of Detection	Detected Concentrations		Oral Reference Dose	Risk Factor	Relative Risk	Screen	Oral Slope Factor	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen		Nutrient Screen	Other Reason for Selection or Elimination
		Range mg/kg	Average mg/kg	mg/kg-day				$(mg/kg\text{-}day)^{-1}$					Average Concentration mg/kg	2X Average mg/kg		
Acetone	2 / 12	0.01 - 0.056		1.00E-01	0.56	0.00	NO	--	D	0.00	0.00	NO				
Benzene	1 / 12	0.004		3.00E-03	1.33	0.00	NO	2.9E-02	A	0.00	0.00	NO				YES; A carcinogen
2-Butanone	2 / 12	0.004 - 0.014		6.00E-01	0.02	0.00	NO	--	D	0.00	0.00	NO				
4-Methyl-2-Pentanone	1 / 12	0.017		8.00E-02	0.21	0.00	NO	--	--	0.00	0.00	NO				
Methylene Chloride	2 / 12	0.003 - 0.016		6E-02	0.27	0.00	NO	7.50E-03	B2	0.00	0.00	NO				
Benzo(g,h,i)perylene	1 / 12	0.083		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit
Fluoranthene	3 / 12	0.064 - 0.24		4E-02	6.00	0.00	NO	--	D	0.00	0.00	NO				
Phenanthrene	2 / 12	0.072 - 0.086		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit
Pyrene	3 / 12	0.086 - 0.21		3E-02	7.00	0.00	NO	--	D	0.00	0.00	NO				
Benzo(a)anthracene	2 / 12	0.068 - 0.092		--	0.00	0.00	NO	7.30E-01	B2	0.07	0.00	NO				
Benzo(a)pyrene	2 / 12	0.077 - 0.12		--	0.00	0.00	NO	7.30E+00	B2	0.88	0.00	NO				
Benzo(b)fluoranthene	1 / 12	0.5		--	0.00	0.00	NO	7.30E-01	B2	0.37	0.00	NO				
Benzo(k)fluoranthene	1 / 12	0.12		--	0.00	0.00	NO	7.30E-02	B2	0.01	0.00	NO				
Chrysene	2 / 12	0.09 - 0.19		--	0.00	0.00	NO	7.30E-03	B2	0.00	0.00	NO				
Indeno(1,2,3-cd)pyrene	1 / 12	0.11		--	0.00	0.00	NO	7.30E-01	B2	0.08	0.00	NO				
bis(2-ethylhexyl)phthalate	2 / 12	0.1 - 0.31		2.00E-02	15.5	0.00	NO	1.40E-02	B2	0.00	0.00	NO				
Butylbenzylphthalate	1 / 12	0.051		2.00E-01	0.26	0.00	NO	--	C	0.00	0.00	NO				
Di-n-butylphthalate	1 / 12	0.017		1.00E-01	0.17	0.00	NO	--	D	0.00	0.00	NO				
total PCBs	4 / 12	0.037 - 0.51		2.00E-05	25500	0.00	NO	2.00E+00	B2	1.02	0.00	NO				
4,4'-DDT	1 / 12	0.01		5.00E-04	20	0.00	NO	3.40E-01	B2	0.00	0.00	NO				
Endrin	1 / 7	0.0053		3.00E-04	17.7	0.00	NO	--	D	0.00	0.00	NO				
Aluminum	12 / 12	3690 - 56600	11583	1.00E+00	56600	0.01	YES	--	--	0.00	0.00	NO	9790	19580		NO; < 2X
Antimony	10 / 12	1.4 - 416	57.3	4.00E-04	1040000	0.11	YES	--	--	0.00	0.00	NO	1.6	3.2		
Arsenic	12 / 12	5.5 - 1790	288	3.00E-04	5966667	0.62	YES	1.50E+00	A	2685	1.00	YES	6.3	12.6		
Barium	12 / 12	19.5 - 313	98.2	7E-02	4471	0.00	NO	--	--	0.00	0.00	NO	49.0	98.1		
Beryllium	7 / 12	0.29 - 0.82	0.53	5.00E-03	164	0.00	NO	4.30E+00	B2	3.5	0.00	NO	0.85	1.7		
Cadmium	6 / 12	1.3 - 8	4.6	1.00E-03	8000	0.00	NO	--	B1	0.00	0.00	NO	ND	ND		
Calcium	12 / 12	285 - 11200	3069	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1070	2141	>1E+06	NO; < nsc
Chromium	12 / 12	9.3 - 93.7	27.7	1E+00	93.7	0.00	NO	--	--	0.00	0.00	NO	18.3	36.7		
Cobalt	12 / 12	2.5 - 4660	419	6.00E-02	77667	0.01	YES	--	ND	0.00	0.00	NO	7.3	14.5		
Copper	12 / 12	6 - 2160	459	3.7E-02	58378	0.01	YES	--	D	0.00	0.00	NO	16.0	32.0		
Iron	12 / 12	16800 - 193000	39483	3.00E-01	643333	0.07	YES	--	--	0.00	0.00	NO	20591	41183	100,000	NO; < 2X

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
ALL SOIL AREA B

CHEMICAL	Frequency of Detection	Detected Concentrations		Oral	Risk	Relative	Screen	Oral	Weight of	Risk	Relative	Screen	Background Screen		Nutrient	Other Reason for
		Range mg/kg	Average mg/kg	Reference Dose mg/kg-day	Factor	Risk		Slope Factor $(mg/kg\text{-}day)^{-1}$	Evidence Classification	Factor	Risk		Average Concentration mg/kg	2X Average mg/kg	Screen	Selection or Elimination
Lead	12 / 12	2.7 - 3710	575	--	0.00	0.00	NO	--	B2	0.00	0.00	NO	24.3	48.6		YES; no toxcrit, >2X
Manganese	12 / 12	155 - 5680	10491	2.30E-02	246957	0.03	YES	--	D	0.00	0.00	NO	677	1353		
Magnesium	12 / 12	913 - 94000	951	--	0.00	0.00	NO	--	--	0.00	0.00	NO	2147	4294	>1E+06	NO; < 2X
Mercury	8 / 12	0.09 - 1.8	0.55	--	0.00	0.00	NO	--	D	0.00	0.00	NO	0.085	0.17		YES; no toxcrit, >2X
Nickel	12 / 12	5.8 - 28900	2464	2E-02	1445000	0.15	YES	--	--	0.00	0.00	NO	12.7	25.5		
Potassium	12 / 12	419 - 1850	893	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1427	2855	>1E+06	NO; < 2X
Selenium	10 / 12	1.3 - 33.1	6.41	5.00E-03	6620	0.00	NO	--	D	0.00	0.00	NO	2.00	4.00		
Silver	7 / 8	0.69 - 103	26	5E-03	20600	0.00	NO	--	D	0.00	0.00	NO	0.47	0.94		YES; inhalation risk, >2X
Sodium	11 / 12	35.7 - 36500	3438	--	0.00	0.00	NO	--	--	0.00	0.00	NO	75.0	150	>1E+06	NO; < nsc
Vanadium	12 / 12	13.7 - 52.8	29	7.00E-03	7543	0.00	NO	--	ND	0.00	0.00	NO	25.2	50.4		
Zinc	12 / 12	15.4 - 1270	242	3.00E-01	4233	0.00	NO	--	D	0.00	0.00	NO	43.9	87.8		
Cyanide	2 / 12	0.46 - 0.56	0.51	2.00E-02	28	0.00	NO	--	D	0.00	0.00	NO	0.23	0.46		
			Total Relative Risk:		9611924			Total Relative Risk:		2689						

no toxcrit = Oral toxicity information is not available.
2X = Two times average background.
nsc = Nutrient screening concentration.
inhalation risk = Chemical does not pass a similar inhalation concentration/toxicity screen.
f/d = Frequency of detection.

302441

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SURFACE SOIL AREA B&C

CHEMICAL	Frequency of Detection	Detected Concentrations Range mg/kg	Detected Concentrations Average mg/kg	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen Average Concentration mg/kg	Background Screen 2X Average mg/kg	Nutrient Screen	Other Reason for Selection or Elimination
Acetone	1 / 19	0.011		1.00E-01	0.11	0.00	NO	--	D	0.00	0.00	NO				
2-Butanone	1 / 19	0.003		6.00E-01	0.01	0.00	NO	--	D	0.00	0.00	NO				
2-Hexanone	1 / 19	0.001		4.00E-02	0.03	0.00	NO	--	--	0.00	0.00	NO				
Methylene Chloride	1 / 19	0.004		6E-02	0.07	0.00	NO	7.50E-03	B2	0.00	0.00	NO				
Anthracene	4 / 19	0.02 - 0.066		3.00E-01	0.22	0.00	NO	--	D	0.00	0.00	NO				
Benzo(g,h,i)perylene	7 / 19	0.04 - 0.31		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit, 0'd
Fluoranthene	11 / 19	0.07 - 0.59		4E-02	14.75	0.00	NO	--	D	0.00	0.00	NO				
Fluorene	1 / 19	0.047		4.00E-02	1.18	0.00	NO	--	D	0.00	0.00	NO				
Phenanthrene	6 / 19	0.05 - 0.4		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit, 0'd
Pyrene	11 / 19	0.07 - 0.82		3E-02	27	0.00	NO	--	D	0.00	0.00	NO				
Benzo(a)anthracene	7 / 19	0.05 - 0.36		--	0.00	0.00	NO	7.30E-01	B2	0.26	0.00	NO				
Benzo(a)pyrene	6 / 19	0.08 - 0.39		--	0.00	0.00	NO	7.30E+00	B2	2.85	0.00	NO				
Benzo(b)fluoranthene	11 / 19	0.09 - 1		--	0.00	0.00	NO	7.30E-01	B2	0.73	0.00	NO				
Benzo(k)fluoranthene	1 / 19	0.37		--	0.00	0.00	NO	7.30E-02	B2	0.03	0.00	NO				
Chrysene	12 / 19	0.04 - 0.4		--	0.00	0.00	NO	7.30E-03	B2	0.00	0.00	NO				
Indeno(1,2,3-cd)pyrene	8 / 19	0.05 - 0.25		--	0.00	0.00	NO	7.30E-01	B2	0.18	0.00	NO				
bis(2-ethylhexyl)phthalate	2 / 19	0.12 - 0.14		2.00E-02	7.00	0.00	NO	1.40E-02	B2	0.00	0.00	NO				
Butylbenzylphthalate	1 / 19	0.1		2.00E-01	0.50	0.00	NO	--	C	0.00	0.00	NO				
Carbazole	1 / 19	0.021		--	0.00	0.00	NO	2.00E-02	B2	0.00	0.00	NO				
Di-n-butylphthalate	1 / 19	0.058		1.00E-01	0.58	0.00	NO	--	D	0.00	0.00	NO				
Naphthalene	1 / 19	0.045		4.00E-02	1.125	0.00	NO	--	D	0.00	0.00	NO				
total PCBs	10 / 18	0.15 - 15.89		2.00E-05	794500	0.02	YES	2.00E+00	B2	31.78	0.00	NO				
Endrin	2 / 12	0.04 - 0.07		3.00E-04	233	0.00	NO	--	D	0.00	0.00	NO				
Aluminum	19 / 19	393 - 27700	9354	1.00E+00	27700	0.00	NO	--	--	0.00	0.00	NO	9790	19580		
Antimony	14 / 19	7.1 - 5610	453	4.00E-04	14025000	0.33	YES	--	--	0.00	0.00	NO	1.6	3.2		
Arsenic	16 / 17	2 - 6300	1074	3.00E-04	21000000	0.49	YES	1.50E+00	A	9450	1.00	YES	6.3	12.6		
Barium	19 / 19	13.5 - 1820	337	7E-02	26000	0.00	NO	--	--	0.00	0.00	NO	49	98		
Beryllium	9 / 19	0.59 - 8.5	3	5.00E-03	1700	0.00	NO	4.30E+00	B2	36.55	0.00	NO	0.85	1.7		
Cadmium	13 / 19	1.4 - 21.9	9	1.00E-03	21900	0.00	NO	--	B1	0.00	0.00	NO	ND	ND		
Calcium	19 / 19	109 - 47800	9134	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1070	2141	>1E+06	
Chromium	19 / 19	9.8 - 1620	140	1E+00	1620	0.00	NO	--	--	0.00	0.00	NO	18.33	37		
Cobalt	19 / 19	3.1 - 4620	567	6.00E-02	77000	0.00	NO	--	ND	0.00	0.00	NO	7.27	15		YES; > 2X
Copper	19 / 19	3 - 4610	1166	3.7E-02	124595	0.00	NO	--	D	0.00	0.00	NO	16	32		YES; copc at Area A, > 2X
Iron	19 / 19	7920 - 313000	85001	3.00E-01	1043333	0.02	YES	--	--	0.00	0.00	NO	20591	41183	100,000	
Lead	15 / 19	4 - 19600	2790	--	0.00	0.00	NO	--	B2	0.00	0.00	NO	24	49		YES; > 2X
Manganese	18 / 18	57.1 - 90000	2158	2.30E-02	3913043	0.09	YES	--	D	0.00	0.00	NO	677	1353		YES; > 2X

302442

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SURFACE SOIL AREA B&C

CHEMICAL	Frequency of Detection	Detected Concentrations		Oral Reference Dose	Risk Factor	Relative Risk	Screen	Oral Slope Factor	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen		Nutrient Screen	Other Reason for Selection or Elimination
		Range mg/kg	Average mg/kg	mg/kg-day				$(mg/kg\text{-}day)^{-1}$					Average Concentration mg/kg	2X Average mg/kg		
Magnesium	19 / 19	908 - 5480	13676	--	0.00	0.00	NO	--	--	0.00	0.00	NO	2147	4294	>1E+06	NO; < nsc
Mercury	17 / 19	0.05 - 8.4	2	--	0.00	0.00	NO	--	D	0.00	0.00	NO	0.09	0.17		YES; no toxcrit, > 2X
Nickel	19 / 19	5.1 - 22000	1540	2E-02	1100000	0.03	YES	--	--	0.00	0.00	NO	13	25		
Potassium	19 / 19	354 - 2510	912	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1427	2855	>1E+06	NO; < nsc
Selenium	12 / 17	2.2 - 140	44	5.00E-03	28000	0.00	NO	--	D	0.00	0.00	NO	2.00	4.00		
Silver	13 / 19	0.39 - 114	42	5E-03	22800	0.00	NO	--	D	0.00	0.00	NO	0.47	0.94		YES; inhalation risk, equiv to Area A, > 2X
Sodium	18 / 19	25.9 - 16600	1952	--	0.00	0.00	NO	--	--	0.00	0.00	NO	75	150	>1E+06	NO; < nsc
Thallium	3 / 19	3.6 - 22.7	10.2	8.00E-05	283750	0.01	YES	--	D	0.00	0.00	NO	1.1	2.2		
Vanadium	17 / 19	12.1 - 165	45	7.00E-03	23571	0.00	NO	--	ND	0.00	0.00	NO	25.2	50.4		
Zinc	19 / 19	17.3 - 2900	679	3.00E-01	9667	0.00	NO	--	D	0.00	0.00	NO	44	88		
Cyanide	10 / 19	0.31 - 2.3	0.73	2.00E-02	115	0.00	NO	--	D	0.00	0.00	NO	0.23	0.46		
			Total Relative Risk: 42524581					Total Relative Risk: 9487								

no toxcrit = Oral toxicity information is not available.
2X = Two times average background.
nsc = Nutrient screening concentration.
inhalation risk = Chemical does not pass a similar inhalation concentration/toxicity screen.
f/d = Frequency of detection.

302443

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
ALL SOIL AREA B&C

CHEMICAL	Frequency of Detection	Detected Concentrations		Oral Reference Dose	Risk Factor	Relative Risk	Screen	Oral Slope Factor	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen		Nutrient Screen	Other Reason for Selection or Elimination
		Range mg/kg	Average mg/kg	mg/kg-day				$(mg/kg\text{-}day)^{-1}$					Average Concentration mg/kg	2X Average mg/kg		
Acetone	4 / 37	0.01 - 0.05		1.00E-01	0.50	0.00	NO	--	D	0.00	0.00	NO				
2-Butanone	2 / 37	0 - 0.012		6.00E-01	0.02	0.00	NO	--	D	0.00	0.00	NO				
2-Hexanone	1 / 37	0.001		4.00E-02	0.03	0.00	NO	--	--	0.00	0.00	NO				
Methylene Chloride	3 / 37	0 - 0.004		6E-02	0.07	0.00	NO	7.50E-03	B2	0.00	0.00	NO				
Toluene	1 / 37	0.001		2.00E-01	0.01	0.00	NO	--	D	0.00	0.00	NO				
Anthracene	4 / 37	0.02 - 0.066		3.00E-01	0.22	0.00	NO	--	D	0.00	0.00	NO				
Benzo(g,h,i)perylene	10 / 37	0.04 - 0.31		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit, 0'd
Fluoranthene	15 / 37	0.03 - 0.59		4E-02	14.75	0.00	NO	--	D	0.00	0.00	NO				
Fluorene	1 / 37	0.047		4.00E-02	1.18	0.00	NO	--	D	0.00	0.00	NO				
Phenanthrene	12 / 37	0.03 - 0.46		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit, 0'd
Pyrene	14 / 37	0.06 - 0.82		3E-02	27.33	0.00	NO	--	D	0.00	0.00	NO				
Benzo(a)anthracene	9 / 37	0.04 - 0.36		--	0.00	0.00	NO	7.30E-01	B2	0.26	0.00	NO				
Benzo(a)pyrene	7 / 37	0.08 - 0.39		--	0.00	0.00	NO	7.30E+00	B2	2.85	0.00	NO				
Benzo(b)fluoranthene	14 / 37	0.09 - 1		--	0.00	0.00	NO	7.30E-01	B2	0.73	0.00	NO				
Benzo(k)fluoranthene	1 / 37	0.37		--	0.00	0.00	NO	7.30E-02	B2	0.03	0.00	NO				
Chrysene	15 / 37	0.04 - 0.4		--	0.00	0.00	NO	7.30E-03	B2	0.00	0.00	NO				
Indeno(1,2,3-cd)pyrene	9 / 37	0.05 - 0.25		--	0.00	0.00	NO	7.30E-01	B2	0.18	0.00	NO				
bis(2-ethylhexyl)phthalate	4 / 37	0.07 - 0.29		2.00E-02	14.50	0.00	NO	1.40E-02	B2	0.00	0.00	NO				
Butylbenzylphthalate	1 / 37	0.1		2.00E-01	0.50	0.00	NO	--	C	0.00	0.00	NO				
Carbazole	1 / 37	0.021		--	0.00	0.00	NO	2.00E-02	B2	0.00	0.00	NO				
Di-n-butylphthalate	1 / 37	0.058		1.00E-01	0.58	0.00	NO	--	D	0.00	0.00	NO				
Naphthalene	1 / 37	0.045		4.00E-02	1.13	0.00	NO	--	D	0.00	0.00	NO				
total PCBs	12 / 35	0.07 - 15.89		2.00E-05	794500	0.02	YES	2.00E+00	B2	31.78	0.00	NO				
Endrin	2 / 25	0.04 - 0.07		3.00E-04	233	0.00	NO	--	D	0.00	0.00	NO				
Aluminum	37 / 37	393 - 27700	7844	1.00E+00	27700	0.00	NO	--	--	0.00	0.00	NO	9790	19580		
Antimony	24 / 37	1.3 - 5610	337	4.00E-04	14025000	0.33	YES	--	--	0.00	0.00	NO	1.6	3.2		
Arsenic	31 / 34	1.4 - 6300	730	3.00E-04	21000000	0.49	YES	1.50E+00	A	9450	0.99	YES	6.3	12.6		
Barium	37 / 37	12.8 - 1820	198	7E-02	26000	0.00	NO	--	--	0.00	0.00	NO	49	98		
Beryllium	14 / 37	0.23 - 8.5	1.99	5.00E-03	1700	0.00	NO	4.30E+00	B2	36.55	0.00	NO	0.85	1.7		
Cadmium	18 / 37	0.65 - 179	16.67	1.00E-03	179000	0.00	NO	--	B1	0.00	0.00	NO	ND	ND		
Calcium	37 / 37	98 - 47800	5915	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1070	2141	>1E+06	NO; < nsc
Chromium	37 / 37	8.4 - 1620	83	1E+00	1620	0.00	NO	--	--	0.00	0.00	NO	18	37		
Cobalt	36 / 37	1.7 - 4620	313	6.00E-02	77000	0.00	NO	--	ND	0.00	0.00	NO	7	15		YES; inhalation risk, >2X
Copper	36 / 36	2 - 4610	694	3.7E-02	124595	0.00	NO	--	D	0.00	0.00	NO	16	32		YES; copc at Area A, >2X
Iron	37 / 37	5730 - 3E+05	56324	3.00E-01	1043333	0.02	YES	--	--	0.00	0.00	NO	20591	41183	100,000	
Lead	29 / 37	3.2 - 19600	1542	--	0.00	0.00	NO	--	B2	0.00	0.00	NO	24	49		YES; >2X
Manganese	35 / 35	57.1 - 90000	1987	2.30E-02	3913043	0.09	YES	--	D	0.00	0.00	NO	677	1353		

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
ALL SOIL AREA B&C

CHEMICAL	Frequency of Detection	Detected Concentrations		Oral	Risk	Relative	Screen	Oral	Weight of	Risk	Relative	Screen	Background Screen		Nutrient	Other Reason for
		Range mg/kg	Average mg/kg	Reference Dose mg/kg-day	Factor	Risk		Slope Factor $(mg/kg\text{-}day)^{-1}$	Evidence Classification	Factor	Risk		Average Concentration mg/kg	2X Average mg/kg	Screen	Selection or Elimination
Magnesium	37 / 37	314 - 6170	7416	--	0.00	0.00	NO	--	--	0.00	0.00	NO	2147	4294	>1E+06	NO; < nsc
Mercury	21 / 37	0.05 - 8.4	1.55	--	0.00	0.00	NO	--	D	0.00	0.00	NO	0.09	0.17		YES; no toxcrit, >2X
Nickel	37 / 37	3.4 - 22000	809	2E-02	1100000	0.03	YES	--	--	0.00	0.00	NO	13	25		
Potassium	37 / 37	156 - 4260	1025	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1427	2855	>1E+06	NO; < 2X
Selenium	15 / 29	1.1 - 140	35.92	5.00E-03	28000	0.00	NO	--	D	0.00	0.00	NO	2	4		
Silver	22 / 37	0.33 - 114	31	5E-03	22800	0.00	NO	--	D	0.00	0.00	NO	0.47	0.94		YES; inhalation risk, copc at Area A, >2X
Sodium	32 / 37	25.9 - 16600	1185	--	0.00	0.00	NO	--	--	0.00	0.00	NO	75	150	>1E+06	NO; < nsc
Thallium	4 / 37	1.4 - 22.7	8.00	8.00E-05	283750	0.01	YES	--	D	0.00	0.00	NO	1.1	2.2		
Vanadium	32 / 37	5.4 - 165	33	7.00E-03	23571	0.00	NO	--	ND	0.00	0.00	NO	25.2	50.4		
Zinc	37 / 37	11.8 - 10400	668	3.00E-01	34667	0.00	NO	--	D	0.00	0.00	NO	44	88		
Cyanide	11 / 37	0.25 - 2.3	0.69	2.00E-02	115	0.00	NO	--	D	0.00	0.00	NO	0.23	0.46		
			Total Relative Risk: 42706689					Total Relative Risk: 9522								

no toxcrit = Oral toxicity information is not available.
2X = Two times average background.
nsc = Nutrient screening concentration.
inhalation risk = Chemical does not pass a similar inhalation concentration/toxicity screen.
f/d = Frequency of detection.

302445

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SURFACE SOIL AREA C

CHEMICAL	Frequency of Detection	Detected Concentrations Range mg/kg	Detected Concentrations Average mg/kg	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen Average Concentration mg/kg	Background Screen 2X Average mg/kg	Nutrient Screen	Other Reason for Selection or Elimination
Benzene	1 / 8	0.002		3.00E-03	0.67	0.00	NO	2.9E-02	A	0.00	0.00	NO				YES; A carcinogen
2-Butanone	3 / 8	0.002 - 0.015		6.00E-01	0.03	0.00	NO	--	D	0.00	0.00	NO				
Chloroform	1 / 8	0.001		1E-02	0.10	0.00	NO	6.1E-03	B2	0.00	0.00	NO				
1,2-Dichloropropane	1 / 8	0.003		--	0.00	0.00	NO	6.80E-02	B2	0.00	0.00	NO				
2-Hexanone	2 / 8	0.026 - 0.045		4.00E-02	1.13	0.00	NO	--	--	0.00	0.00	NO				
4-Methyl-2-Pentanone	4 / 8	0.003 - 0.029		8.00E-02	0.36	0.00	NO	--	--	0.00	0.00	NO				
Methylene Chloride	2 / 8	0.003 - 0.004		6E-02	0.07	0.00	NO	7.50E-03	B2	0.00	0.00	NO				
Benzo(g,h,i)perylene	2 / 8	0.022 - 0.062		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit
Fluoranthene	2 / 8	0.066 - 0.098		4E-02	2.45	0.00	NO	--	D	0.00	0.00	NO				
Phenanthrene	2 / 8	0.041 - 0.064		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit
Pyrene	2 / 8	0.051 - 0.11		3E-02	3.67	0.00	NO	--	D	0.00	0.00	NO				
Benzo(a)anthracene	1 / 8	0.029		--	0.00	0.00	NO	7.30E-01	B2	0.02	0.00	NO				
Benzo(a)pyrene	2 / 8	0.021 - 0.05		--	0.00	0.00	NO	7.30E+00	B2	0.37	0.00	NO				
Benzo(b)fluoranthene	2 / 8	0.062 - 0.15		--	0.00	0.00	NO	7.30E-01	B2	0.11	0.00	NO				
Benzo(k)fluoranthene	1 / 8	0.036		--	0.00	0.00	NO	7.30E-02	B2	0.00	0.00	NO				
Chrysene	2 / 8	0.054 - 0.094		--	0.00	0.00	NO	7.30E-03	B2	0.00	0.00	NO				
Indeno(1,2,3-cd)pyrene	2 / 8	0.027 - 0.049		--	0.00	0.00	NO	7.30E-01	B2	0.04	0.00	NO				
bis(2-ethylhexyl)phthalate	1 / 8	0.021		2.00E-02	1.05	0.00	NO	1.40E-02	B2	0.00	0.00	NO				
N-nitrosodiphenylamine	2 / 8	5.3 - 10		2.00E-02	500	0.00	NO	4.90E-03	B2	0.05	0.00	NO				
Pentachlorophenol	1 / 8	0.08		3E-02	2.67	0.00	NO	1.2E-01	B2	0.01	0.00	NO				
PCBs	2 / 8	0.873 - 2.891		2.00E-05	144550	0.01	YES	2.00E+00	B2	5.78	0.00	NO				
Aluminum	8 / 8	1380 - 16200	5694	1.00E+00	16200	0.00	NO	--	--	0.00	0.00	NO	9790	19580		
Antimony	7 / 8	30.7 - 2430	1057	4.00E-04	6075000	0.48	YES	--	--	0.00	0.00	NO	1.6	3.2		
Arsenic	7 / 7	7.3 - 1440	522	3.00E-04	4800000	0.38	YES	1.50E+00	A	2160	0.98	YES	6.3	12.6		
Barium	8 / 8	26.6 - 1350	406	7E-02	19286	0.00	NO	--	--	0.00	0.00	NO	49.04	98		YES; inhalation risk, >2X
Beryllium	1 / 8	11	11	5.00E-03	2200	0.00	NO	4.30E+00	B2	47.30	0.02	YES	0.85	1.7		
Cadmium	5 / 8	0.89 - 23.9	8.60	1.00E-03	23900	0.00	NO	--	B1	0.00	0.00	NO	ND	ND		
Calcium	8 / 8	506 - 76000	14911	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1070	2141	>1E+06	NO; < nsc
Chromium	8 / 8	12.9 - 434	79	1E+00	434	0.00	NO	--	--	0.00	0.00	NO	18.33	37		
Cobalt	8 / 8	6.7 - 764	180	6.00E-02	12733	0.00	NO	--	ND	0.00	0.00	NO	7.27	15		YES; inhalation risk, >2X
Copper	8 / 8	9.6 - 2070	725	3.7E-02	55946	0.00	NO	--	D	0.00	0.00	NO	15.99	32		YES; copc at Area A, >2X
Iron	8 / 8	11600 - 74300	49825	3.00E-01	247667	0.02	YES	--	--	0.00	0.00	NO	20591	41183	100,000	NO; < nsc
Lead	8 / 8	8.3 - 5140	1787	--	0.00	0.00	NO	--	B2	0.00	0.00	NO	24.31	49		YES; >2X
Manganese	8 / 8	106 - 24800	4053	2.30E-02	1078261	0.09	YES	--	D	0.00	0.00	NO	677	1353		
Magnesium	8 / 8	167 - 2930	1087	--	0.00	0.00	NO	--	--	0.00	0.00	NO	2147	4294	>1E+06	NO; < 2X
Mercury	8 / 8	0.06 - 6.2	2.27	--	0.00	0.00	NO	--	D	0.00	0.00	NO	0.09	0.17		YES; no toxcrit, >2X
Nickel	8 / 8	14.4 - 304	110	2E-02	15200	0.00	NO	--	--	0.00	0.00	NO	13	25		
Potassium	8 / 8	508 - 6780	1857	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1427	2855	>1E+06	NO; < 2X
Selenium	7 / 8	7.4 - 262	95	5.00E-03	52400	0.00	NO	--	D	0.00	0.00	NO	2	4		
Silver	7 / 8	2.8 - 110	34	5E-03	22000	0.00	NO	--	D	0.00	0.00	NO	0.47	0.94		YES; inhalation risk, >2X
Sodium	8 / 8	198 - 2960	1431	--	0.00	0.00	NO	--	--	0.00	0.00	NO	75	150	>1E+06	NO; < nsc
Vanadium	8 / 8	10.6 - 148	36	7.00E-03	21143	0.00	NO	--	ND	0.00	0.00	NO	25.2	50.4		
Zinc	8 / 8	70.9 - 1960	467	3.00E-01	6533	0.00	NO	--	D	0.00	0.00	NO	43.89	88		
Cyanide	2 / 8	0.3 - 0.41	0.36	2.00E-02	20.5	0.00	NO	--	D	0.00	0.00	NO	0.23	0.46		
				Total Relative Risk:	12593985			Total Relative Risk:		2207						

no toxcrit = Oral toxicity information is not available.
2X = Two times average background.
nsc = Nutrient screening concentration.
inhalation risk = Chemical does not pass a similar inhalation concentration/toxicity screen.
f/d = Frequency of detection.

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
ALL SOIL AREA C

CHEMICAL	Frequency of Detection	Detected Concentrations		Oral Reference Dose	Risk Factor	Relative Risk	Screen	Oral Slope Factor	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen		Nutrient Screen	Other Reason for Selection or Elimination
		Range mg/kg	Average mg/kg	mg/kg-day				$(mg/kg\text{-}day)^{-1}$					Average Concentration mg/kg	2X Average mg/kg		
Acetone	4 / 14	0.027 - 0.05		1.00E-01	0.50	0.00	NO	--	D	0.00	0.00	NO				
Benzene	1 / 13	0.002 - 0.002		3.00E-03	0.67	0.00	NO	2.9E-02	A	0.00	0.00	NO				YES; A carcinogen
2-Butanone	5 / 13	0.002 - 0.015		6.00E-01	0.03	0.00	NO	--	D	0.00	0.00	NO				
Chlorobenzene	1 / 13	0.001 - 0.001		2E-02	0.05	0.00	NO	--	D	0.00	0.00	NO				
Chloroform	1 / 13	0.001 - 0.001		1E-02	0.10	0.00	NO	6.1E-03	B2	0.00	0.00	NO				
1,2-Dichloroethene (total)	1 / 13	0.005 - 0.005		9.00E-03	0.56	0.00	NO	--	--	0.00	0.00	NO				
1,2-Dichloropropane	1 / 13	0.003 - 0.003		--	0.00	0.00	NO	6.80E-02	B2	0.00	0.00	NO				
2-Hexanone	3 / 13	0.026 - 0.045		4.00E-02	1.13	0.00	NO	--	--	0.00	0.00	NO				
4-Methyl-2-Pentanone	6 / 13	0.003 - 0.029		8.00E-02	0.36	0.00	NO	--	--	0.00	0.00	NO				
Methylene Chloride	2 / 14	0.003 - 0.004		6E-02	0.07	0.00	NO	7.50E-03	B2	0.00	0.00	NO				
Styrene	2 / 13	0.007 - 0.019		2E-01	0.10	0.00	NO	--	C	0.00	0.00	NO				
1,1,2,2-Tetrachloroethane	1 / 13	0.004 - 0.004		--	0.00	0.00	NO	2.0E-01	C	0.00	0.00	NO				
Tetrachloroethene	1 / 13	0.002 - 0.002		1E-02	0.20	0.00	NO	5.20E-02	WD	0.00	0.00	NO				
Toluene	1 / 13	0.002 - 0.002		2.00E-01	0.01	0.00	NO	--	D	0.00	0.00	NO				
Trichloroethene	2 / 14	0.002 - 0.005		6.00E-03	0.83	0.00	NO	1.10E-02	pending	0.00	0.00	NO				
Xylenes (total)	1 / 13	0.002 - 0.002		2.00E+00	0.00	0.00	NO	--	D	0.00	0.00	NO				
Acenaphthene	1 / 15	0.17 - 0.17		6E-02	2.83	0.00	NO	--	D	0.00	0.00	NO				
Benzo(g,h,i)perylene	3 / 15	0.022 - 0.32		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit
Fluoranthene	5 / 15	0.063 - 0.53		4E-02	13.25	0.00	NO	--	D	0.00	0.00	NO				
Fluorene	1 / 15	0.38 - 0.38		4.00E-02	9.50	0.00	NO	--	D	0.00	0.00	NO				
Phenanthrene	3 / 15	0.041 - 0.32		--	0.00	0.00	NO	--	D	0.00	0.00	NO				YES; no toxcrit
Pyrene	5 / 15	0.051 - 0.42		3E-02	14.00	0.00	NO	--	D	0.00	0.00	NO				
Benzo(a)anthracene	2 / 15	0.029 - 0.26		--	0.00	0.00	NO	7.30E-01	B2	0.19	0.00	NO				
Benzo(a)pyrene	3 / 15	0.021 - 0.25		--	0.00	0.00	NO	7.30E+00	B2	1.83	0.00	NO				
Benzo(b)fluoranthene	4 / 15	0.062 - 0.67		--	0.00	0.00	NO	7.30E-01	B2	0.49	0.00	NO				
Benzo(k)fluoranthene	2 / 15	0.036 - 0.22		--	0.00	0.00	NO	7.30E-02	B2	0.02	0.00	NO				
Chrysene	4 / 15	0.054 - 0.31		--	0.00	0.00	NO	7.30E-03	B2	0.00	0.00	NO				
Indeno(1,2,3-cd)pyrene	3 / 15	0.027 - 0.35		--	0.00	0.00	NO	7.30E-01	B2	0.26	0.00	NO				
bis(2-ethylhexyl)phthalate	2 / 15	0.021 - 0.23		2.00E-02	11.50	0.00	NO	1.40E-02	B2	0.00	0.00	NO				
N-nitrosodiphenylamine	4 / 15	0.53 - 10		2.00E-02	500	0.00	NO	4.90E-03	B2	0.05	0.00	NO				
Pentachlorophenol	1 / 15	0.08 - 0.08		3E-02	2.67	0.00	NO	1.2E-01	B2	0.01	0.00	NO				

302447

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
ALL SOIL AREA C

CHEMICAL	Frequency of Detection	Detected Concentrations		Oral Reference Dose	Risk Factor	Relative Risk	Screen	Oral Slope Factor	Weight of Evidence Classification	Risk Factor	Relative Risk	Screen	Background Screen		Nutrient Screen	Other Reason for Selection or Elimination
		Range mg/kg	Average mg/kg	mg/kg-day				$(mg/kg\text{-}day)^{-1}$					Average Concentration mg/kg	2X Average mg/kg		
PCBs	3 / 15	0.873 - 2.891		2.00E-05	144550	0.01	YES	2.00E+00	B2	5.78	0.00	NO				
Aluminum	15 / 15	1380 - 16200	5787	1.00E+00	16200	0.00	NO	--	--	0.00	0.00	NO	9790	19580		
Antimony	14 / 15	10.2 - 3490	1111	4.00E-04	8725000	0.44	YES	--	--	0.00	0.00	NO	1.6	3.2		
Arsenic	14 / 14	7.3 - 2950	727	3.00E-04	9833333	0.50	YES	1.50E+00	A	4425	0.99	YES	6.3	13		
Barium	15 / 15	26.6 - 1350	296	7E-02	19286	0.00	NO	--	--	0.00	0.00	NO	49	98		YES; inhalation risk, >2X
Beryllium	2 / 15	0.82 - 11	5.91	5.00E-03	2200	0.00	NO	4.30E+00	B2	47.3	0.01	YES	0.85	1.7		
Cadmium	11 / 15	0.89 - 23.9	9.08	1.00E-03	23900	0.00	NO	--	B1	0.00	0.00	NO	ND	ND		
Calcium	15 / 15	506 - 76000	11076	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1070	2141	>1E+06	NO; < nsc
Chromium	15 / 15	12.9 - 434	59	1E+00	434	0.00	NO	--	--	0.00	0.00	NO	18	37		
Cobalt	14 / 15	2.9 - 764	118	6.00E-02	12733	0.00	NO	--	ND	0.00	0.00	NO	7.27	15		YES; inhalation risk, >2X
Copper	15 / 15	9.6 - 6740	1149	3.7E-02	182162	0.01	YES	--	D	0.00	0.00	NO	16	32		
Iron	15 / 15	11600 - 1E+05	53887	3.00E-01	480000	0.02	YES	--	--	0.00	0.00	NO	20591	41183	100,000	
Lead	15 / 15	8.3 - 5140	1294	--	0.00	0.00	NO	--	B2	0.00	0.00	NO	24.31	49		YES; no toxcrit, >2X
Manganese	13 / 13	58.1 - 2930	3113	2.30E-02	127391	0.01	YES	--	D	0.00	0.00	NO	677	1353		
Magnesium	15 / 15	167 - 24800	732	--	0.00	0.00	NO	--	--	0.00	0.00	NO	2147	4294	>1E+06	NO; < 2X
Mercury	15 / 15	0.06 - 29.5	4.57	--	0.00	0.00	NO	--	D	0.00	0.00	NO	0.09	0.17		YES; no toxcrit, >2X
Nickel	15 / 15	7.7 - 311	96	2E-02	15550	0.00	NO	--	--	0.00	0.00	NO	13	25		
Potassium	15 / 15	508 - 6780	1585	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1427	2855	>1E+06	NO; < 2X
Selenium	13 / 15	3.9 - 262	74	5.00E-03	52400	0.00	NO	--	D	0.00	0.00	NO	2	4		
Silver	13 / 15	0.95 - 110	27.57	5E-03	22000	0.00	NO	--	D	0.00	0.00	NO	0.47	0.94		YES; inhalation risk, >2X
Sodium	15 / 15	57.6 - 2960	1117	--	0.00	0.00	NO	--	--	0.00	0.00	NO	75	150	>1E+06	NO; < nsc
Vanadium	15 / 15	10.6 - 148	29	7.00E-03	21143	0.00	NO	--	ND	0.00	0.00	NO	25.2	50.4		
Zinc	15 / 15	40.8 - 2870	635	3.00E-01	9567	0.00	NO	--	D	0.00	0.00	NO	44	88		
Cyanide	3 / 15	0.3 - 8	2.90	2.00E-02	400	0.00	NO	--	D	0.00	0.00	NO	0.23	0.46		
			Total Relative Risk: 19688808					Total Relative Risk: 4472								

no toxcrit = Oral toxicity information is not available.
2X = Two times average background.
nsc = Nutrient screening concentration.
inhalation risk = Chemical does not pass a similar inhalation concentration/toxicity screen.
f/d = Frequency of detection.

302448

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SURFACE WATER
PARCEL B

CHEMICAL	Frequency of Detection	Range of Detected Concentrations mg/L	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence Clasification	Risk Factor	Relative Risk	Screen	Nutrient Screen mg/L	Other Reason for Selection or Elimination
Acetone	1 / 2	0.013	1.00E-01	0.13	0.00	NO	--	D	0.00	0.00	NO		
1,1-Dichloroethane	1 / 2	0.002	1.00E-01	0.02	0.00	NO	--	C	0.00	0.00	NO		
1,2-Dichloroethene (total)	1 / 2	0.015	9.00E-03	1.67	0.00	NO	--	--	0.00	0.00	NO		
Tetrachloroethene	1 / 2	0.006	1E-02	0.60	0.00	NO	5.20E-02	WD	0.00	0.00	NO		
bis(2-ethylhexyl)phthalate	1 / 2	0.001	2.00E-02	0.05	0.00	NO	1.40E-02	B2	0.00	0.00	NO		
4,4'-DDD	1 / 2	0.0091	--	0.00	0.00	NO	2.40E-01	B2	0.00	0.00	NO		
4,4'-DDE	1 / 2	0.0016	--	0.00	0.00	NO	3.4E-01	B2	0.00	0.00	NO		
4,4'-DDT	1 / 2	0.0046	5.00E-04	9.20	0.00	NO	3.40E-01	B2	0.00	0.00	NO		
Aluminum	**2 / 2**	**0.127 - 77**	**1.00E+00**	**77**	**0.00**	**NO**	**--**	**--**	**0.00**	**0.00**	**NO**		**YES; copc at Parcel C**
Antimony	**1 / 2**	**2.26**	**4.00E-04**	**5650**	**0.14**	**YES**	--	--	0.00	0.00	NO		
Arsenic	**1 / 2**	**8.09**	**3.00E-04**	**26967**	**0.67**	**YES**	**1.50E+00**	**A**	**12.14**	**1.00**	**YES**		
Barium	**2 / 2**	**0.101 - 0.463**	**7E-02**	**6.61**	**0.00**	**NO**	**--**	**--**	**0.00**	**0.00**	**NO**		
Cadmium	**1 / 2**	**0.846**	**5.00E-04**	**1692**	**0.04**	**YES**	**--**	**B1**	**0.00**	**0.00**	**NO**		
Calcium	2 / 2	29.8 - 106	--	0.00	0.00	NO	--	--	0.00	0.00	NO	400	NO; no toxcrit,< nsc
Chromium	1 / 2	0.215	1E+00	0.22	0.00	NO	--	--	0.00	0.00	NO		
Cobalt	2 / 2	0.0557 - 42.3	6.00E-02	705	0.02	YES	--	ND	0.00	0.00	NO		
Copper	1 / 2	17.1	3.7E-02	462	0.01	YES	--	D	0.00	0.00	NO		
Iron	2 / 2	13 - 722	3.00E-01	2407	0.06	YES	--	--	0.00	0.00	NO	5	
Lead	1 / 2	1.18	--	0.00	0.00	NO	--	B2	0.00	0.00	NO		YES; no toxcrit
Manganese	2 / 2	4.97 - 5.39	2.30E-02	234	0.01	YES	--	D	0.00	0.00	NO		
Magnesium	2 / 2	9.77 - 30.1	--	0.00	0.00	NO	--	--	0.00	0.00	NO	40	NO; no toxcrit,< nsc
Mercury	1 / 2	0.0036	--	0.00	0.00	NO	--	D	0.00	0.00	NO		
Nickel	2 / 2	0.0177 - 27.9	2E-02	1395	0.03	YES	--	--	0.00	0.00	NO		
Potassium	2 / 2	4.69 - 18.1	--	0.00	0.00	NO	--	--	0.00	0.00	NO	500	NO; no toxcrit,< nsc
Selenium	1 / 2	0.2	5.00E-03	40	0.00	NO	--	D	0.00	0.00	NO		
Silver	1 / 2	0.256	5E-03	51	0.00	NO	--	D	0.00	0.00	NO		
Sodium	2 / 2	47.8 - 296	--	0.00	0.00	NO	--	--	0.00	0.00	NO	500	NO; no toxcrit,< nsc
Vanadium	1 / 2	0.21	7.00E-03	30	0.00	NO	--	ND	0.00	0.00	NO		
Zinc	1 / 2	91.2	3.00E-01	304	0.01	YES	--	D	0.00	0.00	NO		
Cyanide	1 / 2	0.005	2.00E-02	0.26	0.00	NO	--	D	0.00	0.00	NO		
		Total Relative Risk:		40033			Total Relative Risk:		12				

no toxcrit = Oral toxicity information is not available.
nsc = Nutrient screening concentration.

302449

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SEDIMENT
PARCEL B

CHEMICAL	Frequency of Detection	Detected Concentrations Range mg/kg	Detected Concentrations Average mg/kg	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence Clasification	Risk Factor	Relative Risk	Screen	Background Screen Average Concentration mg/kg	Background Screen 2X Average mg/kg	Nutrient Screen mg/kg	Other Reason for Selection or Elimination
Acetone	2 / 2	0.16 - 0.24		1.00E-01	2.40	0.00	NO	--	D	0.00	0.00	NO				
Benzene	1 / 2	0.002		3.00E-03	0.67	0.00	NO	2.9E-02	A	0.00	0.00	NO				YES; A carcinogen
2-Butanone	2 / 2	0.027 - 0.067		6.00E-01	0.11	0.00	NO	--	D	0.00	0.00	NO				
1,1-Dichloroethane	1 / 2	0.002		1.00E-01	0.02	0.00	NO	--	C	0.00	0.00	NO				
1,2-Dichloroethene (total)	1 / 2	0.002		9.00E-03	0.22	0.00	NO	--	--	0.00	0.00	NO				
Fluoranthene	1 / 2	0.074		4E-02	1.85	0.00	NO	--	D	0.00	0.00	NO				
Phenanthrene	1 / 2	0.053		--	0.00	0.00	NO	--	D	0.00	0.00	NO				
Pyrene	2 / 2	0.052 - 0.059		3E-02	1.97	0.00	NO	--	D	0.00	0.00	NO				
Benzo(b)fluoranthene	2 / 2	0.054 - 0.055		--	0.00	0.00	NO	7.30E-01	B2	0.04	0.00	NO				
PCBs (total)	1 / 2	1.806		2.00E-05	90300	0.26	YES	2.00E+00	--	3.61	0.00	NO				
4,4'-DDD	1 / 2	0.116		--	0.00	0.00	NO	2.40E-01	B2	0.03	0.00	NO				
4,4'-DDE	1 / 2	0.056		--	0.00	0.00	NO	3.4E-01	B2	0.02	0.00	NO				
Aluminum	2 / 2	5260 - 5860	5560	1.00E+00	5860	0.02	YES	--	--	0.00	0.00	NO	9790	19580		NO; < 2X
Antimony	2 / 2	3.8 - 5	4.4	4.00E-04	12500	0.04	YES	--	--	0.00	0.00	NO	1.6	3.2		
Arsenic	2 / 2	11.8 - 25.6	18.7	3.00E-04	85333	0.25	YES	1.50E+00	A	38.40	0.00	NO	6.3	13		
Barium	2 / 2	67.6 - 82.1	74.85	7E-02	1173	0.00	NO	--	--	0.00	0.00	NO	49	98		
Calcium	2 / 2	1190 - 1360	1275	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1070	2141	>1E+06	NO; no toxcrit,< 2X
Chromium	2 / 2	15.1 - 18.2	16.65	1E+00	18.20	0.00	NO	--	--	0.00	0.00	NO	18	37		
Cobalt	2 / 2	47.8 - 77.2	62.5	6.00E-02	1287	0.00	NO	--	ND	0.00	0.00	NO	7.27	15		
Copper	2 / 2	34.2 - 191	112.6	3.7E-02	5162	0.02	YES	--	D	0.00	0.00	NO	16	32		
Iron	2 / 2	23100 - 33000	28050	3.00E-01	110000	0.32	YES	--	--	0.00	0.00	NO	20591	41183	100,000	NO; < 2X
Lead	2 / 2	22.1 - 94.2	58.15	--	0.00	0.00	NO	--	B2	0.00	0.00	NO	24.31	49		YES; no toxcrit, >2X
Manganese	2 / 2	372 - 543	457.5	2.30E-02	23609	0.07	YES	--	D	0.00	0.00	NO	677	1353		NO; < 2X
Magnesium	2 / 2	1610 - 1650	1630	--	0.00	0.00	NO	--	--	0.00	0.00	NO	2147	4294	>1E+06	NO; no toxcrit,< 2X
Mercury	2 / 2	0.08 - 0.18	0.13	--	0.00	0.00	NO	--	D	0.00	0.00	NO	0.09	0.17		NO; no toxcrit,< 2X
Nickel	2 / 2	37.5 - 43.4	40.45	2E-02	2170	0.01	YES	--	--	0.00	0.00	NO	13	25		
Potassium	2 / 2	871 - 1090	980.5	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1427	2855	>1E+06	NO; no toxcrit,< 2X
Selenium	2 / 2	2.7 - 3.6	3.15	5.00E-03	720	0.00	NO	--	D	0.00	0.00	NO	2	4		
Silver	2 / 2	0.65 - 3	1.825	5E-03	600	0.00	NO	--	D	0.00	0.00	NO	0.47	0.94		
Sodium	2 / 2	51.5 - 53.7	52.6	--	0.00	0.00	NO	--	--	0.00	0.00	NO	75	150	>1E+06	NO; no toxcrit,< 2X
Vanadium	2 / 2	23 - 31.5	27.25	7.00E-03	4500	0.01	YES	--	ND	0.00	0.00	NO	25.2	50.4		NO; < 2X
Zinc	2 / 2	60.4 - 87.2	73.8	3.00E-01	291	0.00	NO	--	D	0.00	0.00	NO	44	88		
			Total Relative Risk:		343530			Total Relative Risk:		38.45						

no toxcrit = Oral toxicity information is not available.
nsc = Nutrient screening concentration.
2x = Two times average background.

302450

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SURFACE WATER
PARCEL C

CHEMICAL	Frequency of Detection	Range of Detected Concentrations mg/L	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence Clasification	Risk Factor	Relative Risk	Screen	Nutrient Screen mg/L	Other Reason for Selection or Elimination
bis(2-ethylhexyl)phthalate	1 / 2	0.004	2.00E-02	0.20	0.00	NO	1.40E-02	B2	0.00	0.00	NO		
Di-n-butylphthalate	1 / 2	0.001	1.00E-01	0.01	0.00	NO	--	D	0.00	0.00	NO		
Aluminum	2 / 2	13.2 - 28	1.00E+00	28.00	0.02	YES	--	--	0.00	0.00	NO		
Antimony	1 / 2	0.0154	4.00E-04	38.50	0.03	YES	--	--	0.00	0.00	NO		
Arsenic	2 / 2	0.115 - 0.246	3.00E-04	820.00	0.56	YES	1.50E+00	A	0.37	0.94	YES		
Barium	2 / 2	0.023 - 0.0271	7.00E-02	0.39	0.00	NO	--	--	0.00	0.00	NO		
Beryllium	1 / 2	0.0055	5.00E-03	1.10	0.00	NO	4.30E+00	B2	0.02	0.06	YES		
Cadmium	2 / 2	0.023 - 0.0792	5.00E-04	158.40	0.11	YES	--	B1	0.00	0.00	NO		
Calcium	2 / 2	40.9 - 47.5	--	0.00	0.00	NO	--	--	0.00	0.00	NO	400	NO; no toxcrit, < nsc
Chromium	1 / 2	0.012	1.00E+00	0.01	0.00	NO	--	--	0.00	0.00	NO		
Copper	2 / 2	0.956 - 4.14	3.7E-02	111.89	0.08	YES	--	D	0.00	0.00	NO		
Iron	2 / 2	24.5 - 33.6	3.00E-01	112.00	0.08	YES	--	--	0.00	0.00	NO	5	
Lead	2 / 2	0.292 - 0.377	--	0.00	0.00	NO	--	B2	0.00	0.00	NO		YES; no toxcrit
Manganese	2 / 2	3.35 - 3.81	2.30E-02	165.65	0.11	YES	--	D	0.00	0.00	NO		
Magnesium	2 / 2	12.2 - 15	--	0.00	0.00	NO	--	--	0.00	0.00	NO	40	NO; no toxcrit, < nsc
Mercury	1 / 2	0.00012	--	0.00	0.00	NO	--	D	0.00	0.00	NO		
Nickel	2 / 2	0.055 - 0.116	2.00E-02	5.80	0.00	NO	--	--	0.00	0.00	NO		
Potassium	2 / 2	2.62 - 3.76	--	0.00	0.00	NO	--	--	0.00	0.00	NO	500	NO; no toxcrit, < nsc
Silver	1 / 2	0.0051	5.00E-03	1.02	0.00	NO	--	D	0.00	0.00	NO		
Sodium	2 / 2	19.9 - 23	--	0.00	0.00	NO	--	--	0.00	0.00	NO	500	NO; no toxcrit, < nsc
Zinc	2 / 2	2.04 - 4.89	3.00E-01	16.30	0.01	YES	--	D	0.00	0.00	NO		
		Total Relative Risk: 1459.27					Total Relative Risk:		0.39				

no toxcrit = Oral toxicity information is not available.

nsc = Nutrient screening concentration.

302451

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
SEDIMENT
PARCEL C

CHEMICAL	Frequency of Detection	Detected Concentrations Range mg/kg	Detected Concentrations Average mg/kg	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence Clasification	Risk Factor	Relative Risk	Screen	Background Screen Average Concentration mg/kg	Background Screen 2X Average mg/kg	Nutrient Screen mg/kg	Other Reason for Selection or Elimination
2-Butanone	1 / 2	0.021		6.00E-01	0.04	0.00	NO	--	D	0.00	0.00	NO				
Benzo(g,h,i)perylene	1 / 2	0.13		--	0.00	0.00	NO	--	D	0.00	0.00	NO				
Fluoranthene	1 / 2	0.16		4E-02	4.00	0.00	NO	--	D	0.00	0.00	NO				
Phenanthrene	1 / 2	0.099		--	0.00	0.00	NO	--	D	0.00	0.00	NO				
Pyrene	1 / 2	0.13		3E-02	4.33	0.00	NO	--	D	0.00	0.00	NO				
Benzo(a)anthracene	1 / 2	0.08		--	0.00	0.00	NO	7.30E-01	B2	0.06	0.00	NO				
Benzo(a)pyrene	1 / 2	0.075		--	0.00	0.00	NO	7.30E+00	B2	0.55	0.00	NO				
Benzo(b)fluoranthene	1 / 2	0.2		--	0.00	0.00	NO	7.30E-01	B2	0.15	0.00	NO				
Benzo(k)fluoranthene	1 / 2	0.066		--	0.00	0.00	NO	7.30E-02	B2	0.00	0.00	NO				
Chrysene	1 / 2	0.1		--	0.00	0.00	NO	7.30E-03	B2	0.00	0.00	NO				
Indeno(1,2,3-cd)pyrene	1 / 2	0.085		--	0.00	0.00	NO	7.30E-01	B2	0.06	0.00	NO				
Aluminum	2 / 2	1060 - 6890	3975	1.00E+00	6890	0.00	NO	--	--	0.00	0.00	NO	9790	19580		
Antimony	2 / 2	35.2 - 87.8	61.5	4.00E-04	219500	0.03	YES	--	--	0.00	0.00	NO	1.6	3.2		
Arsenic	2 / 2	1610 - 2080	1845	3.00E-04	6933333	0.94	YES	1.50E+00	A	3120.00	0.00	NO	6.3	12.6		
Barium	2 / 2	38.9 - 71.7	55.3	7E-02	1024	0.00	NO	--	--	0.00	0.00	NO	49.04	98		
Cadmium	2 / 2	4.9 - 5.1	5	1.00E-03	5100.00	0.00	NO	--	B1	0.00	0.00	NO	ND	ND		
Calcium	2 / 2	477 - 962	720	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1070	2141	>1E+06	NO; no toxcrit,< 2X
Chromium	2 / 2	9 - 37.5	23.25	1E+00	37.50	0.00	NO	--	--	0.00	0.00	NO	18.33	37		
Cobalt	2 / 2	7.9 - 8.7	8.3	6.00E-02	145	0.00	NO	--	ND	0.00	0.00	NO	7.27	15		
Copper	2 / 2	239 - 418	329	3.7E-02	11297	0.00	NO	--	D	0.00	0.00	NO	15.99	32		YES; copc Parcel B
Iron	2 / 2	52900 - 54400	53650	3.00E-01	181333	0.02	YES	--	--	0.00	0.00	NO	20591	41183	100,000	NO; < nsc
Lead	2 / 2	1950 - 2840	2395	--	0.00	0.00	NO	--	B2	0.00	0.00	NO	24.31	49		YES; no toxcrit, >2X
Manganese	2 / 2	137 - 354	246	2.30E-02	15391	0.00	NO	--	D	0.00	0.00	NO	677	1353		
Magnesium	2 / 2	346 - 1640	993	--	0.00	0.00	NO	--	--	0.00	0.00	NO	2147	4294	>1E+06	NO; no, toxcrit,< 2X
Mercury	2 / 2	0.17 - 2.1	1.14	--	0.00	0.00	NO	--	D	0.00	0.00	NO	0.09	0.17		YES; no toxcrit, >2X
Nickel	2 / 2	6.5 - 15.5	11	2E-02	775	0.00	NO	--	--	0.00	0.00	NO	13	25		
Potassium	2 / 2	1340 - 1860	1600	--	0.00	0.00	NO	--	--	0.00	0.00	NO	1427	2855	>1E+06	NO; no toxcrit,< 2X
Selenium	2 / 2	9.8 - 15.8	12.8	5.00E-03	3160	0.00	NO	--	D	0.00	0.00	NO	2	4		
Silver	2 / 2	19.8 - 63.3	41.55	5E-03	12660	0.00	NO	--	D	0.00	0.00	NO	0.47	0.94		
Sodium	2 / 2	75.6 - 182	129	--	0.00	0.00	NO	--	--	0.00	0.00	NO	75	150	>1E+06	
Vanadium	2 / 2	8.5 - 20.6	14.55	7.00E-03	2943	0.00	NO	--	ND	0.00	0.00	NO	25.2	50.4		
Zinc	2 / 2	435 - 466	451	3.00E-01	1553	0.00	NO	--	D	0.00	0.00	NO	43.89	88		
Cyanide	1 / 2	0.53	0.53	2.00E-02	26.50	0.00	NO	--	D	0.00	0.00	NO	0.23	0.46		
			Total Relative Risk: 7395178						Total Relative Risk:	0.00						

no toxcrit = Oral toxicity information is not available.
nsc = Nutrient screening concentration.
2x = Two times average background.

302452

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
GROUNDWATER

CHEMICAL	Frequency of Detection	Detected Concentrations Range mg/L	Detected Concentrations Average mg/L	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg-day)^{-1}$	Weight of Evidence lassification	Risk Factor	Relative Risk	Screen	Background Screen Average Concentration mg/L	Background Screen 2X Average mg/L	Nutrient Screen mg/L	Reason for Selection or Elimination
Acetone	19 / 59	0 - 17		1.00E-01	170	0.00	NO	--	0.00	0.00	NO	D				
Benzene	8 / 59	0 - 0.54		3E-03	180	0.00	NO	2.9E-02	0.02	0.00	NO	A				YES; A carcinogen, 0'd
2-Butanone	8 / 59	0.07 - 1.5		6.00E-01	2.50	0.00	NO	--	0.00	0.00	NO	D				
Carbon Disulfide	1 / 59	0		1.00E-01	0.01	0.00	NO	--	0.00	0.00	NO	--				
Carbon Tetrachloride	2 / 59	0 - 0.17		7.00E-04	243	0.00	NO	1.30E-01	0.02	0.00	NO	B2				
Chlorobenzene	1 / 59	0		2E-02	0.05	0.00	NO	--	0.00	0.00	NO	D				
Chloroethane	2 / 59	0.03 - 0.03		4.00E-01	0.07	0.00	NO	2.90E-03	0.00	0.00	NO	--				
Chloroform	3 / 59	0.23 - 4		1E-02	400	0.00	NO	6.1E-03	0.02	0.00	NO	B2				
Chloromethane	1 / 59	0		--	0	0.00	NO	--	0.00	0.00	NO	C				NO; no toxcrit, low 0'd
1,1-Dichloroethane	15 / 59	0 - 3.6		1.00E-01	36	0.00	NO	--	0.00	0.00	NO	C				
1,2-Dichloroethane	5 / 59	0 - 0.79		3.00E-02	26	0.00	NO	9.10E-02	0.07	0.00	NO	B2				
1,1-Dichloroethene	4 / 59	0 - 0.65		9.00E-03	72	0.00	NO	6.00E-01	0.39	0.02	YES	C				
1,2-Dichloroethene (total)	29 / 59	0 - 150		9.00E-03	16667	0.15	YES	--	0.00	0.00	NO	--				
Ethylbenzene	8 / 59	0 - 7.6		1.00E-01	76	0.00	NO	--	0.00	0.00	NO	D				
4-Methyl-2-Pentanone	2 / 59	7.9 - 17		8.00E-02	213	0.00	NO	--	0.00	0.00	NO	--				
Methylene Chloride	9 / 59	0 - 120		6E-02	2000	0.02	YES	8E-03	0.90	0.05	YES	B2				
1,1,2,2-Tetrachloroethane	2 / 59	0 - 0		--	0.00	0.00	NO	2.0E-01	0.00	0.00	NO	C				
Tetrachloroethene	26 / 59	0 - 7.8		1E-02	780	0.01	YES	5.20E-02	0.41	0.02	YES	WD				
Toluene	12 / 59	0 - 90		2.00E-01	450	0.00	NO	--	0.00	0.00	NO	D				
1,1,1-Trichloroethane	10 / 59	0 - 16		2.00E-02	800	0.01	YES	--	0.00	0.00	NO	D				
1,1,2-Trichloroethane	4 / 59	0 - 0.07		4E-03	16	0.00	NO	5.7E-02	0.00	0.00	NO	C				
Trichloroethene	26 / 59	0 - 31		6.00E-03	5167	0.05	YES	1.10E-02	0.34	0.02	YES	pending				
Vinyl Chloride	10 / 59	0 - 0.1		--	0.00	0.00	NO	1.90E+00	0.18	0.01	YES	A				
Xylenes (total)	9 / 59	0 - 36		2.00E+00	18	0.00	NO	--	0.00	0.00	NO	D				
Acenaphthene	3 / 59	0 - 0		6E-02	0.07	0.00	NO	--	0.00	0.00	NO	D				
Fluorene	4 / 59	0 - 0		4.00E-02	0.10	0.00	NO	--	0.00	0.00	NO	D				
Phenanthrene	5 / 59	0 - 0		--	0.00	0.00	NO	--	0.00	0.00	NO	D				YES; no toxcrit, 0'd
bis(2-ethylhexyl)phthalate	23 / 59	0 - 2.4		2.00E-02	120	0.00	NO	1.40E-02	0.03	0.00	NO	B2				
Dibenzofuran	3 / 59	0 - 0.01		4.00E-03	1.25	0.00	NO	--	0.00	0.00	NO	D				
Di-n-butylphthalate	13 / 59	0 - 0.79		1.00E-01	7.90	0.00	NO	--	0.00	0.00	NO	D				
Di-n-octylphthalate	1 / 59	0		2.00E-02	0.05	0.00	NO	--	0.00	0.00	NO	--				
1,2-Dichlorobenzene	4 / 59	0.24 - 1.3		9.00E-02	14	0.00	NO	--	0.00	0.00	NO	D				
1,3-Dichlorobenzene	1 / 59	0.02		3.00E-02	0.67	0.00	NO	--	0.00	0.00	NO	D				
1,4-Dichlorobenzene	4 / 59	0.02 - 0.1		3E-02	3.33	0.00	NO	2.40E-02	0.00	0.00	NO	C				
Diethylphthalate	3 / 59	0.01 - 0.06		8E-01	0.08	0.00	NO	--	0.00	0.00	NO	D				
Dimethylphthalate	1 / 59	0		--	0.00	0.00	NO	--	0.00	0.00	NO	D				NO; no toxcrit, low 0'd
2,4-Dimethylphenol	2 / 59	0.03 - 0.11		2.00E-02	5.50	0.00	NO	--	0.00	0.00	NO	C				
Isophorone	5 / 59	0.01 - 0.53		2.00E-01	2.65	0.00	NO	9.50E-04	0.00	0.00	NO	C				
2-Methylnaphthalene	10 / 59	0 - 0.12		4.00E-02	3.00	0.00	NO	--	0.00	0.00	NO	D				
2-Methylphenol	6 / 59	0 - 0.41		5.00E-02	8.20	0.00	NO	--	0.00	0.00	NO	C				
4-Methylphenol	11 / 59	0 - 0.42		5.00E-03	84	0.00	NO	--	0.00	0.00	NO	C				
Naphthalene	11 / 59	0 - 2.3		4.00E-02	58	0.00	NO	--	0.00	0.00	NO	D				
Phenol	9 / 59	0 - 0.63		6.00E-01	1.05	0.00	NO	--	0.00	0.00	NO	D				
Aldrin	5 / 56	0 - 0		3.00E-05	2.20	0.00	NO	1.70E+01	0.00	0.00	NO	B2				
alpha-BHC	2 / 56	0 - 0		--	0.00	0.00	NO	6.30E+00	0.00	0.00	NO	B2				

302453

CONCENTRATION/TOXICITY SCREEN AND SELECTION OF COPC
GROUNDWATER

CHEMICAL	Frequency of Detection	Detected Concentrations Range mg/L	Detected Concentrations Average mg/L	Oral Reference Dose mg/kg-day	Risk Factor	Relative Risk	Screen	Oral Slope Factor $(mg/kg\text{-}day)^{-1}$	Weight of Evidence lassification	Risk Factor	Relative Risk	Screen	Background Screen Average Concentration mg/L	Background Screen 2X Average mg/L	Nutrient Screen mg/L	Reason for Selection or Elimination
beta-BHC	1 / 54	0		--	0.00	0.00	NO	1.8E+00	0.00	0.00	NO	--				NO; no toxcrit, low f/d
gamma-BHC (Lindane)	3 / 55	0 - 0		3.00E-04	0.13	0.00	NO	1.30E+00	0.00	0.00	NO	B2-C				
alpha-Chlordane	1 / 55	0		6E-05	0.63	0.00	NO	1.3E+00	0.00	0.00	NO	B2				
gamma-Chlordane	1 / 55	0		6E-05	0.63	0.00	NO	1.3E+00	0.00	0.00	NO	B2				
4,4'-DDD	1 / 57	0		--	0.00	0.00	NO	2.40E-01	0.00	0.00	NO	B2				
4,4'-DDE	1 / 55	0		--	0.00	0.00	NO	3.4E-01	0.00	0.00	NO	B2				
4,4'-DDT	2 / 56	0 - 0		5.00E-04	0.19	0.00	NO	3.40E-01	0.00	0.00	NO	B2				
Dieldrin	2 / 56	0 - 0		5.00E-05	6.40	0.00	NO	1.60E+01	0.01	0.00	NO	B2				
Endosulfan I	3 / 56	0 - 0		6.00E-03	0.01	0.00	NO	--	0.00	0.00	NO	D				
Endosulfan II	3 / 57	0 - 0		6.00E-03	0.03	0.00	NO	--	0.00	0.00	NO	D				
Endosulfan sulfate	1 / 56	0		--	0.00	0.00	NO	--	0.00	0.00	NO	--				NO; no toxcrit, low f/d
Endrin	2 / 57	0 - 0		3.00E-04	4.33	0.00	NO	--	0.00	0.00	NO	D				
Endrin aldehyde	1 / 56	0		--	0.00	0.00	NO	--	0.00	0.00	NO	--				NO; no toxcrit, low f/d
Heptachlor	3 / 55	0 - 0		5.00E-04	0.09	0.00	NO	4.50E+00	0.00	0.00	NO	B2				
Aluminum	60 / 60	0.07 - 122	33	1.00E+00	122	0.00	NO	--	0.00	0.00	NO	--	35.7	71.5		
Antimony	30 / 60	0.01 - 11.1	0.78	4.00E-04	27750	0.25	YES	--	0.00	0.00	NO	--	ND	ND		
Arsenic	34 / 41	0.01 - 10.9	0.43	3.00E-04	36333	0.33	YES	1.50E+00	16.35	0.87	YES	A	0.08	0.16		
Barium	60 / 60	0.02 - 1.64	0.38	7E-02	23	0.00	NO	--	0.00	0.00	NO	--	1.05	2.09		
Beryllium	34 / 60	0 - 0.01	0.0035	5.00E-03	2.48	0.00	NO	4.30E+00	0.05	0.00	NO	B2	0.001	0.002		
Cadmium	56 / 60	0 - 1.16	0.05	5.00E-04	2320	0.02	YES	--	0.00	0.00	NO	B1	0.008	0.02		
Calcium	60 / 60	5.44 - 554	122	--	0	0.00	NO	--	0.00	0.00	NO	--	56.0	112	400	YES; no toxcrit, >2X, >nsc
Chromium	57 / 59	0 - 0.56	0.10	1E+00	0.56	0.00	NO	--	0.00	0.00	NO	--	0.12	0.24		
Cobalt	58 / 60	0 - 17.6	0.77	6.00E-02	293	0.00	NO	--	0.00	0.00	NO	ND	0.06	0.12		
Copper	59 / 60	0 - 36.9	1.43	3.7E-02	997	0.01	YES	--	0.00	0.00	NO	D	0.14	0.28		
Iron	60 / 60	0.15 - 1260	146	3.00E-01	4200	0.04	YES	--	0.00	0.00	NO	--	127	253	5	NO; < 2X
Lead	51 / 60	0 - 0.84	0.2	--	0	0.00	NO	--	0.00	0.00	NO	B2	0.06	0.13		YES; no toxcrit, >2X
Magnesium	60 / 60	3.2 - 247	34	--	0	0.00	NO	--	0.00	0.00	NO	--	16.4	32.7	40	YES; no toxcrit, >2X, >nsc
Manganese	59 / 59	0.16 - 68.3	9	2.3E-02	2970	0.03	YES	--	0.00	0.00	NO	D	20.4	40.7		NO; < 2X
Mercury	31 / 57	0 - 0.01	0.0014	--	0	0.00	NO	--	0.00	0.00	NO	D	0.001	0.0012		YES; no toxcrit, >2X
Nickel	60 / 60	0 - 110	3.65	2E-02	5500	0.05	YES	--	0.00	0.00	NO	--	0.39	0.776		
Potassium	57 / 57	2.16 - 236	26	--	0	0.00	NO	--	0.00	0.00	NO	--	16.8	33.6	500	NO; no toxcrit, < 2X
Selenium	31 / 58	0 - 1.31	0.10	5.00E-03	262	0.00	NO	--	0.00	0.00	NO	D	0.008	0.02		
Silver	38 / 60	0 - 0.35	0.02	5E-03	70.4	0.00	NO	--	0.00	0.00	NO	D	0.004	0.008		
Sodium	59 / 59	7.82 - 8400	406	--	0	0.00	NO	--	0.00	0.00	NO	--	72.6	145	500	YES; no toxcrit, >2X, >nsc
Thallium	35 / 58	0 - 0.02	0.01	8.00E-05	296	0.00	NO	--	0.00	0.00	NO	D	0.08	0.17		
Vanadium	51 / 59	0 - 0.43	0.10	7.00E-03	62	0.00	NO	--	0.00	0.00	NO	ND	0.11	0.22		
Zinc	60 / 60	0.01 - 17.1	1.15	3.00E-01	57	0.00	NO	--	0.00	0.00	NO	D	0.68	1.36		
Cyanide	3 / 60	0.01 - 0.01	0.01	2.00E-02	0.32	0.00	NO	--	0.00	0.00	NO	D	0.04	0.08		
			Total Relative Risk: 108900					Total Relative Risk: 18.80								

no toxcrit = Oral toxicity information is not available.
2X = Two times average background.
nsc = Nutrient screening concentration.
f/d = Frequency of detection.

302454

ESSENTIAL NUTRIENT SCREEN

Nutrient screening concentrations to evaluate the concentrations of essential nutrients (i.e., calcium, iron, magnesium, potassium, and sodium) in soil and groundwater were derived from Recommended Daily Allowances (RDAs) and exposure parameters in the models used by the USEPA, Region III in their derivation of risk-based concentrations (USEPA, 1995). Based on the exposure scenarios considered in the human health risk evaluation, nutrient screening concentrations for soil were derived for ingestion by a child and reference concentrations for groundwater were derived for residential tap water use by a child (ESHA Research, 1990).

Nutrient Screening Concentrations for Soil

$$RC_s = RDA_a / IR_s * FI * CF$$

where

RC_s = nutrient screening concentration for soil (mg/Kg)
RDA_a = recommended daily allowance for a child (mg/day)
IR_s = soil ingestion rate (200 mg/day)
RI = fraction ingested (0.5)
CF = conversion factor (10^{-6} Kg/mg)

Nutrient Screening Concentration for Groundwater

$$RC_w = RDA_c / IR_w$$

where

RC_w = nutrient screening concentration for water (mg/L)
RDA_c = recommended daily allowance for a child (mg/day)
IR_w = water ingestion rate (2 L/day)

302455

Essential Nutrient	Recommended Daily Allowance (mg/day; male child)	Nutrient Screening Concentration for Soil (mg/Kg)	Nutrient Screening Concentration for Groundwater (mg/L)
Calcium	800	> 1E+06	400
Iron	10	100,000	5
Magnesium	80	8E+05	40
Potassium	1000	> 1E+06	500
Sodium	975	> 1E+06	500

References

U.S. Environmental Protection Agency. 1995. Risk-Based Concentration Table, July-December 1995. Philadelphia, PA: USEPA Region III, Technical Support Section.

ESHA Research. 1990. The Food Processor II. Nutrient Analysis System.

302456

INDOOR SHOWER MODEL

The concentrations of volatile chemicals of potential concern in bathroom air during and after showering are estimated using an approach recommended by the United States Environmental Protection Agency (Schaum, 1992). The Schaum model is a realistic yet simple model which treats the bathroom as one compartment and yields air concentrations averaged over the time of the actual shower and the time spent in the bathroom subsequent to the shower. It is assumed that the chemicals volatilize at a constant rate, instantly mix uniformly with the bathroom air, and that ventilation with clean air does not occur. This implies that the chemical concentrations in the air increase linearly from zero to a maximum at the end of the shower and then remain constant during the time an individual spends in the bathroom immediately after the shower.

The average concentration of a volatile chemical in the shower air over a period of t_s minutes (for $t_s > 0$) is estimated from the following equation:

$$C_a = ((C_{amax} / 2)\, t_1 + C_{amax}\, t_2) / (t_1 + t_2)$$

where:

C_a = the concentration of a volatile chemical in the bathroom air over a duration of t_s minutes (mg/m^3)

C_{amax} = the maximum concentration of a volatile chemical in the bathroom air (mg/m^3)

t_1 = the time of shower (0.2 hr)

t_2 = the time after shower (0.2 hr)

t_s = the time in the bathroom during (t_1) and after (t_2) the shower (0.4 hr)

and where:

$$C_{amax} = C_w\, f\, F_w\, t_1 / V_a$$

where:

C_{amax} = the maximum volatile chemical concentration in the bathroom air (mg/m^3)

C_w = the water concentration (mg/L)

f = the fraction volatilized (unitless)

F_w = the water flow rate (500 L/hr)

V_a = the bathroom volume (16 m^3)

The fraction volatilized value is the mass fraction of the chemical in water that volatilizes over the course of the shower. It is a chemical-specific value which is not easily predicted. The volatilization rates depend on properties such as Henry's Law constant and molecular weight. McKone (1989) has suggested an approach where the volatilization fraction for an untested chemical can be predicted from a tested chemical using a ratio of their overall mass transfer coefficients:

$$f_i = f_j \left((2.5/D_w^{0.67}) + ((RT/D_a^{0.67})*H)\right)_j / \left((_{2.5}/D_w^{0.67}) + ((RT/D_a^{0.67})*H)\right)_i$$

where:

f_i = the volatilization fraction for chemical i

f_j = the volatilization fraction for chemical j

D_a = the diffusion coefficient in air (m^2/sec)

D_w = the diffusion coefficient in water (m^2/sec)

R = the gas constant (atm-m^3/mol-K) = $8.21*10^{-5}$

H = Henry's law constant (atm-m^3/mol-K)

T = temperature (K)

The various input parameters and the estimates of C_a are presented in the following table.

References

Schaum, J., K. Hoang, R. Kinerson, and J. Moya. 1992. Estimating Dermal and Inhalation Exposure to Volatile Chemicals in Domestic Water. California Environmental Protection Agency. Sacramento, CA.

McKone, T.E. 1989. Household exposure models. Toxicology Letters, 49: 321-339.

302458

INDOOR SHOWER MODEL SCENARIO
LI TUNGSTEN SITE

Chemical	Concentration in Air Ca (mg/m3)	Concentration in Water Cw (mg/L)	Henry's Law Constant H (unitless)	H (atm-m3/mol)	Diffusion Coefficient in Water Dw (m^2/sec)	Diffusion Coefficient in Air Da (m^2/sec)	Fraction Volatilized f (unitless)	Flow Rate of Shower Fw (L/hr)	Time of Shower t1 (hours)	Time after Shower t2 (hours)	Bathroom Volume Va (m^3)	Max Chemical Concentration in Bathroom Air Camax (mg/m3)
Benzene	2.77E-01	9.39E-02	2.28E-01	5.55E-03	9.80E-06	8.80E-02	6.29E-01	500	0.2	0.2	16	3.70E-01
1,1 Dichloroethene	2.85E-01	9.27E-02	1.07E+00	2.61E-02	1.04E-05	9.00E-02	6.57E-01	500	0.2	0.2	16	3.81E-01
1,2 Dichloroethene (total)	6.02E+01	1.86E+01	1.67E-01	4.08E-03	1.13E-05	7.36E-02	6.91E-01	500	0.2	0.2	16	8.03E+01
Methylene Chloride	2.29E+00	6.92E-01	8.98E-02	2.19E-03	1.17E-05	1.01E-01	7.04E-01	500	0.2	0.2	16	3.05E+00
1,1,1 Trichloroethane	2.50E+00	9.08E-01	7.05E-01	1.72E-02	8.80E-06	7.80E-02	5.87E-01	500	0.2	0.2	16	3.33E+00
Trichloroethene	8.67E+00	3.08E+00	4.22E-01	1.03E-02	9.10E-06	7.90E-02	6.00E-01	500	0.2	0.2	16	1.16E+01
Tetrachloroethene	3.80E+00	1.45E+00	7.54E-01	1.84E-02	8.20E-06	7.20E-02	5.60E-01	500	0.2	0.2	16	5.07E+00
Vinyl Chloride	8.89E-02	1.21E-01	1.11E+00	2.70E-02	1.23E-06	1.06E-01	1.57E-01	500	0.2	0.2	16	1.19E-01

Henry's Law constant for 1,2-Dichloroethene is for cis-1,2-Dichloroethene

302459

Appendix O-1

Radiological Risk - RAGS Exposure and Risk Summaries

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR AN ADULT OFF-SITE RESIDENT

INHALATION OF RADIONUCLIDES ON RESPIRABLE PARTICULATE

CHEMICAL	AIR CONCENTRATION (pCi/m^3)	BACKGROUND AIR CONCENTRATION (pCi/m^3)	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	INHALATION SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES							
Uranium 238	2.80E-03	1.00E-05	6E+02	2E+00	1.24E-08	8E-06	3E-08
Uranium 234	2.80E-03	1.37E-05	6E+02	3E+00	1.40E-08	9E-06	4E-08
Thorium 230	1.95E-03	1.74E-05	4E+02	4E+00	1.72E-08	7E-06	7E-08
Radium 226	7.77E-04	1.37E-05	2E+02	3E+00	2.75E-09	5E-07	8E-09
Lead 210	7.79E-04	1.37E-05	2E+02	3E+00	3.86E-09	7E-07	1E-08
Thorium 232	8.28E-04	1.27E-05	2E+02	3E+00	1.93E-08	3E-06	5E-08
Radium 228	2.29E-03	1.57E-05	5E+02	3E+00	9.94E-10	5E-07	3E-09
Thorium 228	2.29E-03	1.42E-05	5E+02	3E+00	9.68E-08	5E-05	3E-07
					CANCER RISK:	8E-05	5E-07

Intake of radionuclides on respirable particulates via inhalation (adult off-site resident):
(pCi/m^3 air * $0.83m^3$/hour * 1 * 8760 hours/year * 30 years)

302461

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR A CHILD OFF-SITE RESIDENT

INHALATION OF RADIONUCLIDES ON RESPIRABLE PARTICULATE

CHEMICAL	AIR CONCENTRATION (pCi/m^3)	BACKGROUND AIR CONCENTRATION (pCi/m^3)	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	INHALATION SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES							
Uranium 238	2.80E-03	1.00E-05	1E+02	4E-01	1.24E-08	2E-06	5E-09
Uranium 234	2.80E-03	1.37E-05	1E+02	6E-01	4.40E-11	5E-09	3E-11
Thorium 230	1.95E-03	1.74E-05	8E+01	8E-01	1.72E-08	1E-06	1E-08
Radium 226	7.77E-04	1.37E-05	3E+01	6E-01	2.75E-09	9E-08	2E-09
Lead 210	7.79E-04	1.37E-05	3E+01	6E-01	1.01E-09	3E-08	6E-10
Thorium 232	8.28E-04	1.27E-05	4E+01	6E-01	1.93E-08	7E-07	1E-08
Radium 228	2.29E-03	1.57E-05	1E+02	7E-01	9.94E-10	1E-07	7E-10
Thorium 228	2.29E-03	1.42E-05	1E+02	6E-01	2.31E-10	2E-08	1E-10
					CANCER RISK:	4E-06	3E-08

Intake of radionuclides on respirable particulate via inhaltion (child off-site resident):
(pCi/m^3 air * 0.83 m^3/hour * 1 * 8760 hours/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302462

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF RADIONUCLIDES IN SURFACE SOIL AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	8.43E+00	UCLlog	8.11E-01	UCLnorm	6.1E+02	5.8E+01	6.20E-11	3.8E-08	3.6E-09
Uranium 234	8.53E+00	*	1.11E+00	*	6.1E+02	8.0E+01	4.40E-11	2.7E-08	3.5E-09
Thorium 230	1.04E+01	UCLlog	1.41E+00	UCLlog	7.5E+02	1.0E+02	3.75E-11	2.8E-08	3.8E-09
Radium 226	6.75E+00	UCLlog	1.11E+00	UCLnorm	4.9E+02	8.0E+01	2.96E-10	1.4E-07	2.4E-08
Lead 210	8.53E+00	*	1.11E+00	*	6.1E+02	8.0E+01	1.01E-09	6.2E-07	8.1E-08
Thorium 232	2.35E+01	UCLlog	1.03E+00	UCLnorm	1.7E+03	7.4E+01	3.28E-11	5.5E-08	2.4E-09
Radium 228	1.51E+02	UCLlog	1.27E+00	UCLnorm	1.1E+04	9.1E+01	2.48E-10	2.7E-06	2.3E-08
Thorium 228	1.51E+02	**	1.15E+00	**	1.1E+04	8.3E+01	2.31E-10	2.5E-06	1.9E-08
							CANCER RISK:	6.1E-06	1.6E-07

Intake of radionuclides in surface soils via ingestion (adolescent trespasser):
(pCi/g soil * 1.00E-03 g/mg * 100 mg/day * 1 * 120 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302463

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADOLESCENT TRESPASSER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN SURFACE SOIL AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	8.43E+00	UCLlog	8.11E-01	UCLnorm	1.4E+00	1.3E-01	6.57E-08	9.1E-08	8.7E-09
Uranium 234	8.53E+00	*	1.11E+00	*	1.4E+00	1.8E-01	2.14E-11	3.0E-11	3.9E-12
Thorium 230	1.04E+01	UCLlog	1.41E+00	UCLlog	1.7E+00	2.3E-01	4.40E-11	7.5E-11	1.0E-11
Radium 226	6.75E+00	UCLlog	1.11E+00	UCLnorm	1.1E+00	1.8E-01	6.74E-06	7.5E-06	1.2E-06
Lead 210	8.53E+00	*	1.11E+00	*	1.4E+00	1.8E-01	1.45E-10	2.0E-10	2.6E-11
Thorium 232	2.35E+01	UCLlog	1.03E+00	UCLnorm	3.9E+00	1.7E-01	1.97E-11	7.6E-11	3.3E-12
Radium 228	1.51E+02	UCLlog	1.27E+00	UCLnorm	2.5E+01	2.1E-01	3.28E-06	8.1E-05	6.8E-07
Thorium 228	1.51E+02	**	1.15E+00	**	2.5E+01	1.9E-01	6.20E-06	1.5E-04	1.2E-06
							CANCER RISK:	2.4E-04	3.1E-06

External exposure from radionuclides in surface soils (adolescent trespasser):
(pCi/g soil * 2 hours/day * 120 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 6 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0

Fo = Time Fraction Outdoors = 1

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302464

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF RADIONUCLIDES IN SURFACE SOIL AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE FOR (pCi)	INTAKE BACKGR (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.59E+00	UCLlog	8.11E-01	UCLnorm	1.9E+02	5.8E+01	6.20E-11	1.2E-08	3.6E-09
Uranium 234	3.63E+00	*	1.11E+00	*	2.6E+02	8.0E+01	4.40E-11	1.1E-08	3.5E-09
Thorium 230	5.49E+00	UCLlog	1.41E+00	UCLlog	4.0E+02	1.0E+02	3.75E-11	1.5E-08	3.8E-09
Radium 226	2.82E+00	UCLlog	1.11E+00	UCLnorm	2.0E+02	8.0E+01	2.96E-10	6.0E-08	2.4E-08
Lead 210	3.63E+00	*	1.11E+00	*	2.6E+02	8.0E+01	1.01E-09	2.6E-07	8.1E-08
Thorium 232	7.04E+00	UCLlog	1.03E+00	UCLnorm	5.1E+02	7.4E+01	3.28E-11	1.7E-08	2.4E-09
Radium 228	1.78E+01	UCLlog	1.27E+00	UCLnorm	1.3E+03	9.1E+01	2.48E-10	3.2E-07	2.3E-08
Thorium 228	1.78E+01	**	1.15E+00	**	1.3E+03	8.3E+01	2.31E-10	3.0E-07	1.9E-08
							CANCER RISK:	9.9E-07	1.6E-07

Intake of radionuclides in surface soils via ingestion (adolescent trespasser):
(pCi/g soil * 1.00E-03 g/mg * 100 mg/day * 1 * 120 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302465

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN SURFACE SOIL AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.59E+00	UCLlog	8.11E-01	UCLnorm	4.3E-01	1.3E-01	6.57E-08	2.8E-08	8.7E-09
Uranium 234	3.63E+00	*	1.11E+00	*	6.0E-01	1.8E-01	2.14E-11	1.3E-11	3.9E-12
Thorium 230	5.49E+00	UCLlog	1.41E+00	UCLlog	9.0E-01	2.3E-01	4.40E-11	4.0E-11	1.0E-11
Radium 226	2.82E+00	UCLlog	1.11E+00	UCLnorm	4.6E-01	1.8E-01	6.74E-06	3.1E-06	1.2E-06
Lead 210	3.63E+00	*	1.11E+00	*	6.0E-01	1.8E-01	1.45E-10	8.6E-11	2.6E-11
Thorium 232	7.04E+00	UCLlog	1.03E+00	UCLnorm	1.2E+00	1.7E-01	1.97E-11	2.3E-11	3.3E-12
Radium 228	1.78E+01	UCLlog	1.27E+00	UCLnorm	2.9E+00	2.1E-01	3.28E-06	9.6E-06	6.8E-07
Thorium 228	1.78E+01	**	1.15E+00	**	2.9E+00	1.9E-01	6.20E-06	1.8E-05	1.2E-06
							CANCER RISK:	3.1E-05	3.1E-06

External exposure from radionuclides in surface soils (adolescent trespasser):
(pCi/g soil * 2 hours/day * 120 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 6 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0

Fo = Time Fraction Outdoors = 1

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302466

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF RADIONUCLIDES IN SURFACE SOIL AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE FOR (pCi)	INTAKE BACKGR (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.07E+02	UCLlog	8.11E-01	UCLnorm	2.2E+04	5.8E+01	6.20E-11	1.4E-06	3.6E-09
Uranium 234	3.07E+02	*	1.11E+00	*	2.2E+04	8.0E+01	4.40E-11	9.7E-07	3.5E-09
Thorium 230	2.14E+02	UCLlog	1.41E+00	UCLlog	1.5E+04	1.0E+02	3.75E-11	5.8E-07	3.8E-09
Radium 226	8.49E+01	UCLlog	1.11E+00	UCLnorm	6.1E+03	8.0E+01	2.96E-10	1.8E-06	2.4E-08
Lead 210	8.49E+01	*	1.11E+00	*	6.1E+03	8.0E+01	1.01E-09	6.2E-06	8.1E-08
Thorium 232	8.81E+01	UCLlog	1.03E+00	UCLnorm	6.3E+03	7.4E+01	3.28E-11	2.1E-07	2.4E-09
Radium 228	2.49E+02	UCLlog	1.27E+00	UCLnorm	1.8E+04	9.1E+01	2.48E-10	4.4E-06	2.3E-08
Thorium 228	2.49E+02	**	1.15E+00	**	1.8E+04	8.3E+01	2.31E-10	4.1E-06	1.9E-08
							CANCER RISK:	2.0E-05	1.6E-07

Intake of radionuclides in surface soils via ingestion (adolescent trespasser):
(pCi/g soil * 1.00E-03 g/mg * 100 mg/day * 1 * 120 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302467

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN SURFACE SOIL AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.07E+02	UCLlog	8.11E-01	UCLnorm	4.8E+01	1.3E-01	6.57E-08	3.1E-06	8.3E-09
Uranium 234	3.07E+02	*	1.11E+00	*	4.8E+01	1.7E-01	2.14E-11	1.0E-09	3.7E-12
Thorium 230	2.14E+02	UCLlog	1.41E+00	UCLlog	3.3E+01	2.2E-01	4.40E-11	1.5E-09	9.7E-12
Radium 226	8.49E+01	UCLlog	1.11E+00	UCLnorm	1.3E+01	1.7E-01	6.74E-06	8.9E-05	1.2E-06
Lead 210	8.49E+01	*	1.11E+00	*	1.3E+01	1.7E-01	1.45E-10	1.9E-09	2.5E-11
Thorium 232	8.81E+01	UCLlog	1.03E+00	UCLnorm	1.4E+01	1.6E-01	1.97E-11	2.7E-10	3.2E-12
Radium 228	2.49E+02	UCLlog	1.27E+00	UCLnorm	3.9E+01	2.0E-01	3.28E-06	1.3E-04	6.5E-07
Thorium 228	2.49E+02	**	1.15E+00	**	3.9E+01	1.8E-01	6.20E-06	2.4E-04	1.1E-06
							CANCER RISK:	4.6E-04	2.9E-06

External exposure from radionuclides in surface soils (adolescent trespasser):
(pCi/g soil * 2 hours/day * 120 days/year * [(Fi * GSFi) + (Fo * GSFo) * 6 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.25

Fo = Time Fraction Outdoors = 0.75

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302468

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF RADIONUCLIDES IN SURFACE SOIL AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE FOR (pCi)	INTAKE BACKGR (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.70E+01	MAX	8.11E-01	UCLnorm	1.9E+03	5.8E+01	6.20E-11	1.2E-07	3.6E-09
Uranium 234	2.70E+01	*	1.11E+00	*	1.9E+03	8.0E+01	4.40E-11	8.6E-08	3.5E-09
Thorium 230	1.16E+01	UCLlog	1.41E+00	UCLlog	8.3E+02	1.0E+02	3.75E-11	3.1E-08	3.8E-09
Radium 226	6.81E+00	UCLlog	1.11E+00	UCLnorm	4.9E+02	8.0E+01	2.96E-10	1.5E-07	2.4E-08
Lead 210	6.81E+00	*	1.11E+00	*	4.9E+02	8.0E+01	1.01E-09	5.0E-07	8.1E-08
Thorium 232	1.65E+01	UCLlog	1.03E+00	UCLnorm	1.2E+03	7.4E+01	3.28E-11	3.9E-08	2.4E-09
Radium 228	1.56E+01	UCLlog	1.27E+00	UCLnorm	1.1E+03	9.1E+01	2.48E-10	2.8E-07	2.3E-08
Thorium 228	1.61E+01	**	1.15E+00	**	1.2E+03	8.3E+01	2.31E-10	2.7E-07	1.9E-08
							CANCER RISK:	1.5E-06	1.6E-07

Intake of radionuclides in surface soils via ingestion (adolescent trespasser):
(pCi/g soil * 1.00E-03 g/mg * 100 mg/day * 1 * 120 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302469

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN SURFACE SOIL AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.70E+01	MAX	8.11E-01	UCLnorm	4.2E+00	1.3E-01	6.57E-08	2.8E-07	8.3E-09
Uranium 234	2.70E+01	*	1.11E+00	*	4.2E+00	1.7E-01	2.14E-11	9.0E-11	3.7E-12
Thorium 230	1.16E+01	UCLlog	1.41E+00	UCLlog	1.8E+00	2.2E-01	4.40E-11	7.9E-11	9.7E-12
Radium 226	6.81E+00	UCLlog	1.11E+00	UCLnorm	1.1E+00	1.7E-01	6.74E-06	7.2E-06	1.2E-06
Lead 210	6.81E+00	*	1.11E+00	*	1.1E+00	1.7E-01	1.45E-10	1.5E-10	2.5E-11
Thorium 232	1.65E+01	UCLlog	1.03E+00	UCLnorm	2.6E+00	1.6E-01	1.97E-11	5.1E-11	3.2E-12
Radium 228	1.56E+01	UCLlog	1.27E+00	UCLnorm	2.4E+00	2.0E-01	3.28E-06	8.0E-06	6.5E-07
Thorium 228	1.61E+01	**	1.15E+00	**	2.5E+00	1.8E-01	6.20E-06	1.6E-05	1.1E-06
							CANCER RISK:	3.1E-05	2.9E-06

External exposure from radionuclides in surface soils (adolescent trespasser):
(pCi/g soil * 2 hours/day * 120 days/year * [(Fi * GSFi) + (Fo * GSFo) * 6 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.25

Fo = Time Fraction Outdoors = 0.75

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302470

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF RADIONUCLIDES IN SEDIMENT AT PARCEL B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	9.00E-01	MAX	8.11E-01	UCLnorm	6.5E+01	5.8E+01	6.20E-11	4.0E-09	3.6E-09
Uranium 234	7.70E-01	*	1.11E+00	*	5.5E+01	8.0E+01	4.44E-11	2.5E-09	3.5E-09
Thorium 230	3.20E-01	MAX	1.41E+00	UCLlog	2.3E+01	1.0E+02	3.75E-11	8.6E-10	3.8E-09
Radium 226	1.10E+00	MAX	1.11E+00	UCLnorm	7.9E+01	8.0E+01	2.96E-10	2.3E-08	2.4E-08
Lead 210	7.70E-01	*	1.11E+00	*	5.5E+01	8.0E+01	1.01E-09	5.6E-08	8.1E-08
Thorium 232	7.80E-01	MAX	1.03E+00	UCLnorm	5.6E+01	7.4E+01	3.28E-11	1.8E-09	2.4E-09
Radium 228	1.20E+00	MAX	1.27E+00	UCLnorm	8.6E+01	9.1E+01	2.48E-10	2.1E-08	2.3E-08
Thorium 228	9.90E-01	**	1.15E+00	**	7.1E+01	8.3E+01	2.31E-10	1.6E-08	1.9E-08
							CANCER RISK:	1.3E-07	1.6E-07

Intake of radionuclides in sediment via ingestion (adolescent trespasser):
(pCi/g soil * 1.00E-03 g/mg * 100 mg/day * 1 * 120 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302471

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN SEDIMENT AT PARCEL B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	9.00E-01	MAX	8.11E-01	UCLnorm	1.5E-01	1.3E-01	6.57E-08	9.7E-09	8.7E-09
Uranium 234	7.70E-01	*	1.11E+00	*	1.3E-01	1.8E-01	2.14E-11	2.7E-12	3.9E-12
Thorium 230	3.20E-01	MAX	1.41E+00	UCLlog	5.3E-02	2.3E-01	4.40E-11	2.3E-12	1.0E-11
Radium 226	1.10E+00	MAX	1.11E+00	UCLnorm	1.8E-01	1.8E-01	6.74E-06	1.2E-06	1.2E-06
Lead 210	7.70E-01	*	1.11E+00	*	1.3E-01	1.8E-01	1.45E-10	1.8E-11	2.6E-11
Thorium 232	7.80E-01	MAX	1.03E+00	UCLnorm	1.3E-01	1.7E-01	1.97E-11	2.5E-12	3.3E-12
Radium 228	1.20E+00	MAX	1.27E+00	UCLnorm	2.0E-01	2.1E-01	3.28E-06	6.5E-07	6.8E-07
Thorium 228	9.90E-01	**	1.15E+00	**	1.6E-01	1.9E-01	6.20E-06	1.0E-06	1.2E-06
							CANCER RISK:	2.9E-06	3.1E-06

External exposure from radionuclides in sediment (adolescent trespasser):
(pCi/g sediment * 2 hours/day * 120 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 6 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0

Fo = Time Fraction Outdoors = 1

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302472

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF RADIONUCLIDES IN SEDIMENT AT PARCEL C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	1.70E+00	MAX	8.11E-01	UCLnorm	1.2E+02	5.8E+01	6.20E-11	7.6E-09	3.6E-09
Uranium 234	1.75E+00	*	1.11E+00	*	1.3E+02	8.0E+01	4.44E-11	5.6E-09	3.5E-09
Thorium 230	1.30E+00	MAX	1.41E+00	UCLlog	9.4E+01	1.0E+02	3.75E-11	3.5E-09	3.8E-09
Radium 226	2.20E+00	MAX	1.11E+00	UCLnorm	1.6E+02	8.0E+01	2.96E-10	4.7E-08	2.4E-08
Lead 210	1.75E+00	*	1.11E+00	*	1.3E+02	8.0E+01	1.01E-09	1.3E-07	8.1E-08
Thorium 232	1.50E+00	MAX	1.03E+00	UCLnorm	1.1E+02	7.4E+01	3.28E-11	3.5E-09	2.4E-09
Radium 228	1.80E+00	MAX	1.27E+00	UCLnorm	1.3E+02	9.1E+01	2.48E-10	3.2E-08	2.3E-08
Thorium 228	1.65E+00	**	1.15E+00	**	1.2E+02	8.3E+01	2.31E-10	2.7E-08	1.9E-08
							CANCER RISK:	2.5E-07	1.6E-07

Intake of radionuclides in sediment via ingestion (adolescent trespasser):
(pCi/g sediment * 1.00E-03 g/mg * 100 mg/day * 1 * 120 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302473

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN SEDIMENT AT PARCEL C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	1.70E+00	MAX	8.11E-01	UCLnorm	2.8E-01	1.3E-01	6.57E-08	1.8E-08	8.7E-09
Uranium 234	1.75E+00	*	1.11E+00	*	2.9E-01	1.8E-01	2.14E-11	6.1E-12	3.9E-12
Thorium 230	1.30E+00	MAX	1.41E+00	UCLlog	2.1E-01	2.3E-01	4.40E-11	9.4E-12	1.0E-11
Radium 226	2.20E+00	MAX	1.11E+00	UCLnorm	3.6E-01	1.8E-01	6.74E-06	2.4E-06	1.2E-06
Lead 210	1.75E+00	*	1.11E+00	*	2.9E-01	1.8E-01	1.45E-10	4.2E-11	2.6E-11
Thorium 232	1.50E+00	MAX	1.03E+00	UCLnorm	2.5E-01	1.7E-01	1.97E-11	4.9E-12	3.3E-12
Radium 228	1.80E+00	MAX	1.27E+00	UCLnorm	3.0E-01	2.1E-01	3.28E-06	9.7E-07	6.8E-07
Thorium 228	1.65E+00	**	1.15E+00	**	2.7E-01	1.9E-01	6.20E-06	1.7E-06	1.2E-06
							CANCER RISK:	5.1E-06	3.1E-06

External exposure from radionuclides in sediment (adolescent trespasser):
(pCi/kg sediment * 2 hours/day * 120 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 6 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0

Fo = Time Fraction Outdoors = 1

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302474

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN SURFACE SOIL AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE FOR (pCi)	INTAKE BACKGR (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	8.43E+00	UCLlog	8.11E-01	UCLnorm	2.6E+03	2.5E+02	6.20E-11	1.6E-07	1.6E-08
Uranium 234	8.53E+00	*	1.11E+00	*	2.7E+03	3.5E+02	4.40E-11	1.2E-07	1.5E-08
Thorium 230	1.04E+01	UCLlog	1.41E+00	UCLlog	3.3E+03	4.4E+02	3.75E-11	1.2E-07	1.6E-08
Radium 226	6.75E+00	UCLlog	1.11E+00	UCLnorm	2.1E+03	3.5E+02	2.96E-10	6.2E-07	1.0E-07
Lead 210	8.53E+00	*	1.11E+00	*	2.7E+03	3.5E+02	1.01E-09	2.7E-06	3.5E-07
Thorium 232	2.35E+01	UCLlog	1.03E+00	UCLnorm	7.3E+03	3.2E+02	3.28E-11	2.4E-07	1.1E-08
Radium 228	1.51E+02	UCLlog	1.27E+00	UCLnorm	4.7E+04	4.0E+02	2.48E-10	1.2E-05	9.8E-08
Thorium 228	1.51E+02	**	1.15E+00	**	4.7E+04	3.6E+02	2.31E-10	1.1E-05	8.3E-08
							CANCER RISK:	2.7E-05	6.9E-07

Intake of radionuclides in surface soils via ingestion (site worker):
(pCi/g soil * 1.00E-03 g/mg * 50 mg/day * 1 * 250 days/year * 25 years)

302475

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN SURFACE SOIL AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	8.43E+00	UCLlog	8.11E-01	UCLnorm	4.3E+01	4.2E+00	6.57E-08	2.8E-06	2.7E-07
Uranium 234	8.53E+00	*	1.11E+00	*	4.4E+01	5.7E+00	2.14E-11	9.4E-10	1.2E-10
Thorium 230	1.04E+01	UCLlog	1.41E+00	UCLlog	5.4E+01	7.2E+00	4.40E-11	2.4E-09	3.2E-10
Radium 226	6.75E+00	UCLlog	1.11E+00	UCLnorm	3.5E+01	5.7E+00	6.74E-06	2.3E-04	3.8E-05
Lead 210	8.53E+00	*	1.11E+00	*	4.4E+01	5.7E+00	1.45E-10	6.3E-09	8.3E-10
Thorium 232	2.35E+01	UCLlog	1.03E+00	UCLnorm	1.2E+02	5.3E+00	1.97E-11	2.4E-09	1.0E-10
Radium 228	1.51E+02	UCLlog	1.27E+00	UCLnorm	7.7E+02	6.5E+00	3.28E-06	2.5E-03	2.1E-05
Thorium 228	1.51E+02	**	1.15E+00	**	7.7E+02	5.9E+00	6.20E-06	4.8E-03	3.7E-05
							CANCER RISK:	7.6E-03	9.7E-05

External exposure from radionuclides in surface soils (site worker):
(pCi/g soil * 8 hours/day * 250 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 25 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.5

Fo = Time Fraction Outdoors = 0.5

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302476

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN SURFACE SOIL AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE FOR (pCi)	INTAKE BACKGR (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.59E+00	UCLlog	8.11E-01	UCLnorm	8.1E+02	2.5E+02	6.20E-11	5.0E-08	1.6E-08
Uranium 234	3.63E+00	*	1.11E+00	*	1.1E+03	3.5E+02	4.40E-11	5.0E-08	1.5E-08
Thorium 230	5.49E+00	UCLlog	1.41E+00	UCLlog	1.7E+03	4.4E+02	3.75E-11	6.4E-08	1.6E-08
Radium 226	2.82E+00	UCLlog	1.11E+00	UCLnorm	8.8E+02	3.5E+02	2.96E-10	2.6E-07	1.0E-07
Lead 234	3.63E+00	*	1.11E+00	*	1.1E+03	3.5E+02	1.01E-09	1.1E-06	3.5E-07
Thorium 232	7.04E+00	UCLlog	1.03E+00	UCLnorm	2.2E+03	3.2E+02	3.28E-11	7.2E-08	1.1E-08
Radium 228	1.78E+01	UCLlog	1.27E+00	UCLnorm	5.6E+03	4.0E+02	2.48E-10	1.4E-06	9.8E-08
Thorium 228	1.78E+01	**	1.15E+00	**	5.6E+03	3.6E+02	2.31E-10	1.3E-06	8.3E-08
							CANCER RISK:	**4.3E-06**	**6.9E-07**

Intake of radionuclides in surface soils via ingestion (site worker):
(pCi/g soil * 1.00E-03 g/mg * 50 mg/day * 1 * 250 days/year * 25 years)

302477

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN SURFACE SOIL AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.59E+00	UCLlog	8.11E-01	UCLnorm	1.3E+01	4.2E+00	6.57E-08	8.7E-07	2.7E-07
Uranium 234	3.63E+00	*	1.11E+00	*	1.9E+01	5.7E+00	2.14E-11	4.0E-10	1.2E-10
Thorium 230	5.49E+00	UCLlog	1.41E+00	UCLlog	2.8E+01	7.2E+00	4.40E-11	1.2E-09	3.2E-10
Radium 226	2.82E+00	UCLlog	1.11E+00	UCLnorm	1.4E+01	5.7E+00	6.74E-06	9.8E-05	3.8E-05
Lead 210	3.63E+00	*	1.11E+00	*	1.9E+01	5.7E+00	1.45E-10	2.7E-09	8.3E-10
Thorium 232	7.04E+00	UCLlog	1.03E+00	UCLnorm	3.6E+01	5.3E+00	1.97E-11	7.1E-10	1.0E-10
Radium 228	1.78E+01	UCLlog	1.27E+00	UCLnorm	9.1E+01	6.5E+00	3.28E-06	3.0E-04	2.1E-05
Thorium 228	1.78E+01	**	1.15E+00	**	9.1E+01	5.9E+00	6.20E-06	5.7E-04	3.7E-05
							CANCER RISK:	**9.7E-04**	**9.7E-05**

External exposure from radionuclides in surface soils (site worker):
(pCi/g soil * 8 hours/day * 250 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 25 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.5

Fo = Time Fraction Outdoors = 0.5

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302478

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN SURFACE SOIL AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE FOR (pCi)	INTAKE BACKGR (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.07E+02	UCLlog	8.11E-01	UCLnorm	9.6E+04	2.5E+02	6.20E-11	5.9E-06	1.6E-08
Uranium 234	3.07E+02	*	1.11E+00	*	9.6E+04	3.5E+02	4.40E-11	4.2E-06	1.5E-08
Thorium 230	2.14E+02	UCLlog	1.41E+00	UCLlog	6.7E+04	4.4E+02	3.75E-11	2.5E-06	1.6E-08
Radium 226	8.49E+01	UCLlog	1.11E+00	UCLnorm	2.7E+04	3.5E+02	2.96E-10	7.9E-06	1.0E-07
Lead 210	8.49E+01	*	1.11E+00	*	2.7E+04	3.5E+02	1.01E-09	2.7E-05	3.5E-07
Thorium 232	8.81E+01	UCLlog	1.03E+00	UCLnorm	2.8E+04	3.2E+02	3.28E-11	9.0E-07	1.1E-08
Radium 228	2.49E+02	UCLlog	1.27E+00	UCLnorm	7.8E+04	4.0E+02	2.48E-10	1.9E-05	9.8E-08
Thorium 228	2.49E+02	**	1.15E+00	**	7.8E+04	3.6E+02	2.31E-10	1.8E-05	8.3E-08
							CANCER RISK:	**8.5E-05**	**6.9E-07**

Intake of radionuclides in surface soils via ingestion (site worker):
(pCi/g soil * 1.00E-03 g/mg * 50 mg/day * 1 * 250 days/year * 25 years)

302479

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN SURFACE SOIL AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.07E+02	UCLlog	8.11E-01	UCLnorm	1.6E+03	4.2E+00	6.57E-08	1.0E-04	2.7E-07
Uranium 234	3.07E+02	*	1.11E+00	*	1.6E+03	5.7E+00	2.14E-11	3.4E-08	1.2E-10
Thorium 230	2.14E+02	UCLlog	1.41E+00	UCLlog	1.1E+03	7.2E+00	4.40E-11	4.8E-08	3.2E-10
Radium 226	8.49E+01	UCLlog	1.11E+00	UCLnorm	4.4E+02	5.7E+00	6.74E-06	2.9E-03	3.8E-05
Lead 210	8.49E+01	*	1.11E+00	*	4.4E+02	5.7E+00	1.45E-10	6.3E-08	8.3E-10
Thorium 232	8.81E+01	UCLlog	1.03E+00	UCLnorm	4.5E+02	5.3E+00	1.97E-11	8.9E-09	1.0E-10
Radium 228	2.49E+02	UCLlog	1.27E+00	UCLnorm	1.3E+03	6.5E+00	3.28E-06	4.2E-03	2.1E-05
Thorium 228	2.49E+02	**	1.15E+00	**	1.3E+03	5.9E+00	6.20E-06	7.9E-03	3.7E-05
							CANCER RISK:	**1.5E-02**	**9.7E-05**

External exposure from radionuclides in surface soils (site worker):
(pCi/g soil * 8 hours/day * 250 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 25 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.5

Fo = Time Fraction Outdoors = 0.5

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302480

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN SURFACE SOIL AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE FOR (pCi)	INTAKE BACKGR (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.70E+01	MAX	8.11E-01	UCLnorm	8.4E+03	2.5E+02	6.20E-11	5.2E-07	1.6E-08
Uranium 234	2.70E+01	*	1.11E+00	*	8.4E+03	3.5E+02	4.40E-11	3.7E-07	1.5E-08
Thorium 230	1.16E+01	UCLlog	1.41E+00	UCLlog	3.6E+03	4.4E+02	3.75E-11	1.4E-07	1.6E-08
Radium 226	6.81E+00	UCLlog	1.11E+00	UCLnorm	2.1E+03	3.5E+02	2.96E-10	6.3E-07	1.0E-07
Lead 210	6.81E+00	*	1.11E+00	*	2.1E+03	3.5E+02	1.01E-09	2.1E-06	3.5E-07
Thorium 232	1.65E+01	UCLlog	1.03E+00	UCLnorm	5.1E+03	3.2E+02	3.28E-11	1.7E-07	1.1E-08
Radium 228	1.56E+01	UCLlog	1.27E+00	UCLnorm	4.9E+03	4.0E+02	2.48E-10	1.2E-06	9.8E-08
Thorium 228	1.61E+01	**	1.15E+00	**	5.0E+03	3.6E+02	2.31E-11	1.2E-07	8.3E-09
							CANCER RISK:	5.3E-06	6.2E-07

Intake of radionuclides in surface soils via ingestion (site worker):
(pCi/g soil * 1.00E-03 g/mg * 50 mg/day * 1 * 250 days/year * 25 years)

302481

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN SURFACE SOIL AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.70E+01	MAX	8.11E-01	UCLnorm	1.4E+02	4.2E+00	6.57E-08	9.1E-06	2.7E-07
Uranium 234	2.70E+01	*	1.11E+00	*	1.4E+02	5.7E+00	2.14E-11	3.0E-09	1.2E-10
Thorium 230	1.16E+01	UCLlog	1.41E+00	UCLlog	5.9E+01	7.2E+00	4.40E-11	2.6E-09	3.2E-10
Radium 226	6.81E+00	UCLlog	1.11E+00	UCLnorm	3.5E+01	5.7E+00	6.74E-06	2.4E-04	3.8E-05
Lead 210	6.81E+00	*	1.11E+00	*	3.5E+01	5.7E+00	1.45E-10	5.1E-09	8.3E-10
Thorium 232	1.65E+01	UCLlog	1.03E+00	UCLnorm	8.4E+01	5.3E+00	1.97E-11	1.7E-09	1.0E-10
Radium 228	1.56E+01	UCLlog	1.27E+00	UCLnorm	8.0E+01	6.5E+00	3.28E-06	2.6E-04	2.1E-05
Thorium 228	1.61E+01	**	1.15E+00	**	8.3E+01	5.9E+00	6.20E-06	5.1E-04	3.7E-05
							CANCER RISK:	1.0E-03	9.7E-05

External exposure from radionuclides in surface soils (site worker):
(pCi/g soil * * hours/day * 250 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 25 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.5

Fo = Time Fraction Outdoors = 0.5

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302482

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN GROUNDWATER

CHEMICAL	GROUNDWATER CONCENTRATION (pCi/l)		BACKGROUND FOR GROUNDWATER CONCENTRATION (pCi/l)		GROUNDWATER INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi/l)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	8.30E+00	UCLlog	2.90E-01	MAX	5.2E+04	1.8E+03	6.20E-11	3.2E-06	1.1E-07
Uranium 234	4.48E+00	*	2.87E-01	*	2.8E+04	1.8E+03	4.44E-11	1.2E-06	8.0E-08
Thorium 230	1.14E+00	UCLlog	2.20E-01	MAX	7.1E+03	1.4E+03	3.75E-11	2.7E-07	5.2E-08
Radium 226	4.02E+00	UCLlog	3.50E-01	MAX	2.5E+04	2.2E+03	2.96E-10	7.4E-06	6.5E-07
Lead 210	4.48E+00	*	2.87E-01	*	2.8E+04	1.8E+03	1.01E-09	2.8E-05	1.8E-06
Thorium 232	9.53E-01	UCLlog	2.90E-01	MAX	6.0E+03	1.8E+03	3.28E-11	2.0E-07	5.9E-08
Radium 228	2.42E+00	UCLlog	9.40E-01	MAX	1.5E+04	5.9E+03	2.48E-10	3.7E-06	1.5E-06
Thorium 228	1.68E+00	**	6.15E-01	**	1.1E+04	3.8E+03	2.31E-10	2.4E-06	8.9E-07
							CANCER RISK:	4.7E-05	5.1E-06

Intake of radionuclides in groundwater via ingestion (child resident):
(pCi/l water * 1 l/day * 250 days/year * 25 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302483

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	9.8E+01	2.3E+01	6.20E-11	6.1E-09	1.4E-09
Uranium 234	3.79E+00	*	1.11E+00	*	1.1E+02	3.2E+01	4.44E-11	4.8E-09	1.4E-09
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	1.2E+02	4.1E+01	3.75E-11	4.4E-09	1.5E-09
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	1.1E+02	3.2E+01	2.96E-10	3.3E-08	9.5E-09
Lead 210	3.79E+00	*	1.11E+00	*	1.1E+02	3.2E+01	1.01E-09	1.1E-07	3.2E-08
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	2.1E+02	3.0E+01	3.28E-11	7.0E-09	9.7E-10
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	7.5E+02	3.7E+01	2.48E-10	1.8E-07	9.1E-09
Thorium 228	2.59E+01	**	1.15E+00	**	7.5E+02	3.3E+01	2.31E-10	1.7E-07	7.7E-09
							CANCER RISK:	**5.2E-07**	**6.4E-08**

Intake of radionuclides in soil via ingestion (construction worker):
(pCi/g soil * 1.00E-03 g/mg * 480 mg/day * 1 * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	1.8E-01	4.2E-02	6.57E-08	1.2E-08	2.8E-09
Uranium 234	3.79E+00	*	1.11E+00	*	2.0E-01	5.8E-02	2.14E-11	4.2E-12	1.2E-12
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	2.1E-01	7.3E-02	4.40E-11	9.3E-12	3.2E-12
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	2.0E-01	5.8E-02	6.74E-06	1.4E-06	3.9E-07
Lead 210	3.79E+00	*	1.11E+00	*	2.0E-01	5.8E-02	1.45E-10	2.9E-11	8.4E-12
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	3.8E-01	5.3E-02	1.97E-11	7.6E-12	1.1E-12
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	1.3E+00	6.6E-02	3.28E-06	4.4E-06	2.2E-07
Thorium 228	2.59E+01	**	1.15E+00	**	1.3E+00	6.0E-02	6.20E-06	8.3E-06	3.7E-07
							CANCER RISK:	1.4E-05	9.8E-07

External exposure from radionuclides in soil (construction worker):
(pCi/g soil * 8 hours/day * 60 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 1 year * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.25

Fo = Time Fraction Outdoors = 0.75

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302485

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RADIONUCLIDES ON RESPIRABLE PARTICULATE AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		AIR CONCENTRATION (pCi/m^3)	BACKGROUND AIR CONCENTRATION (pCi/m^3)	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	INHALATION SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES											
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	4.54E-03	1.09E-03	5.0E+00	1.2E+00	1.24E-08	6.2E-08	1.5E-08
Uranium 234	3.79E+00	*	1.11E+00	*	5.08E-03	1.49E-03	5.6E+00	1.6E+00	1.40E-08	7.8E-08	2.3E-08
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	5.47E-03	1.88E-03	6.0E+00	2.1E+00	1.72E-08	1.0E-07	3.6E-08
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	5.21E-03	1.49E-03	5.7E+00	1.6E+00	2.75E-09	1.6E-08	4.5E-09
Lead 210	3.79E+00	*	1.11E+00	*	5.08E-03	1.49E-03	5.6E+00	1.6E+00	3.86E-09	2.2E-08	6.3E-09
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	9.91E-03	1.37E-03	1.1E+01	1.5E+00	1.93E-08	2.1E-07	2.9E-08
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	3.47E-02	1.70E-03	3.8E+01	1.9E+00	9.94E-10	3.8E-08	1.9E-09
Thorium 228	2.59E+01	**	1.15E+00	**	3.47E-02	1.54E-03	3.8E+01	1.7E+00	9.68E-08	3.7E-06	1.6E-07
									CANCER RISK:	**4.2E-06**	**2.8E-07**

Intake of radionuclides on respirable particulates via inhalation (construction worker):
(pCi/m^3 air * $2.3 m^3$/hour * 8 hours/day * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302486

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	5.8E+01	2.3E+01	6.20E-11	3.6E-09	1.4E-09
Uranium 234	2.47E+00	*	1.11E+00	*	7.1E+01	3.2E+01	4.44E-11	3.2E-09	1.4E-09
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	8.5E+01	4.1E+01	3.75E-11	3.2E-09	1.5E-09
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	7.1E+01	3.2E+01	2.96E-10	2.1E-08	9.5E-09
Lead 210	2.47E+00	*	1.11E+00	*	7.1E+01	3.2E+01	1.01E-09	7.2E-08	3.2E-08
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	1.1E+02	3.0E+01	3.28E-11	3.6E-09	9.7E-10
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	2.0E+02	3.7E+01	2.48E-10	4.9E-08	9.1E-09
Thorium 228	6.89E+00	**	1.15E+00	**	2.0E+02	3.3E+01	2.31E-10	4.6E-08	7.7E-09
							CANCER RISK:	2.0E-07	6.4E-08

Intake of radionuclides in soil via ingestion (construction worker):
(pCi/g soil * 1.00E-03 g/mg * 480 mg/day * 1 * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302487

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	1.0E-01	4.2E-02	6.57E-08	6.8E-09	2.8E-09
Uranium 234	2.47E+00	*	1.11E+00	*	1.3E-01	5.8E-02	2.14E-11	2.7E-12	1.2E-12
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	1.5E-01	7.3E-02	4.40E-11	6.8E-12	3.2E-12
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	1.3E-01	5.8E-02	6.74E-06	8.7E-07	3.9E-07
Lead 210	2.47E+00	*	1.11E+00	*	1.3E-01	5.8E-02	1.45E-10	1.9E-11	8.4E-12
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	2.0E-01	5.3E-02	1.97E-11	3.9E-12	1.1E-12
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	3.6E-01	6.6E-02	3.28E-06	1.2E-06	2.2E-07
Thorium 228	6.89E+00	**	1.15E+00	**	3.6E-01	6.0E-02	6.20E-06	2.2E-06	3.7E-07
							CANCER RISK:	4.3E-06	9.8E-07

External exposure from radionuclides in soil (construction worker):
(pCi/g soil * 8 hours/day * 60 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 1 year * 1.14e-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.25

Fo = Time Fraction Outdoors = 0.75

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302488

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RADIONUCLIDES ON RESPIRABLE PARTICULATE AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		AIR CONCENTRATION (pCi/m^3)	BACKGROUND AIR CONCENTRATION (pCi/m^3)	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	INHALATION SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES											
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	2.69E-03	1.09E-03	3.0E+00	1.2E+00	1.24E-08	3.7E-08	1.5E-08
Uranium 234	2.47E+00	*	1.11E+00	*	3.31E-03	1.49E-03	3.7E+00	1.6E+00	1.40E-08	5.1E-08	2.3E-08
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	3.96E-03	1.88E-03	4.4E+00	2.1E+00	1.72E-08	7.5E-08	3.6E-08
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	3.31E-03	1.49E-03	3.7E+00	1.6E+00	2.75E-09	1.0E-08	4.5E-09
Lead 210	2.47E+00	*	1.11E+00	*	3.31E-03	1.49E-03	3.7E+00	1.6E+00	3.86E-09	1.4E-08	6.3E-09
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	5.15E-03	1.37E-03	5.7E+00	1.5E+00	1.93E-08	1.1E-07	2.9E-08
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	9.24E-03	1.70E-03	1.0E+01	1.9E+00	9.94E-10	1.0E-08	1.9E-09
Thorium 228	6.89E+00	**	1.15E+00	**	9.24E-03	1.54E-03	1.0E+01	1.7E+00	9.68E-08	9.9E-07	1.6E-07
									CANCER RISK:	1.3E-06	2.8E-07

Intake of radionuclides on respirable particulates via inhalation (construction worker):
(pCi/g soil * 1.34E-06 kg/m^3 * 1000 g/kg * 2.3m^3/hour * 8 hours/day * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302489

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	1.1E+03	2.3E+01	6.20E-11	7.0E-08	1.4E-09
Uranium 234	3.85E+01	*	1.11E+00	*	1.1E+03	3.2E+01	4.44E-11	4.9E-08	1.4E-09
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	1.1E+03	4.1E+01	3.75E-11	4.1E-08	1.5E-09
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	5.7E+02	3.2E+01	2.96E-10	1.7E-07	9.5E-09
Lead 210	2.00E+01	*	1.11E+00	*	5.8E+02	3.2E+01	1.01E-09	5.8E-07	3.2E-08
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	5.5E+02	3.0E+01	3.28E-11	1.8E-08	9.7E-10
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	1.2E+03	3.7E+01	2.48E-10	3.1E-07	9.1E-09
Thorium 228	4.33E+01	**	1.15E+00	**	1.2E+03	3.3E+01	2.31E-10	2.9E-07	7.7E-09
							CANCER RISK:	**1.5E-06**	**6.4E-08**

Intake of radionuclides in soil via ingestion (construction worker):
(pCi/g soil * 1.00E-03 g/mg * 480 mg/day * 1 * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302490

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	2.0E+00	4.2E-02	6.57E-08	1.3E-07	2.8E-09
Uranium 234	3.85E+01	*	1.11E+00	*	2.0E+00	5.8E-02	2.14E-11	4.3E-11	1.2E-12
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	2.0E+00	7.3E-02	4.40E-11	8.6E-11	3.2E-12
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	1.0E+00	5.8E-02	6.74E-06	7.0E-06	3.9E-07
Lead 210	2.00E+01	*	1.11E+00	*	1.0E+00	5.8E-02	1.45E-10	1.5E-10	8.4E-12
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	1.0E+00	5.3E-02	1.97E-11	2.0E-11	1.1E-12
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	2.3E+00	6.6E-02	3.28E-06	7.4E-06	2.2E-07
Thorium 228	4.33E+01	**	1.15E+00	**	2.3E+00	6.0E-02	6.20E-06	1.4E-05	3.7E-07
							CANCER RISK:	**2.8E-05**	**9.8E-07**

External exposure from radionuclides in soil (construction worker):
(pCi/g soil * 8 hours/day * 60 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 1 year * 1.14e-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.25

Fo = Time Fraction Outdoors = 0.75

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302491

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RADIONUCLIDES ON RESPIRABLE PARTICULATE AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		AIR CONCENTRATION (pCi/m^3)	BACKGROUND AIR CONCENTRATION (pCi/m^3)	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	INHALATION SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES											
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	5.27E-02	1.09E-03	5.8E+01	1.2E+00	1.24E-08	7.2E-07	1.5E-08
Uranium 234	3.85E+01	*	1.11E+00	*	5.16E-02	1.49E-03	5.7E+01	1.6E+00	1.40E-08	8.0E-07	2.3E-08
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	5.06E-02	1.88E-03	5.6E+01	2.1E+00	1.72E-08	9.6E-07	3.6E-08
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	2.67E-02	1.49E-03	3.0E+01	1.6E+00	2.75E-09	8.1E-08	4.5E-09
Lead 210	2.00E+01	*	1.11E+00	*	2.68E-02	1.49E-03	3.0E+01	1.6E+00	3.86E-09	1.1E-07	6.3E-09
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	2.58E-02	1.37E-03	2.8E+01	1.5E+00	1.93E-08	5.5E-07	2.9E-08
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	5.81E-02	1.70E-03	6.4E+01	1.9E+00	9.94E-10	6.4E-08	1.9E-09
Thorium 228	4.33E+01	**	1.15E+00	**	5.81E-02	1.54E-03	6.4E+01	1.7E+00	9.68E-08	6.2E-06	1.6E-07
									CANCER RISK:	9.5E-06	2.8E-07

Intake of radionuclides on respirable particulates via inhalation (construction worker):
(pCi/g soil * 1.34E-06 kg/m^3 * 1000 g/kg * 2.3m^3/hour * 8 hours/day * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302492

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	2.1E+02	2.3E+01	6.20E-11	1.3E-08	1.4E-09
Uranium 234	5.21E+00	*	1.11E+00	*	1.5E+02	3.2E+01	4.44E-11	6.7E-09	1.4E-09
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	1.3E+02	4.1E+01	3.75E-11	4.8E-09	1.5E-09
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	1.1E+02	3.2E+01	2.96E-10	3.3E-08	9.5E-09
Lead 210	5.21	*	1.11E+00	*	1.5E+02	3.2E+01	1.01E-09	1.5E-07	3.2E-08
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	1.2E+02	3.0E+01	3.28E-11	3.9E-09	9.7E-10
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	1.4E+02	3.7E+01	2.48E-10	3.5E-08	9.1E-09
Thorium 228	4.50E+00	**	1.15E+00	**	1.3E+02	3.3E+01	2.31E-10	3.0E-08	7.7E-09
							CANCER RISK:	2.8E-07	6.4E-08

Intake of radionuclides in soil via ingestion (construction worker):
(pCi/g soil * 1.00E-03 g/mg * 480 mg/day * 1 * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302493

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	3.8E-01	4.2E-02	6.57E-08	2.5E-08	2.8E-09
Uranium 234	5.21E+00	*	1.11E+00	*	2.7E-01	5.8E-02	2.14E-11	5.8E-12	1.2E-12
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	2.3E-01	7.3E-02	4.40E-11	1.0E-11	3.2E-12
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	2.0E-01	5.8E-02	6.74E-06	1.3E-06	3.9E-07
Lead 210	5.21E+00	*	1.11E+00	*	2.7E-01	5.8E-02	1.45E-10	3.9E-11	8.4E-12
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	2.1E-01	5.3E-02	1.97E-11	4.2E-12	1.1E-12
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	2.6E-01	6.6E-02	3.28E-06	8.4E-07	2.2E-07
Thorium 228	4.50E+00	**	1.15E+00	**	2.3E-01	6.0E-02	6.20E-06	1.5E-06	3.7E-07
							CANCER RISK:	3.7E-06	9.8E-07

External exposure from radionuclides in soil (construction worker):
(pCi/g soil * 8 hours/day * 60 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 1 year * 1.14e-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.25

Fo = Time Fraction Outdoors = 0.75

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302494

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RADIONUCLIDES ON RESPIRABLE PARTICULATE AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		AIR CONCENTRATION (pCi/m^3)	BACKGROUND AIR CONCENTRATION (pCi/m^3)	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	INHALATION SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES											
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	9.91E-03	1.09E-03	1.1E+01	1.2E+00	1.24E-08	1.4E-07	1.5E-08
Uranium 234	5.21E+00	*	1.11E+00	*	6.98E-03	1.49E-03	7.7E+00	1.6E+00	1.40E-08	1.1E-07	2.3E-08
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	5.91E-03	1.88E-03	6.5E+00	2.1E+00	1.72E-08	1.1E-07	3.6E-08
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	5.13E-03	1.49E-03	5.7E+00	1.6E+00	2.75E-09	1.6E-08	4.5E-09
Lead 210	5.21E+00	*	1.11E+00	*	6.98E-03	1.49E-03	7.7E+00	1.6E+00	3.86E-09	3.0E-08	6.3E-09
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	5.48E-03	1.37E-03	6.1E+00	1.5E+00	1.93E-08	1.2E-07	2.9E-08
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	6.58E-03	1.70E-03	7.3E+00	1.9E+00	9.94E-10	7.2E-09	1.9E-09
Thorium 228	4.50E+00	**	1.15E+00	**	6.03E-03	1.54E-03	6.7E+00	1.7E+00	9.68E-08	6.4E-07	1.6E-07
									CANCER RISK:	1.2E-06	2.8E-07

Intake of radionuclides on respirable particulates via inhalation (construction worker):
(pCi/g soil * 1.34E-06 kg/m^3 * 1000 g/kg * 2.3m^3/hour * 8 hours/day * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302495

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	9.8E+01	2.3E+01	6.20E-11	6.1E-09	1.4E-09
Uranium 234	3.79E+00	*	1.11E+00	*	1.1E+02	3.2E+01	4.44E-11	4.8E-09	1.4E-09
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	1.2E+02	4.1E+01	3.75E-11	4.4E-09	1.5E-09
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	1.1E+02	3.2E+01	2.96E-10	3.3E-08	9.5E-09
Lead 210	3.79E+00	*	1.11E+00	*	1.1E+02	3.2E+01	1.01E-09	1.1E-07	3.2E-08
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	2.1E+02	3.0E+01	3.28E-11	7.0E-09	9.7E-10
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	7.5E+02	3.7E+01	2.48E-10	1.8E-07	9.1E-09
Thorium 228	2.59E+01	**	1.15E+00	**	7.5E+02	3.3E+01	2.31E-10	1.7E-07	7.7E-09
							CANCER RISK:	5.2E-07	6.4E-08

Intake of radionuclides in soil via ingestion (construction worker):
(pCi/g soil * 1.00E-03 g/mg * 480 mg/day * 1 * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	1.8E-01	4.2E-02	6.57E-08	1.2E-08	2.8E-09
Uranium 234	3.79E+00	*	1.11E+00	*	2.0E-01	5.8E-02	2.14E-11	4.2E-12	1.2E-12
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	2.1E-01	7.3E-02	4.40E-11	9.3E-12	3.2E-12
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	2.0E-01	5.8E-02	6.74E-06	1.4E-06	3.9E-07
Lead 210	3.79E+00	*	1.11E+00	*	2.0E-01	5.8E-02	1.45E-10	2.9E-11	8.4E-12
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	3.8E-01	5.3E-02	1.97E-11	7.6E-12	1.1E-12
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	1.3E+00	6.6E-02	3.28E-06	4.4E-06	2.2E-07
Thorium 228	2.59E+01	**	1.15E+00	**	1.3E+00	6.0E-02	6.20E-06	8.3E-06	3.7E-07
							CANCER RISK:	1.4E-05	9.8E-07

External exposure from radionuclides in soil (construction worker):
(pCi/g soil * 8 hours/day * 60 days/year * |(Fi * GSFi) + (Fo * GSFo)| * 1 year * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.25

Fo = Time Fraction Outdoors = 0.75

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302497

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RADIONUCLIDES ON RESPIRABLE PARTICULATE AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		AIR CONCENTRATION (pCi/m^3)	BACKGROUND AIR CONCENTRATION (pCi/m^3)	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	INHALATION SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES											
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	4.54E-03	1.09E-03	5.0E+00	1.2E+00	1.24E-08	6.2E-08	1.5E-08
Uranium 234	3.79E+00	*	1.11E+00	*	5.08E-03	1.49E-03	5.6E+00	1.6E+00	1.40E-08	7.8E-08	2.3E-08
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	5.47E-03	1.88E-03	6.0E+00	2.1E+00	1.72E-08	1.0E-07	3.6E-08
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	5.21E-03	1.49E-03	5.7E+00	1.6E+00	2.75E-09	1.6E-08	4.5E-09
Lead 210	3.79E+00	*	1.11E+00	*	5.08E-03	1.49E-03	5.6E+00	1.6E+00	3.86E-09	2.2E-08	6.3E-09
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	9.91E-03	1.37E-03	1.1E+01	1.5E+00	1.93E-08	2.1E-07	2.9E-08
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	3.47E-02	1.70E-03	3.8E+01	1.9E+00	9.94E-10	3.8E-08	1.9E-09
Thorium 228	2.59E+01	**	1.15E+00	**	3.47E-02	1.54E-03	3.8E+01	1.7E+00	9.68E-08	3.7E-06	1.6E-07
									CANCER RISK:	4.2E-06	2.8E-07

Intake of radionuclides on respirable particulates via inhalation (construction worker):
(pCi/m^3 air * $2.3m^3$/hour * 8 hours/day * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302498

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	5.8E+01	2.3E+01	6.20E-11	3.6E-09	1.4E-09
Uranium 234	2.47E+00	*	1.11E+00	*	7.1E+01	3.2E+01	4.44E-11	3.2E-09	1.4E-09
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	8.5E+01	4.1E+01	3.75E-11	3.2E-09	1.5E-09
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	7.1E+01	3.2E+01	2.96E-10	2.1E-08	9.5E-09
Lead 210	2.47E+00	*	1.11E+00	*	7.1E+01	3.2E+01	1.01E-09	7.2E-08	3.2E-08
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	1.1E+02	3.0E+01	3.28E-11	3.6E-09	9.7E-10
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	2.0E+02	3.7E+01	2.48E-10	4.9E-08	9.1E-09
Thorium 228	6.89E+00	**	1.15E+00	**	2.0E+02	3.3E+01	2.31E-10	4.6E-08	7.7E-09
							CANCER RISK:	**2.0E-07**	**6.4E-08**

Intake of radionuclides in soil via ingestion (construction worker):
(pCi/g soil * 1.00E-03 g/mg * 480 mg/day * 1 * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302499

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	1.0E-01	4.2E-02	6.57E-08	6.8E-09	2.8E-09
Uranium 234	2.47E+00	*	1.11E+00	*	1.3E-01	5.8E-02	2.14E-11	2.7E-12	1.2E-12
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	1.5E-01	7.3E-02	4.40E-11	6.8E-12	3.2E-12
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	1.3E-01	5.8E-02	6.74E-06	8.7E-07	3.9E-07
Lead 210	2.47E+00	*	1.11E+00	*	1.3E-01	5.8E-02	1.45E-10	1.9E-11	8.4E-12
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	2.0E-01	5.3E-02	1.97E-11	3.9E-12	1.1E-12
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	3.6E-01	6.6E-02	3.28E-06	1.2E-06	2.2E-07
Thorium 228	6.89E+00	**	1.15E+00	**	3.6E-01	6.0E-02	6.20E-06	2.2E-06	3.7E-07
							CANCER RISK:	4.3E-06	9.8E-07

External exposure from radionuclides in soil (construction worker):
(pCi/g soil * 8 hours/day * 60 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 1 year * 1.14e-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.25

Fo = Time Fraction Outdoors = 0.75

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302500

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RADIONUCLIDES ON RESPIRABLE PARTICULATE AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		AIR CONCENTRATION (pCi/m^3)	BACKGROUND AIR CONCENTRATION (pCi/m^3)	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	INHALATION SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES											
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	2.69E-03	1.09E-03	3.0E+00	1.2E+00	1.24E-08	3.7E-08	1.5E-08
Uranium 234	2.47E+00	*	1.11E+00	*	3.31E-03	1.49E-03	3.7E+00	1.6E+00	1.40E-08	5.1E-08	2.3E-08
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	3.96E-03	1.88E-03	4.4E+00	2.1E+00	1.72E-08	7.5E-08	3.6E-08
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	3.31E-03	1.49E-03	3.7E+00	1.6E+00	2.75E-09	1.0E-08	4.5E-09
Lead 210	2.47E+00	*	1.11E+00	*	3.31E-03	1.49E-03	3.7E+00	1.6E+00	3.86E-09	1.4E-08	6.3E-09
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	5.15E-03	1.37E-03	5.7E+00	1.5E+00	1.93E-08	1.1E-07	2.9E-08
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	9.24E-03	1.70E-03	1.0E+01	1.9E+00	9.94E-10	1.0E-08	1.9E-09
Thorium 228	6.89E+00	**	1.15E+00	**	9.24E-03	1.54E-03	1.0E+01	1.7E+00	9.68E-08	9.9E-07	1.6E-07
									CANCER RISK:	1.3E-06	2.8E-07

Intake of radionuclides on respirable particulates via inhalation (construction worker):
(pCi/g soil * 1.34E-06 kg/m^3 * 1000 g/kg * 2.3m^3/hour * 8 hours/day * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302501

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	2.0E+00	4.2E-02	6.57E-08	1.3E-07	2.8E-09
Uranium 234	3.85E+01	*	1.11E+00	*	2.0E+00	5.8E-02	2.14E-11	4.3E-11	1.2E-12
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	2.0E+00	7.3E-02	4.40E-11	8.6E-11	3.2E-12
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	1.0E+00	5.8E-02	6.74E-06	7.0E-06	3.9E-07
Lead 210	2.00E+01	*	1.11E+00	*	1.0E+00	5.8E-02	1.45E-10	1.5E-10	8.4E-12
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	1.0E+00	5.3E-02	1.97E-11	2.0E-11	1.1E-12
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	2.3E+00	6.6E-02	3.28E-06	7.4E-06	2.2E-07
Thorium 228	4.33E+01	**	1.15E+00	**	2.3E+00	6.0E-02	6.20E-06	1.4E-05	3.7E-07
							CANCER RISK:	**2.8E-05**	**9.8E-07**

External exposure from radionuclides in soil (construction worker):
(pCi/g soil * 8 hours/day * 60 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 1 year * 1.14e-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.25

Fo = Time Fraction Outdoors = 0.75

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302502

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RADIONUCLIDES ON RESPIRABLE PARTICULATE AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		AIR CONCENTRATION (pCi/m^3)	BACKGROUND AIR CONCENTRATION (pCi/m^3)	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	INHALATION SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES											
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	5.27E-02	1.09E-03	5.8E+01	1.2E+00	1.24E-08	7.2E-07	1.5E-08
Uranium 234	3.85E+01	*	1.11E+00	*	5.16E-02	1.49E-03	5.7E+01	1.6E+00	1.40E-08	8.0E-07	2.3E-08
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	5.06E-02	1.88E-03	5.6E+01	2.1E+00	1.72E-08	9.6E-07	3.6E-08
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	2.67E-02	1.49E-03	3.0E+01	1.6E+00	2.75E-09	8.1E-08	4.5E-09
Lead 210	2.00E+01	*	1.11E+00	*	2.68E-02	1.49E-03	3.0E+01	1.6E+00	3.86E-09	1.1E-07	6.3E-09
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	2.58E-02	1.37E-03	2.8E+01	1.5E+00	1.93E-08	5.5E-07	2.9E-08
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	5.81E-02	1.70E-03	6.4E+01	1.9E+00	9.94E-10	6.4E-08	1.9E-09
Thorium 228	4.33E+01	**	1.15E+00	**	5.81E-02	1.54E-03	6.4E+01	1.7E+00	9.68E-08	6.2E-06	1.6E-07
									CANCER RISK:	9.5E-06	2.8E-07

Intake of radionuclides on respirable particulates via inhalation (construction worker):
(pCi/g soil * 1.34E-06 kg/m^3 * 1000 g/kg * 2.3m^3/hour * 8 hours/day * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302503

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	2.1E+02	2.3E+01	6.20E-11	1.3E-08	1.4E-09
Uranium 234	5.21E+00	*	1.11E+00	*	1.5E+02	3.2E+01	4.44E-11	6.7E-09	1.4E-09
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	1.3E+02	4.1E+01	3.75E-11	4.8E-09	1.5E-09
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	1.1E+02	3.2E+01	2.96E-10	3.3E-08	9.5E-09
Lead 210	5.21	*	1.11E+00	*	1.5E+02	3.2E+01	1.01E-09	1.5E-07	3.2E-08
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	1.2E+02	3.0E+01	3.28E-11	3.9E-09	9.7E-10
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	1.4E+02	3.7E+01	2.48E-10	3.5E-08	9.1E-09
Thorium 228	4.50E+00	**	1.15E+00	**	1.3E+02	3.3E+01	2.31E-10	3.0E-08	7.7E-09
							CANCER RISK:	**2.8E-07**	**6.4E-08**

Intake of radionuclides in soil via ingestion (construction worker):
(pCi/g soil * 1.00E-03 g/mg * 480 mg/day * 1 * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302504

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	3.8E-01	4.2E-02	6.57E-08	2.5E-08	2.8E-09
Uranium 234	5.21E+00	*	1.11E+00	*	2.7E-01	5.8E-02	2.14E-11	5.8E-12	1.2E-12
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	2.3E-01	7.3E-02	4.40E-11	1.0E-11	3.2E-12
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	2.0E-01	5.8E-02	6.74E-06	1.3E-06	3.9E-07
Lead 210	5.21E+00	*	1.11E+00	*	2.7E-01	5.8E-02	1.45E-10	3.9E-11	8.4E-12
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	2.1E-01	5.3E-02	1.97E-11	4.2E-12	1.1E-12
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	2.6E-01	6.6E-02	3.28E-06	8.4E-07	2.2E-07
Thorium 228	4.50E+00	**	1.15E+00	**	2.3E-01	6.0E-02	6.20E-06	1.5E-06	3.7E-07
							CANCER RISK:	3.7E-06	9.8E-07

External exposure from radionuclides in soil (construction worker):
(pCi/g soil * 8 hours/day * 60 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 1 year * 1.14e-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.25

Fo = Time Fraction Outdoors = 0.75

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

SUMMARY OF CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RADIONUCLIDES ON RESPIRABLE PARTICULATE AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		AIR CONCENTRATION (pCi/m^3)	BACKGROUND AIR CONCENTRATION (pCi/m^3)	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	INHALATION SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES											
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	9.91E-03	1.09E-03	1.1E+01	1.2E+00	1.24E-08	1.4E-07	1.5E-08
Uranium 234	5.21E+00	*	1.11E+00	*	6.98E-03	1.49E-03	7.7E+00	1.6E+00	1.40E-08	1.1E-07	2.3E-08
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	5.91E-03	1.88E-03	6.5E+00	2.1E+00	1.72E-08	1.1E-07	3.6E-08
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	5.13E-03	1.49E-03	5.7E+00	1.6E+00	2.75E-09	1.6E-08	4.5E-09
Lead 210	5.21E+00	*	1.11E+00	*	6.98E-03	1.49E-03	7.7E+00	1.6E+00	3.86E-09	3.0E-08	6.3E-09
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	5.48E-03	1.37E-03	6.1E+00	1.5E+00	1.93E-08	1.2E-07	2.9E-08
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	6.58E-03	1.70E-03	7.3E+00	1.9E+00	9.94E-10	7.2E-09	1.9E-09
Thorium 228	4.50E+00	**	1.15E+00	**	6.03E-03	1.54E-03	6.7E+00	1.7E+00	9.68E-08	6.4E-07	1.6E-07
									CANCER RISK:	1.2E-06	2.8E-07

Intake of radionuclides on respirable particulates via inhalation (construction worker):
(pCi/g soil * 1.34E-06 kg/m^3 * 1000 g/kg * 2.3m^3/hour * 8 hours/day * 60 days/year * 1 year)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302506

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE FOR SOIL (pCi)	INTAKE FOR BACKGROUND	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	3.6E+03	8.5E+02	6.20E-11	2.2E-07	5.3E-08
Uranium 234	3.79E+00	*	1.11E+00	*	4.0E+03	1.2E+03	4.44E-11	1.8E-07	5.2E-08
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	4.3E+03	1.5E+03	3.75E-11	1.6E-07	5.5E-08
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	4.1E+03	1.2E+03	2.96E-10	1.2E-06	3.5E-07
Lead 210	3.79E+00	*	1.11E+00	*	4.0E+03	1.2E+03	1.01E-09	4.0E-06	1.2E-06
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	7.8E+03	1.1E+03	3.28E-11	2.5E-07	3.5E-08
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	2.7E+04	1.3E+03	2.48E-10	6.7E-06	3.3E-07
Thorium 228	2.59E+01	**	1.15E+00	**	2.7E+04	1.2E+03	2.31E-10	6.3E-06	2.8E-07
							CANCER RISK:	1.9E-05	2.3E-06

Intake of radionuclides in soil via ingestion (adult resident):
(pCi/g soil * 1.00E-03 g/mg * 100 mg/day * 1 * 350 days/year * 30 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	5.9E+01	1.4E+01	6.57E-08	3.9E-06	9.2E-07
Uranium 234	3.79E+00	*	1.11E+00	*	6.6E+01	1.9E+01	2.14E-10	1.4E-08	4.1E-09
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	7.1E+01	2.4E+01	4.40E-11	3.1E-09	1.1E-09
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	6.7E+01	1.9E+01	6.74E-06	4.5E-04	1.3E-04
Lead 210	3.79E+00	*	1.11E+00	*	6.6E+01	1.9E+01	1.45E-10	9.5E-09	2.8E-09
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	1.3E+02	1.8E+01	1.97E-11	2.5E-09	3.5E-10
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	4.5E+02	2.2E+01	3.28E-06	1.5E-03	7.2E-05
Thorium 228	2.59E+01	**	1.15E+00	**	4.5E+02	2.0E+01	6.20E-06	2.8E-03	1.2E-04
							CANCER RISK:	4.7E-03	3.3E-04

External exposure from radionuclides in soil (adult resident):
(pCi/g soil * 17 hours/day * 350 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 30 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.75

Fo = Time Fraction Outdoors = 0.25

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302508

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN HOME GROWN PRODUCE AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)	BACKGROUND SOIL CONCENTRATION (pCi/g)	PLANT UPTAKE FACTOR LETTUCE	ROOT UPTAKE FACTOR CARROTS	PLANT UPTAKE FACTOR TOMATOES	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES										
Uranium 238	3.39E+00 UCLlog	8.11E-01 UCLnorm	4.25E-04	4.80E-04	5.10E-04	2.1E+03	5.1E+02	6.20E-11	1.3E-07	3.1E-08
Uranium 234	3.79E+00 *	1.11E+00 *	4.25E-04	4.80E-04	5.10E-04	2.4E+03	6.9E+02	4.44E-11	1.0E-07	3.1E-08
Thorium 230	4.08E+00 UCLlog	1.41E+00 UCLlog	4.25E-05	1.02E-05	5.10E-05	1.8E+02	6.1E+01	3.75E-11	6.6E-09	2.3E-09
Radium 226	3.89E+00 UCLlog	1.11E+00 UCLnorm	7.50E-04	1.56E-04	9.00E-04	2.9E+03	8.3E+02	2.96E-10	8.6E-07	2.5E-07
Lead 210	3.79E+00 *	1.11E+00 *	2.25E-03	1.08E-03	2.70E-03	9.7E+03	2.8E+03	1.01E-09	9.8E-06	2.9E-06
Thorium 232	7.40E+00 UCLlog	1.03E+00 UCLnorm	4.25E-05	1.02E-05	5.10E-05	3.2E+02	4.4E+01	3.28E-11	1.0E-08	1.5E-09
Radium 228	2.59E+01 UCLlog	1.27E+00 UCLnorm	7.50E-04	1.56E-04	9.00E-04	1.9E+04	9.5E+02	2.48E-10	4.8E-06	2.4E-07
Thorium 228	2.59E+01 **	1.15E+00 **	4.25E-05	1.02E-05	5.10E-05	1.1E+03	5.0E+01	2.31E-10	2.6E-07	1.1E-08
								CANCER RISK:	1.6E-05	3.4E-06

Intake of radionuclides in home grown produce via ingestion (adult resident):
(pCi/g soil * (17 g/day * PUF lettuce + 48 g/day * RUF carrots + 57 g/day * PUF tomatoes) * 350 days/year * 30 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302509

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	1.4E+03	3.4E+02	6.20E-11	8.8E-08	2.1E-08
Uranium 234	3.79E+00	*	1.11E+00	*	1.6E+03	4.7E+02	4.44E-11	7.1E-08	2.1E-08
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	1.7E+03	5.9E+02	3.75E-11	6.4E-08	2.2E-08
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	1.6E+03	4.7E+02	2.96E-10	4.8E-07	1.4E-07
Lead 210	3.79E+00	*	1.11E+00	*	1.6E+03	4.7E+02	1.01E-09	1.6E-06	4.7E-07
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	3.1E+03	4.3E+02	3.28E-11	1.0E-07	1.4E-08
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	1.1E+04	5.3E+02	2.48E-10	2.7E-06	1.3E-07
Thorium 228	2.59E+01	**	1.15E+00	**	1.1E+04	4.8E+02	2.31E-10	2.5E-06	1.1E-07
							CANCER RISK:	7.6E-06	9.3E-07

Intake of radionuclides in soil via ingestion (child resident):
(pCi/g soil * 1.00E-03 g/mg * 200 mg/day * 1 * 350 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302510

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	1.1E+01	2.7E+00	6.57E-08	7.5E-07	1.8E-07
Uranium 234	3.79E+00	*	1.11E+00	*	1.3E+01	3.7E+00	2.14E-11	2.7E-10	8.0E-11
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	1.4E+01	4.7E+00	4.40E-11	6.0E-10	2.1E-10
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	1.3E+01	3.7E+00	6.74E-06	8.8E-05	2.5E-05
Lead 210	3.79E+00	*	1.11E+00	*	1.3E+01	3.7E+00	1.45E-10	1.8E-09	5.4E-10
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	2.5E+01	3.4E+00	1.97E-11	4.9E-10	6.8E-11
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	8.7E+01	4.3E+00	3.28E-06	2.9E-04	1.4E-05
Thorium 228	2.59E+01	**	1.15E+00	**	8.7E+01	3.9E+00	6.20E-06	5.4E-04	2.4E-05
								CANCER RISK:	

External exposure from radionuclides in soil (child resident):
(pCi/g soil * 17 hours/day * 350 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 6 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.875

Fo = Time Fraction Outdoors = 0.125

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302511

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN HOME GROWN PRODUCE AT AREA A

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		PLANT UPTAKE FACTOR LETTUCE	ROOT UPTAKE FACTOR CARROTS	PLANT UPTAKE FACTOR TOMATOES	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES												
Uranium 238	3.39E+00	UCLlog	8.11E-01	UCLnorm	4.25E-04	4.80E-04	5.10E-04	1.9E+02	4.6E+01	6.20E-11	1.2E-08	2.8E-09
Uranium 234	3.79E+00	*	1.11E+00	*	4.25E-04	4.80E-04	5.10E-04	2.1E+02	6.3E+01	4.44E-11	9.5E-09	2.8E-09
Thorium 230	4.08E+00	UCLlog	1.41E+00	UCLlog	4.25E-05	1.02E-05	5.10E-05	1.4E+01	4.9E+00	3.75E-11	5.4E-10	1.8E-10
Radium 226	3.89E+00	UCLlog	1.11E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	2.4E+02	6.7E+01	2.96E-10	7.0E-08	2.0E-08
Lead 210	3.79E+00	*	1.11E+00	*	2.25E-03	1.08E-03	2.70E-03	8.2E+02	2.4E+02	1.01E-09	8.3E-07	2.4E-07
Thorium 232	7.40E+00	UCLlog	1.03E+00	UCLnorm	4.25E-05	1.02E-05	5.10E-05	2.6E+01	3.6E+00	3.28E-11	8.5E-10	1.2E-10
Radium 228	2.59E+01	UCLlog	1.27E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	1.6E+03	7.7E+01	2.48E-10	3.9E-07	1.9E-08
Thorium 228	2.59E+01	**	1.15E+00	**	4.25E-05	1.02E-05	5.10E-05	9.1E+01	4.0E+00	2.31E-10	2.1E-08	9.3E-10
										CANCER RISK:	1.3E-06	2.9E-07

Intake of radionuclides in home grown produce via ingestion (child resident):
(pCi/g soil * (4 g/day * PUF lettuce + 27 g/day * RUF carrots + 24 g/day * PUF tomatoes) * 350 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302512

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	2.1E+03	8.5E+02	6.20E-11	1.3E-07	5.3E-08
Uranium 234	2.47E+00	*	1.11E+00	*	2.6E+03	1.2E+03	4.44E-11	1.2E-07	5.2E-08
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	3.1E+03	1.5E+03	3.75E-11	1.2E-07	5.5E-08
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	2.6E+03	1.2E+03	2.96E-10	7.7E-07	3.5E-07
Lead 210	2.47E+00	*	1.11E+00	*	2.6E+03	1.2E+03	1.01E-09	2.6E-06	1.2E-06
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	4.0E+03	1.1E+03	3.28E-11	1.3E-07	3.5E-08
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	7.2E+03	1.3E+03	2.48E-10	1.8E-06	3.3E-07
Thorium 228	6.89E+00	**	1.15E+00	**	7.2E+03	1.2E+03	2.31E-10	1.7E-06	2.8E-07
							CANCER RISK:	7.3E-06	2.3E-06

Intake of radionuclides in soil via ingestion (adult resident):
(pCi/g soil * 1.00E-03 g/mg * 100 mg/day * 1 * 350 days/year * 30 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302513

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	3.5E+01	1.4E+01	6.57E-08	2.3E-06	9.2E-07
Uranium 234	2.47E+00	*	1.11E+00	*	4.3E+01	1.9E+01	2.14E-11	9.1E-10	4.1E-10
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	5.1E+01	2.4E+01	4.40E-11	2.2E-09	1.1E-09
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	4.3E+01	1.9E+01	6.74E-06	2.9E-04	1.3E-04
Lead 210	2.47E+00	*	1.11E+00	*	4.3E+01	1.9E+01	1.45E-10	6.2E-09	2.8E-09
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	6.7E+01	1.8E+01	1.97E-11	1.3E-09	3.5E-10
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	1.2E+02	2.2E+01	3.28E-06	3.9E-04	7.2E-05
Thorium 228	6.89E+00	**	1.15E+00	**	1.2E+02	2.0E+01	6.20E-06	7.4E-04	1.2E-04
							CANCER RISK:	**1.4E-03**	**3.3E-04**

External exposure from radionuclides in soil (adult resident):
(pCi/g soil * 17 hours/day * 350 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 30 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.75

Fo = Time Fraction Outdoors = 0.25

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302514

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN HOME GROWN PRODUCE AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		PLANT UPTAKE FACTOR LETTUCE	ROOT UPTAKE FACTOR CARROTS	PLANT UPTAKE FACTOR TOMATOES	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES												
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	4.25E-04	4.80E-04	5.10E-04	1.2E+03	5.1E+02	6.20E-11	7.7E-08	3.1E-08
Uranium 234	2.47E+00	*	1.11E+00	*	4.25E-04	4.80E-04	5.10E-04	1.5E+03	6.9E+02	4.44E-11	6.8E-08	3.1E-08
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	4.25E-05	1.02E-05	5.10E-05	1.3E+02	6.1E+01	3.75E-11	4.8E-09	2.3E-09
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	1.9E+03	8.3E+02	2.96E-10	5.5E-07	2.5E-07
Lead 210	2.47E+00	*	1.11E+00	*	2.25E-03	1.08E-03	2.70E-03	6.3E+03	2.8E+03	1.01E-09	6.4E-06	2.9E-06
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	4.25E-05	1.02E-05	5.10E-05	1.7E+02	4.4E+01	3.28E-11	5.5E-09	1.5E-09
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	5.2E+03	9.5E+02	2.48E-10	1.3E-06	2.4E-07
Thorium 228	6.89E+00	**	1.15E+00	**	4.25E-05	1.02E-05	5.10E-05	3.0E+02	5.0E+01	2.31E-10	6.9E-08	1.1E-08
										CANCER RISK:	**8.4E-06**	**3.4E-06**

Intake of radionuclides in home grown produce via ingestion (adult resident):
(pCi/g soil * (17 g/day * PUF lettuce + 48 g/day * RUF carrots + 57 g/day * PUF tomatoes) * 350 days/year * 30 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302515

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	8.4E+02	3.4E+02	6.20E-11	5.2E-08	2.1E-08
Uranium 234	2.47E+00	*	1.11E+00	*	1.0E+03	4.7E+02	4.44E-11	4.6E-08	2.1E-08
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	1.2E+03	5.9E+02	3.75E-11	4.7E-08	2.2E-08
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	1.0E+03	4.7E+02	2.96E-10	3.1E-07	1.4E-07
Lead 210	2.47E+00	*	1.11E+00	*	1.0E+03	4.7E+02	1.01E-09	1.0E-06	4.7E-07
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	1.6E+03	4.3E+02	3.28E-11	5.3E-08	1.4E-08
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	2.9E+03	5.3E+02	2.48E-10	7.2E-07	1.3E-07
Thorium 228	6.89E+00	**	1.15E+00	**	2.9E+03	4.8E+02	2.31E-10	6.7E-07	1.1E-07
							CANCER RISK:	2.9E-06	9.3E-07

Intake of radionuclides in soil via ingestion (child resident):
(pCi/g soil * 1.00E-03 g/mg * 200 mg/day * 1 * 350 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	6.7E+00	2.7E+00	6.57E-08	4.4E-07	1.8E-07
Uranium 234	2.47E+00	*	1.11E+00	*	8.3E+00	3.7E+00	2.14E-11	1.8E-10	8.0E-11
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	9.9E+00	4.7E+00	4.40E-11	4.4E-10	2.1E-10
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	8.3E+00	3.7E+00	6.74E-06	5.6E-05	2.5E-05
Lead 210	2.47E+00	*	1.11E+00	*	8.3E+00	3.7E+00	1.45E-10	1.2E-09	5.4E-10
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	1.3E+01	3.4E+00	1.97E-11	2.5E-10	6.8E-11
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	2.3E+01	4.3E+00	3.28E-06	7.6E-05	1.4E-05
Thorium 228	6.89E+00	**	1.15E+00	**	2.3E+01	3.9E+00	6.20E-06	1.4E-04	2.4E-05
							CANCER RISK:	2.8E-04	6.3E-05

External exposure from radionuclides in soil (child resident):
(pCi/g soil * 17 hours/day * 350 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 6 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.875

Fo = Time Fraction Outdoors = 0.125

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302517

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN HOME GROWN PRODUCE AT AREA B

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		PLANT UPTAKE FACTOR LETTUCE	ROOT UPTAKE FACTOR CARROTS	PLANT UPTAKE FACTOR TOMATOES	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES												
Uranium 238	2.00E+00	UCLlog	8.11E-01	UCLnorm	4.25E-04	4.80E-04	5.10E-04	1.1E+02	4.6E+01	6.20E-11	7.0E-09	2.8E-09
Uranium 234	2.47E+00	*	1.11E+00	*	4.25E-04	4.80E-04	5.10E-04	1.4E+02	6.3E+01	4.44E-11	6.2E-09	2.8E-09
Thorium 230	2.95E+00	UCLlog	1.41E+00	UCLlog	4.25E-05	1.02E-05	5.10E-05	1.0E+01	4.9E+00	3.75E-11	3.9E-10	1.8E-10
Radium 226	2.47E+00	UCLlog	1.11E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	1.5E+02	6.7E+01	2.96E-10	4.4E-08	2.0E-08
Lead 210	2.47E+00	*	1.11E+00	*	2.25E-03	1.08E-03	2.70E-03	5.3E+02	2.4E+02	1.01E-09	5.4E-07	2.4E-07
Thorium 232	3.85E+00	UCLlog	1.03E+00	UCLnorm	4.25E-05	1.02E-05	5.10E-05	1.3E+01	3.6E+00	3.28E-11	4.4E-10	1.2E-10
Radium 228	6.89E+00	UCLlog	1.27E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	4.2E+02	7.7E+01	2.48E-10	1.0E-07	1.9E-08
Thorium 228	6.89E+00	**	1.15E+00	**	4.25E-05	1.02E-05	5.10E-05	2.4E+01	4.0E+00	2.31E-10	5.6E-09	9.3E-10
										CANCER RISK:	7.1E-07	2.9E-07

Intake of radionuclides in home grown produce via ingestion (child resident):
(pCi/g soil * (4 g/day * PUF lettuce + 27 g/day * RUF carrots + 24 g/day * PUF tomatoes) * 350 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302518

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	4.1E+04	8.5E+02	6.20E-11	2.6E-06	5.3E-08
Uranium 234	3.85E+01	*	1.11E+00	*	4.0E+04	1.2E+03	4.44E-11	1.8E-06	5.2E-08
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	4.0E+04	1.5E+03	3.75E-11	1.5E-06	5.5E-08
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	2.1E+04	1.2E+03	2.96E-10	6.2E-06	3.5E-07
Lead 210	2.00E+01	*	1.11E+00	*	2.1E+04	1.2E+03	1.01E-09	2.1E-05	1.2E-06
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	2.0E+04	1.1E+03	3.28E-11	6.6E-07	3.5E-08
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	4.6E+04	1.3E+03	2.48E-10	1.1E-05	3.3E-07
Thorium 228	4.33E+01	**	1.15E+00	**	4.6E+04	1.2E+03	2.31E-10	1.1E-05	2.8E-07
							CANCER RISK:	**5.6E-05**	**2.3E-06**

Intake of radionuclides in soil via ingestion (adult resident):
(pCi/g soil * 1.00E-03 g/mg * 100 mg/day * 1 * 3500 days/year * 30 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302519

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	6.8E+02	1.4E+01	6.57E-08	4.5E-05	9.2E-07
Uranium 234	3.85E+01	*	1.11E+00	*	6.7E+02	1.9E+01	2.14E-11	1.4E-08	4.1E-10
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	6.5E+02	2.4E+01	4.40E-11	2.9E-08	1.1E-09
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	3.5E+02	1.9E+01	6.74E-06	2.3E-03	1.3E-04
Lead 210	2.00E+01	*	1.11E+00	*	3.5E+02	1.9E+01	1.45E-10	5.0E-08	2.8E-09
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	3.3E+02	1.8E+01	1.97E-11	6.5E-09	3.5E-10
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	7.5E+02	2.2E+01	3.28E-06	2.5E-03	7.2E-05
Thorium 228	4.33E+01	**	1.15E+00	**	7.5E+02	2.0E+01	6.20E-06	4.6E-03	1.2E-04
							CANCER RISK:	9.5E-03	3.3E-04

External exposure from radionuclides in soil (adult resident):
(pCi/g soil * 17 hours/day * 350 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 30 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.75

Fo = Time Fraction Outdoors = 0.25

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302520

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN HOME GROWN PRODUCE AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		PLANT UPTAKE FACTOR LETTUCE	ROOT UPTAKE FACTOR CARROTS	PLANT UPTAKE FACTOR TOMATOES	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES												
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	4.25E-04	4.80E-04	5.10E-04	2.4E+04	5.1E+02	6.20E-11	1.5E-06	3.1E-08
Uranium 234	3.85E+01	*	1.11E+00	*	4.25E-04	4.80E-04	5.10E-04	2.4E+04	6.9E+02	4.44E-11	1.1E-06	3.1E-08
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	4.25E-05	1.02E-05	5.10E-05	1.6E+03	6.1E+01	3.75E-11	6.1E-08	2.3E-09
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	1.5E+04	8.3E+02	2.96E-10	4.4E-06	2.5E-07
Lead 210	2.00E+01	*	1.11E+00	*	2.25E-03	1.08E-03	2.70E-03	5.1E+04	2.8E+03	3.86E-09	2.0E-04	1.1E-05
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	4.25E-05	1.02E-05	5.10E-05	8.3E+02	4.4E+01	3.28E-11	2.7E-08	1.5E-09
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	3.3E+04	9.5E+02	2.48E-10	8.1E-06	2.4E-07
Thorium 228	4.33E+01	**	1.15E+00	**	4.25E-05	1.02E-05	5.10E-05	1.9E+03	5.0E+01	9.68E-08	1.8E-04	4.8E-06
										CANCER RISK:	3.9E-04	1.6E-05

Intake of radionuclides in home grown produce via ingestion (adult resident):
(pCi/g soil * (17 g/day * PUF lettuce + 48 g/day * RUF carrots + 57 g/day * PUF tomatoes) * 350 days/year * 30 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302521

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	1.7E+04	3.4E+02	6.20E-11	1.0E-06	2.1E-08
Uranium 234	3.85E+01	*	1.11E+00	*	1.6E+04	4.7E+02	4.44E-11	7.2E-07	2.1E-08
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	1.6E+04	5.9E+02	3.75E-11	5.9E-07	2.2E-08
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	8.4E+03	4.7E+02	2.96E-10	2.5E-06	1.4E-07
Lead 210	2.00E+01	*	1.11E+00	*	8.4E+03	4.7E+02	1.01E-09	8.5E-06	4.7E-07
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	8.1E+03	4.3E+02	3.28E-11	2.6E-07	1.4E-08
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	1.8E+04	5.3E+02	2.48E-10	4.5E-06	1.3E-07
Thorium 228	4.33E+01	**	1.15E+00	**	1.8E+04	4.8E+02	2.31E-10	4.2E-06	1.1E-07
							CANCER RISK:	2.2E-05	9.3E-07

Intake of radionuclides in soil via ingestion (child resident):
(pCi/g soil * 1.00E-03 g/mg * 200 mg/day * 1 * 350 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302522

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	1.3E+02	2.7E+00	6.57E-08	8.7E-06	1.8E-07
Uranium 234	3.85E+01	*	1.11E+00	*	1.3E+02	3.7E+00	2.14E-11	2.8E-09	8.0E-11
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	1.3E+02	4.7E+00	4.40E-11	5.6E-09	2.1E-10
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	6.7E+01	3.7E+00	6.74E-06	4.5E-04	2.5E-05
Lead 210	2.00E+01	*	1.11E+00	*	6.7E+01	3.7E+00	1.45E-10	9.7E-09	5.4E-10
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	6.5E+01	3.4E+00	1.97E-11	1.3E-09	6.8E-11
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	1.5E+02	4.3E+00	3.28E-06	4.8E-04	1.4E-05
Thorium 228	4.33E+01	**	1.15E+00	**	1.5E+02	3.9E+00	6.20E-06	9.0E-04	2.4E-05
							CANCER RISK:	1.8E-03	6.3E-05

External exposure from radionuclides in soil (child resident):
(pCi/g soil * 17 hours/day * 350 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 6 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.875

Fo = Time Fraction Outdoors = 0.125

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302523

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN HOME GROWN PRODUCE AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		PLANT UPTAKE FACTOR LETTUCE	ROOT UPTAKE FACTOR CARROTS	PLANT UPTAKE FACTOR TOMATOES	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES												
Uranium 238	3.93E+01	UCLlog	8.11E-01	UCLnorm	4.25E-04	4.80E-04	5.10E-04	2.2E+03	4.6E+01	6.20E-11	1.4E-07	2.8E-09
Uranium 234	3.85E+01	*	1.11E+00	*	4.25E-04	4.80E-04	5.10E-04	2.2E+03	6.3E+01	4.44E-11	9.7E-08	2.8E-09
Thorium 230	3.77E+01	UCLlog	1.41E+00	UCLlog	4.25E-05	1.02E-05	5.10E-05	1.3E+02	4.9E+00	3.75E-11	5.0E-09	1.8E-10
Radium 226	2.00E+01	UCLlog	1.11E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	1.2E+03	6.7E+01	2.96E-10	3.6E-07	2.0E-08
Lead 210	2.00E+01	*	1.11E+00	*	2.25E-03	1.08E-03	2.70E-03	4.3E+03	2.4E+02	1.01E-09	4.4E-06	2.4E-07
Thorium 232	1.92E+01	UCLlog	1.03E+00	UCLnorm	4.25E-05	1.02E-05	5.10E-05	6.7E+01	3.6E+00	3.28E-11	2.2E-09	1.2E-10
Radium 228	4.33E+01	UCLlog	1.27E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	2.6E+03	7.7E+01	2.48E-10	6.5E-07	1.9E-08
Thorium 228	4.33E+01	**	1.15E+00	**	4.25E-05	1.02E-05	5.10E-05	1.5E+02	4.0E+00	2.31E-10	3.5E-08	9.3E-10
										CANCER RISK:	5.7E-06	2.9E-07

Intake of radionuclides in home grown produce via ingestion (child resident):
(pCi/g soil * (4 g/day * PUF lettuce + 27 g/day * RUF carrots + 24 g/day * PUF tomatoes) * 350 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302524

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	7.8E+03	8.5E+02	6.20E-11	4.8E-07	5.3E-08
Uranium 234	5.21E+00	*	1.11E+00	*	5.5E+03	1.2E+03	4.44E-11	2.4E-07	5.2E-08
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	4.6E+03	1.5E+03	3.75E-11	1.7E-07	5.5E-08
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	4.0E+03	1.2E+03	2.96E-10	1.2E-06	3.5E-07
Lead 210	5.21E+00	*	1.11E+00	*	5.5E+03	1.2E+03	1.01E-09	5.5E-06	1.2E-06
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	4.3E+03	1.1E+03	3.28E-11	1.4E-07	3.5E-08
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	5.2E+03	1.3E+03	2.48E-10	1.3E-06	3.3E-07
Thorium 228	4.50E+00	**	1.15E+00	**	4.7E+03	1.2E+03	2.31E-10	1.1E-06	2.8E-07
							CANCER RISK:	1.0E-05	2.3E-06

Intake of radionuclides in soil via ingestion (adult resident):
(pCi/g soil * 1.00E-03 g/mg * 100 mg/day * 1 * 350 days/year * 30 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302525

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	1.3E+02	1.4E+01	6.57E-08	8.4E-06	9.2E-07
Uranium 234	5.21E+00	*	1.11E+00	*	9.0E+01	1.9E+01	2.14E-11	1.9E-09	4.1E-10
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	7.6E+01	2.4E+01	4.40E-11	3.4E-09	1.1E-09
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	6.6E+01	1.9E+01	6.74E-06	4.5E-04	1.3E-04
Lead 210	5.21	*	1.11E+00	*	9.0E+01	1.9E+01	1.45E-10	1.3E-08	2.8E-09
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	7.1E+01	1.8E+01	1.97E-11	1.4E-09	3.5E-10
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	8.5E+01	2.2E+01	3.28E-06	2.8E-04	7.2E-05
Thorium 228	4.50E+00	**	1.15E+00	**	7.8E+01	2.0E+01	6.20E-06	4.8E-04	1.2E-04
							CANCER RISK:	1.2E-03	3.3E-04

External exposure from radionuclides in soil (adult resident):
(pCi/g soil * 17 hours/day * 350 days/year * [(Fi * GSFi) + (Fo * GSFo)] * 30 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.75

Fo = Time Fraction Outdoors = 0.25

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

302526

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN HOME GROWN PRODUCE AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		PLANT UPTAKE FACTOR LETTUCE	ROOT UPTAKE FACTOR CARROTS	PLANT UPTAKE FACTOR TOMATOES	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES												
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	4.25E-04	4.80E-04	5.10E-04	4.6E+03	5.1E+02	6.20E-11	2.9E-07	3.1E-08
Uranium 234	5.21E+00	*	1.11E+00	*	4.25E-04	4.80E-04	5.10E-04	3.2E+03	6.9E+02	4.44E-11	1.4E-07	3.1E-08
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	4.25E-05	1.02E-05	5.10E-05	1.9E+02	6.1E+01	3.75E-11	7.2E-09	2.3E-09
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	2.9E+03	8.3E+02	2.96E-10	8.5E-07	2.5E-07
Lead 210	5.21E+00	*	1.11E+00	*	2.25E-03	1.08E-03	2.70E-03	1.3E+04	2.8E+03	1.01E-09	1.3E-05	2.9E-06
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	4.25E-05	1.02E-05	5.10E-05	1.8E+02	4.4E+01	3.28E-11	5.8E-09	1.5E-09
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	3.7E+03	9.5E+02	2.48E-10	9.1E-07	2.4E-07
Thorium 228	4.50E+00	**	1.15E+00	**	4.25E-05	1.02E-05	5.10E-05	1.9E+02	5.0E+01	2.31E-10	4.5E-08	1.1E-08
										CANCER RISK:	1.6E-05	3.4E-06

Intake of radionuclides in home grown produce via ingestion (adult resident):
(pCi/g soil * (17 g/day * PUF lettuce + 48 g/day * RUF carrots + 57 g/day * PUF tomatoes) * 350 days/year * 30 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226.

302527

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	3.1E+03	3.4E+02	6.20E-11	1.9E-07	2.1E-08
Uranium 234	5.21E+00	*	1.11E+00	*	2.2E+03	4.7E+02	4.44E-11	9.7E-08	2.1E-08
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	1.9E+03	5.9E+02	3.75E-11	7.0E-08	2.2E-08
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	1.6E+03	4.7E+02	2.96E-10	4.8E-07	1.4E-07
Lead 210	5.21E+00	*	1.11E+00	*	2.2E+03	4.7E+02	1.01E-09	2.2E-06	4.7E-07
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	1.7E+03	4.3E+02	3.28E-11	5.6E-08	1.4E-08
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	2.1E+03	5.3E+02	2.48E-10	5.1E-07	1.3E-07
Thorium 228	4.50E+00	**	1.15E+00	**	1.9E+03	4.8E+02	2.31E-10	4.4E-07	1.1E-07
							CANCER RISK:	4.0E-06	9.3E-07

Intake of radionuclides in soil via ingestion (child resident):
(pCi/g soil * 1.00E-03 g/mg * 200 mg/day * 1 * 350 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302528

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

EXTERNAL PENETRATING RADIATION FROM RADIONUCLIDES IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		EXTERNAL EXPOSURE (pCi-year/g)	BACKGROUND EXTERNAL EXPOSURE (pCi-year/g)	EXTERNAL EXPOSURE SLOPE FACTOR Risk/year per pCi/g soil	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	2.5E+01	2.7E+00	6.57E-08	1.6E-06	1.8E-07
Uranium 234	5.21E+00	*	1.11E+00	*	1.7E+01	3.7E+00	2.14E-11	3.7E-10	8.0E-11
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	1.5E+01	4.7E+00	4.40E-11	6.5E-10	2.1E-10
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	1.3E+01	3.7E+00	6.74E-06	8.7E-05	2.5E-05
Lead 210	5.21E+00	*	1.11E+00	*	1.7E+01	3.7E+00	1.45E-10	2.5E-09	5.4E-10
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	1.4E+01	3.4E+00	1.97E-11	2.7E-10	6.8E-11
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	1.6E+01	4.3E+00	3.28E-06	5.4E-05	1.4E-05
Thorium 228	4.50E+00	**	1.15E+00	**	1.5E+01	3.9E+00	6.20E-06	9.4E-05	2.4E-05
							CANCER RISK:	2.4E-04	6.3E-05

External exposrue from radionuclides in soil (child resident):
(pCi/g soil * 17 hours/day * 350 days/year * |(Fi * GSFi) + (Fo * GSFo)| * 6 years * 1.14E-04 year/hours)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

Fi = Time Fraction Indoors = 0.875

Fo = Time Fraction Outdoors = 0.125

GSFi = Gamma Shielding Factor Indoors = 0.8

GSFo = Gamma Shielding Factor Outdoors = 1

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN HOME GROWN PRODUCE AT AREA C

CHEMICAL	SOIL CONCENTRATION (pCi/g)		BACKGROUND SOIL CONCENTRATION (pCi/g)		PLANT UPTAKE FACTOR LETTUCE	ROOT UPTAKE FACTOR CARROTS	PLANT UPTAKE FACTOR TOMATOES	INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES												
Uranium 238	7.40E+00	UCLlog	8.11E-01	UCLnorm	4.25E-04	4.80E-04	5.10E-04	4.2E+02	4.6E+01	6.20E-11	2.6E-08	2.8E-09
Uranium 234	5.21E+00	*	1.11E+00	*	4.25E-04	4.80E-04	5.10E-04	2.9E+02	6.3E+01	4.44E-11	1.3E-08	2.8E-09
Thorium 230	4.41E+00	UCLlog	1.41E+00	UCLlog	4.25E-05	1.02E-05	5.10E-05	1.5E+01	4.9E+00	3.75E-11	5.8E-10	1.8E-10
Radium 226	3.83E+00	UCLlog	1.11E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	2.3E+02	6.7E+01	2.96E-10	6.9E-08	2.0E-08
Lead 210	5.21E+00	*	1.11E+00	*	2.25E-03	1.08E-03	2.70E-03	1.1E+03	2.4E+02	1.01E-09	1.1E-06	2.4E-07
Thorium 232	4.09E+00	UCLlog	1.03E+00	UCLnorm	4.25E-05	1.02E-05	5.10E-05	1.4E+01	3.6E+00	3.28E-11	4.7E-10	1.2E-10
Radium 228	4.91E+00	UCLlog	1.27E+00	UCLnorm	7.50E-04	1.56E-04	9.00E-04	3.0E+02	7.7E+01	2.48E-10	7.4E-08	1.9E-08
Thorium 228	4.50E+00	**	1.15E+00	**	4.25E-05	1.02E-05	5.10E-05	1.6E+01	4.0E+00	2.31E-10	3.6E-09	9.3E-10
										CANCER RISK:	1.3E-06	2.9E-07

Intake of radionuclides in home grown produce via ingestion (child resident):
(pCi/g soil * (4 g/day * PUF lettuce + 27 g/day * RUF carrots + 24 g/day * PUF tomatoes) * 350 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302530

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN GROUNDWATER

CHEMICAL	GROUNDWATER CONCENTRATION (pCi/l)		BACKGROUND FOR GROUNDWATER CONCENTRATION (pCi/l)		GROUNDWATER INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi/l)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	8.30E+00	UCLlog	2.90E-01	MAX	1.7E+05	6.1E+03	6.2E-11	1.1E-05	3.8E-07
Uranium 234	4.48E+00	*	2.87E-01	*	9.4E+04	6.0E+03	4.4E-11	4.2E-06	2.7E-07
Thorium 230	1.14E+00	UCLlog	2.20E-01	MAX	2.4E+04	4.6E+03	3.8E-11	9.0E-07	1.7E-07
Radium 226	4.02E+00	UCLlog	3.50E-01	MAX	8.4E+04	7.4E+03	3.0E-10	2.5E-05	2.2E-06
Lead 210	4.48E+00	*	2.87E-01	*	9.4E+04	6.0E+03	1.0E-09	9.5E-05	6.1E-06
Thorium 232	9.53E-01	UCLlog	2.90E-01	MAX	2.0E+04	6.1E+03	3.3E-11	6.6E-07	2.0E-07
Radium 228	2.42E+00	UCLlog	9.40E-01	MAX	5.1E+04	2.0E+04	2.5E-10	1.3E-05	4.9E-06
Thorium 228	1.68E+00	**	6.15E-01	**	3.5E+04	1.3E+04	2.3E-10	8.2E-06	3.0E-06
							CANCER RISK:	1.6E-04	1.7E-05

Intake of radionuclides in groundwater via ingestion (adult resident):
(pCi/l water * 2 l/day * 350 days/year * 30 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302531

SUMMARY OF CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF RADIONUCLIDES IN GROUNDWATER

CHEMICAL	GROUNDWATER CONCENTRATION (pCi/l)		BACKGROUND FOR GROUNDWATER CONCENTRATION (pCi/l)		GROUNDWATER INTAKE (pCi)	INTAKE FOR BACKGROUND (pCi/l)	ORAL SLOPE FACTOR Risk/pCi	CANCER RISK	CANCER RISK BACKGROUND
RADIONUCLIDES									
Uranium 238	8.30E+00	UCLlog	2.90E-01	MAX	1.7E+04	6.1E+02	6.20E-11	1.1E-06	3.8E-08
Uranium 234	4.48E+00	*	2.87E-01	*	9.4E+03	6.0E+02	4.44E-11	4.2E-07	2.7E-08
Thorium 230	1.14E+00	UCLlog	2.20E-01	MAX	2.4E+03	4.6E+02	3.75E-11	9.0E-08	1.7E-08
Radium 226	4.02E+00	UCLlog	3.50E-01	MAX	8.4E+03	7.4E+02	2.96E-10	2.5E-06	2.2E-07
Lead 210	4.48E+00	*	2.87E-01	*	9.4E+03	6.0E+02	1.01E-09	9.5E-06	6.1E-07
Thorium 232	9.53E-01	UCLlog	2.90E-01	MAX	2.0E+03	6.1E+02	3.28E-11	6.6E-08	2.0E-08
Radium 228	2.42E+00	UCLlog	9.40E-01	MAX	5.1E+03	2.0E+03	2.48E-10	1.3E-06	4.9E-07
Thorium 228	1.68E+00	**	6.15E-01	**	3.5E+03	1.3E+03	2.31E-10	8.2E-07	3.0E-07
							CANCER RISK:	1.6E-05	1.7E-06

Intake of radionuclides in groundwater via ingestion (child resident):
(pCi/l water * 1 l/day * 350 days/year * 6 years)

* Where Uranium 238, Thorium 230, and Radium 226 data approximate secular equilibrium, assume Uranium 234 and Lead 210 to be equal to the average of Uranium 238 Thorium 230, and Radium 226. Otherwise, assume Uranium 234 is equal to Uranium 238 and Lead 210 is equal to Radium 226.

** Where Thorium 232 and Radium 228 data approximate secular equilibrium, assume Thorium 228 to be equal to the average of Thorium 232 and Radium 226. Otherwise, assume Thorium 228 is equal to Radium 228.

302532

Appendix O-2

Radiological Risk - RES-RAD Exposure and Risk Summaries

Cancer Risk Slope Factors Summary Table
File: DOSFAC.BIN

Menu	Parameter	Current Value	Default	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Pb-210+D	1.50E-10	1.50E-10	SLPF(1,1)
Sf-1	Ra-226+D	6.70E-06	6.70E-06	SLPF(2,1)
Sf-1	Ra-228+D	3.30E-06	3.30E-06	SLPF(3,1)
Sf-1	Th-228+D	6.20E-06	6.20E-06	SLPF(4,1)
Sf-1	Th-230	4.40E-11	4.40E-11	SLPF(5,1)
Sf-1	Th-232	2.00E-11	2.00E-11	SLPF(6,1)
Sf-1	U-234	2.10E-11	2.10E-11	SLPF(7,1)
Sf-1	U-238+D	6.60E-08	6.60E-08	SLPF(8,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Pb-210+D	3.90E-09	3.90E-09	SLPF(1,2)
Sf-2	Ra-226+D	2.70E-09	2.70E-09	SLPF(2,2)
Sf-2	Ra-228+D	9.90E-10	9.90E-10	SLPF(3,2)
Sf-2	Th-228+D	9.70E-08	9.70E-08	SLPF(4,2)
Sf-2	Th-230	1.70E-08	1.70E-08	SLPF(5,2)
Sf-2	Th-232	1.90E-08	1.90E-08	SLPF(6,2)
Sf-2	U-234	1.40E-08	1.40E-08	SLPF(7,2)
Sf-2	U-238+D	1.20E-08	1.20E-08	SLPF(8,2)
Sf-3	Ingestion, slope factors, 1/(pCi):			
Sf-3	Pb-210+D	1.00E-09	1.00E-09	SLPF(1,3)
Sf-3	Ra-226+D	3.00E-10	3.00E-10	SLPF(2,3)
Sf-3	Ra-228+D	2.50E-10	2.50E-10	SLPF(3,3)
Sf-3	Th-228+D	2.30E-10	2.30E-10	SLPF(4,3)
Sf-3	Th-230	3.80E-11	3.80E-11	SLPF(5,3)
Sf-3	Th-232	3.30E-11	3.30E-11	SLPF(6,3)
Sf-3	U-234	4.40E-11	4.40E-11	SLPF(7,3)
Sf-3	U-238+D	6.20E-11	6.20E-11	SLPF(8,3)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12$	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Rn-220	1.90E-13	1.90E-13	SLPFRN(2,1)
Sf-Rn	Po-216	3.00E-15	3.00E-15	SLPFRN(2,2)
Sf-Rn	Pb-212	3.90E-11	3.90E-11	SLPFRN(2,3)
Sf-Rn	Bi-212	3.70E-11	3.70E-11	SLPFRN(2,4)

Note: Default values followed by '*' were derived by multiplying the dose conversion factors with 7.6E-7 (risk/mrem). For external radiation, the dose conversion factors used for this derivation were obtained from the EPA's Federal Guidance Report No.12, and for inhalation and ingestion, the dose conversion factors were the ones used in RESRAD default database.

Default values followed by '$' were obtained from 'Estimating Radiogenic Cancer Risks', EPA 402-R-93-076, June, 1994.

Default values followed by '#' were taken from individual radionuclides given in HEAST.

302534

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	3.630E+00
Thickness:	2.00 meters	Ra-226	2.820E+00
Cover Depth:	0.00 meters	Ra-228	1.780E+01
		Th 228	1.780E+01
		Th-230	5.490E+00
		Th 232	7.040E+00
		U 234	3.630E+00
		U-238	2.590E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	8.288E+00	8.046E+00	7.430E+00	5.521E+00	3.946E+00	3.791E+00	3.810E+00	3.836E+00
M(t):	5.525E-01	5.364E-01	4.953E-01	3.680E-01	2.631E-01	2.528E-01	2.540E-01	2.557E-01

Maximum TDOSE(t): 8.288E+00 mrem/yr at t = 0.000E+00 years

302535

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.963E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.592E-03	0.0009
Ra-226	8.150E-01	0.0983	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.079E-03	0.0001
Ra-228	3.746E+00	0.3314	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.374E-03	0.0009
Th-228	4.689E+00	0.5659	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.138E-03	0.0005
Th-230	1.749E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.656E-04	0.0001
Th-232	9.715E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.529E-03	0.0007
U-234	3.876E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.956E-04	0.0000
U-238	9.169E-03	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.004E-04	0.0000
Total	8.261E+00	0.9967	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.707E-02	0.0033

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.189E-03	0.0010
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.160E-01	0.0985
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.754E+00	0.3322
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.694E+00	0.5663
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.040E-03	0.0001
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.627E-03	0.0007
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.343E-04	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.369E-03	0.0011
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.288E+00	1.0000

*Sum of all water independent and dependent pathways.

302536

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.044E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.044E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.113E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.113E-01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.121E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.121E+00
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.121E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.121E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.579E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.579E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.025E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.025E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.044E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.044E+00
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.451E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.451E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water Ind. -- Water Independent Water-dep. -- Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.769E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.266E-09	0.0002
Ra-226	2.925E-06	0.1003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.460E-09	0.0001
Ra-228	9.093E-06	0.3117	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.682E-09	0.0003
Th-228	1.710E-05	0.5863	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.067E-09	0.0002
Th-230	3.815E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.601E-10	0.0000
Th-232	2.238E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.010E-10	0.0000
U-234	1.215E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.757E-10	0.0000
U-238	2.650E-08	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.772E-10	0.0000
Total	2.915E-05	0.9992	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.379E-08	0.0008

302537

Excess Cancer Risks CNPS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.354E-09	0.0002
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.927E-06	0.1003
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.100E-06	0.3120
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.711E-05	0.5865
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.983E-10	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.234E-10	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.879E-10	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.678E-08	0.0009
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.917E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. -- Water-independent Water-dep. -- Water-dependent

302538

Summary : C[illegible]t-adolescent trespasser; background (0% indoors) . Cels B and A soil and Parcel B sediment
File : TRSCRBKG.B

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	1.110E+00
Thickness:	2.00 meters	Ra-226	1.110E+00
Cover Depth:	0.00 meters	Ra-228	1.270E+00
		Th-228	1.150E+00
		Th-230	1.410E+00
		Th-232	1.030E+00
		U-234	1.110E+00
		U-238	8.110E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	8.275E-01	8.317E-01	8.293E-01	7.964E-01	7.617E-01	7.573E-01	7.571E-01	7.521E-01
M(t):	5.517E-02	5.545E-02	5.529E-02	5.309E-02	5.078E-02	5.049E-02	5.048E-02	5.014E-02

Maximum TDOSE(t): 8.322E-01 mrem/yr at t = 1.501 ± 0.002 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.501 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.740E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.216E-03	0.0027
Ra-226	3.206E-01	0.3852	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.302E-04	0.0006
Ra-228	2.908E-01	0.3495	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.514E-04	0.0007
Th-228	1.759E-01	0.2113	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.552E-04	0.0002
Th-230	3.098E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.227E-04	0.0003
Th-232	3.686E-02	0.0443	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.888E-04	0.0011
U-234	1.160E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.848E-05	0.0001
U-238	2.811E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.145E-05	0.0001
Total	8.275E-01	0.9943	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.714E-03	0.0057

302539

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Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.823E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.322E-03	0.0028
Ra-226	3.208E-01	0.3876	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.247E-04	0.0005
Ra-228	1.959E-01	0.2368	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.261E-04	0.0006
Th-228	3.030E-01	0.3661	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.673E-04	0.0003
Th-230	4.491E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.223E-04	0.0003
Th-232	1.421E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.090E-04	0.0010
U-234	1.185E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.038E-05	0.0001
U-238	2.871E-03	0.0035	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.276E-05	0.0001
Total	8.228E-01	0.9943	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.724E-03	0.0057

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.504E-03	0.0030
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.212E-01	0.3881
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.965E-01	0.2374
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.032E-01	0.3664
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.672E-04	0.0003
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.232E-04	0.0010
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.022E-04	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.934E-03	0.0035
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.275E-01	1.0000

*Sum of all water independent and dependent pathways.

302540

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.193E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.193E-01
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.193E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.193E-01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.654E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.654E-01
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.309E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.309E-01
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.057E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.057E-01
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.963E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.963E-01
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.193E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.193E-01
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.333E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.333E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water Ind. -- Water-independent Water-dep. -- Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.682E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.916E-09	0.0007
Ra-226	1.151E-06	0.3947	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.748E-10	0.0002
Ra-228	6.488E-07	0.2224	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.481E-10	0.0002
Th-228	1.105E-06	0.3788	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.566E-10	0.0002
Th-230	9.799E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.249E-11	0.0000
Th-232	3.274E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.867E-11	0.0000
U-234	3.715E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.431E-11	0.0000
U-238	8.299E-09	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.680E-11	0.0000
Total	2.913E-06	0.9987	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.818E-09	0.0013

302541

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.943E 09	0.0007
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.152E 06	0.3949
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.493E-07	0.2226
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.105E-06	0.3789
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.023E-10	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.195E-11	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.802E-11	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.386E-09	0.0029
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.917E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. = Water-independent Water-dep. = Water-dependent

302542

and Parcel C soil and Parcel C sediment

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	8.490E+01
Thickness:	2.00 meters	Ra-226	8.490E+01
Cover Depth:	0.00 meters	Ra-228	2.490E+02
		Th-228	2.490E+02
		Th-230	2.140E+02
		Th-232	8.810E+01
		U-234	3.070E+02
		U-238	3.070E+02

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.233E+02	1.198E+02	1.111E+02	8.408E+01	6.180E+01	5.998E+01	6.200E+01	6.775E+01
M(t):	8.218E+00	7.990E+00	7.408E+00	5.606E+00	4.120E+00	3.998E+00	4.134E+00	4.517E+00

Maximum TDOSE(t): 1.233E+02 mrem/yr at t = 0.000E+00 years

302543

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.320E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.769E-01	0.0014
Ra-226	2.323E+01	0.1884	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.237E-02	0.0003
Ra-228	3.637E+01	0.2950	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.028E-01	0.0008
Th-228	6.210E+01	0.5038	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.767E-02	0.0005
Th-230	6.453E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.362E-02	0.0003
Th-232	1.151E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.894E-02	0.0006
U-234	3.103E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.490E-02	0.0002
U-238	1.029E+00	0.0083	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.367E-02	0.0002
Total	1.228E+02	0.9958	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.209E-01	0.0042

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.901E-01	0.0015
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.326E+01	0.1887
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.647E+01	0.2959
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.216E+01	0.5043
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.007E-02	0.0003
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.009E-02	0.0006
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.801E-02	0.0002
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.053E+00	0.0085
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.233E+02	1.0000

*Sum of all water independent and dependent pathways.

302544

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.434E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.434E+01
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.434E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.434E+01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.138E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.138E+01
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.138E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.138E+01
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.134E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.134E+01
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.525E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.525E+01
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.800E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.800E+01
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.800E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.800E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNR8(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.942E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.460E-07	0.0003
Ra-226	8.337E-05	0.1922	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.381E-08	0.0001
Ra-228	1.204E-04	0.2776	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.071E-07	0.0002
Th-228	2.265E-04	0.5222	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.850E-08	0.0002
Th-230	1.408E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.399E-08	0.0000
Th-232	2.651E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.000E-09	0.0000
U-234	9.726E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.323E-08	0.0001
U-238	2.974E-06	0.0069	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.274E-08	0.0001
Total	4.333E-04	0.9989	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.703E-07	0.0011

302545

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.480E-07	0.0003
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.342E-05	0.1923
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.205E-04	0.2779
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.266E-04	0.5224
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.539E-08	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.265E-09	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.421E-08	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.007E-06	0.0069
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.337E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. = Water-independent Water-dep. = Water-dependent

302546

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	1.110E+00
Thickness:	2.00 meters	Ra-226	1.110E+00
Cover Depth:	0.00 meters	Ra-228	1.270E+00
		Th-228	1.150E+00
		Th-230	1.410E+00
		Th-232	1.030E+00
		U-234	1.110E+00
		U-238	8.110E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	7.837E-01	7.877E-01	7.853E-01	7.542E-01	7.213E-01	7.171E-01	7.167E-01	7.112E-01
M(t):	5.225E-02	5.251E-02	5.236E-02	5.028E-02	4.808E-02	4.780E-02	4.778E-02	4.741E-02

Maximum TDOSE(t): 7.881E-01 mrem/yr at t = 1.498 ± 0.001 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.498 years

Water Independent Pathways (Inhalation excludes radon)

Radio	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.648E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.208E-03	0.0028
Ra-226	3.035E-01	0.3851	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.281E-04	0.0007
Ra-228	2.753E-01	0.3493	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.494E-04	0.0007
Th-228	1.667E-01	0.2115	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.548E-04	0.0002
Th-230	2.928E-04	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.219E-04	0.0003
Th-232	3.483E-02	0.0442	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.854E-04	0.0011
U-234	1.098E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.809E-05	0.0001
U-238	2.659E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.118E-05	0.0001
Total	7.834E-01	0.9940	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.697E-03	0.0060

302547

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.726E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.313E-03	0.0030
Ra-226	3.037E 01	0.3875	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.232E-04	0.0005
Ra-228	1.855E 01	0.2367	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.242E-04	0.0007
Th-228	2.868E-01	0.3660	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.664E-04	0.0003
Th-230	4.252E 05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.215E-04	0.0003
Th-232	1.346E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.060E-04	0.0010
U-234	1.122E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.005E-05	0.0001
U-238	2.718E-03	0.0035	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.254E-05	0.0001
Total	7.790E-01	0.9940	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.707E-03	0.0060

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.486E-03	0.0032
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.041E 01	0.3881
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.860E-01	0.2374
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.871E-01	0.3663
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.640E-04	0.0003
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.195E-04	0.0010
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.013E-04	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.781E-03	0.0035
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.837E-01	1.0000

*Sum of all water independent and dependent pathways.

302548

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.182E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.182E-01
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.182E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.182E-01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.640E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.640E-01
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.296E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.296E-01
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.042E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.042E-01
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.952E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.952E-01
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.182E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.182E-01
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.325E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.325E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. == Water-independent Water dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.539E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.909E-09	0.0007
Ra-226	1.090E-06	0.3947	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.727E-10	0.0002
Ra-228	6.142E-07	0.2224	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.461E-10	0.0002
Th-228	1.046E-06	0.3787	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.549E-10	0.0002
Th-230	9.277E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.215E-11	0.0000
Th-232	3.099E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.846E-11	0.0000
U-234	3.517E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.400E-11	0.0000
U-238	7.857E-09	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.648E-11	0.0000
Total	2.758E-06	0.9986	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.804E-09	0.0014

302549

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.934E-09	0.0007
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.091E-06	0.3949
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.147E-07	0.2226
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.047E-06	0.3789
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.014E-10	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.156E-11	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.752E-11	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.943E-09	0.0029
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.762E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. == Water-independent Water-dep. == Water-dependent

302550

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	6.810E+00
Thickness:	2.00 meters	Ra-226	6.810E+00
Cover Depth:	0.00 meters	Ra-228	1.560E+01
		Th 228	1.610E+01
		Th 230	1.160E+01
		Th-232	1.650E+01
		U-234	2.700E+01
		U-238	2.700E+01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	8.296E+00	8.276E+00	8.278E+00	8.384E+00	8.489E+00	8.470E+00	8.463E+00	8.433E+00
M(t):	5.530E-01	5.517E-01	5.519E-01	5.589E-01	5.659E-01	5.647E-01	5.642E-01	5.622E-01

Maximum TDOSE(t): 8.491E+00 mrem/yr at t = 36.70 ; 0.04 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 36.70 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.382E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.532E-03	0.0005
Ra-226	1.834E+00	0.2160	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.212E-02	0.0014
Ra-228	9.709E-02	0.0114	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.419E-04	0.0000
Th-228	6.716E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.237E-09	0.0000
Th-230	5.035E-02	0.0059	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.041E-03	0.0002
Th-232	6.410E+00	0.7550	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.334E-02	0.0027
U-234	1.789E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.304E-03	0.0002
U-238	5.383E-02	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.239E-03	0.0001
Total	8.446E+00	0.9947	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.472E-02	0.0053

302551

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.059E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.419E-02	0.0017
Ra-226	1.863E+00	0.2246	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.596E-03	0.0003
Ra-228	2.279E+00	0.2747	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.439E-03	0.0008
Th-228	4.016E+00	0.4841	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.729E-03	0.0004
Th-230	3.498E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.822E-03	0.0002
Th-232	3.156E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.291E-02	0.0016
U-234	2.729E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.190E-03	0.0003
U-238	9.049E-02	0.0109	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.082E-03	0.0003
Total	8.250E+00	0.9945	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.596E-02	0.0055

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.525E-02	0.0018
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.866E+00	0.2249
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.285E+00	0.2754
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.019E+00	0.4845
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.172E-03	0.0003
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.313E-02	0.0016
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.463E-03	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.257E-02	0.0112
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.296E+00	1.0000

*Sum of all water independent and dependent pathways.

302552

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.952E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.952E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.952E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.952E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.472E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.472E+00
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.615E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.615E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.325E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.325E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.730E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.730E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.740E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.740E+00
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.740E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.740E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.557E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.171E-08	0.0004
Ra-226	6.687E-06	0.2292	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.514E-09	0.0001
Ra-228	7.544E-06	0.2586	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.708E-09	0.0002
Th-228	1.465E-05	0.5020	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.369E-09	0.0002
Th-230	7.632E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.581E-10	0.0000
Th-232	4.965E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.365E-10	0.0000
U-234	8.554E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.043E-09	0.0001
U-238	2.616E-07	0.0090	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.879E-09	0.0001
Total	2.914E-05	0.9988	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.492E-08	0.0012

302553

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.187E-08	0.0004
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.691E-06	0.2293
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.551E-06	0.2588
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.465E-05	0.5022
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.345E-10	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.861E-10	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.129E-09	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.644E-07	0.0091
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.917E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water-dep. = Water-dependent

302554

Contaminated Zone Dimensions	
Area:	10000.00 square meters
Thickness:	2.00 meters
Cover Depth:	0.00 meters

Initial Soil Concentrations, pCi/g	
Pb 210	8.530E+00
Ra 226	6.750E+00
Ra 228	1.510E+02
Th 228	1.510E+02
Th 230	1.040E+01
Th 232	2.350E+01
U 234	8.530E+00
U 238	8.430E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	6.520E+01	6.233E+01	5.503E+01	3.241E+01	1.374E+01	1.187E+01	1.190E+01	1.198E+01
M(t):	4.347E+00	4.156E+00	3.669E+00	2.161E+00	9.162E-01	7.912E-01	7.933E-01	7.988E-01

Maximum TDOSE(t): 6.520E+01 mrem/yr at t = 0.000E+00 years

302555

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.401E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.784E-02	0.0003
Ra-226	1.951E+00	0.0299	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.583E-03	0.0000
Ra-228	2.330E+01	0.3573	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.256E-02	0.0010
Th-228	3.978E+01	0.6101	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.510E-02	0.0005
Th-230	3.313E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.640E-03	0.0000
Th-232	3.243E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.846E-02	0.0003
U-234	9.107E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.945E-04	0.0000
U-238	2.984E-02	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.524E-04	0.0000
Total	6.506E+01	0.9979	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.395E-01	0.0021

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.924E-02	0.0003
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.953E+00	0.0300
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.336E+01	0.3583
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.982E+01	0.6107
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.971E-03	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.878E-02	0.0003
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.856E-04	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.050E-02	0.0005
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.520E+01	1.0000

*Sum of all water independent and dependent pathways.

302556

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.454E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.454E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.942E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.942E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.344E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.344E+01
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.344E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.344E+01
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.992E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.992E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.761E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.761E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.454E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.454E+00
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.425E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.425E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.061E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.472E-08	0.0001
Ra-226	7.002E-06	0.0305	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.496E-09	0.0000
Ra-228	7.714E-05	0.3362	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.516E-08	0.0003
Th-228	1.451E-04	0.6323	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.995E-08	0.0003
Th-230	7.228E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.822E-10	0.0000
Th-232	7.469E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.339E-09	0.0000
U-234	2.854E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.479E-10	0.0000
U-238	8.626E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.022E-10	0.0000
Total	2.293E-04	0.9994	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.469E-07	0.0006

302557

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.493E-08	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.005E-06	0.0305
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.720E-05	0.3364
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.451E-04	0.6326
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.545E-10	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.413E-09	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.764E-10	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.716E-08	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.295E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. = Water-independent Water-dep. = Water-dependent

302558

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	1000.00 square meters	Pb-210	7.700E-01
Thickness:	0.10 meters	Ra-226	1.100E+00
Cover Depth:	0.00 meters	Ra-228	1.200E+00
		Th-228	9.900E-01
		Th-230	3.200E-01
		Th-232	7.800E-01
		U-234	7.700E-01
		U-238	9.000E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	5.116E-01	5.142E-01	5.082E-01	4.637E-01	4.071E-01	3.377E-01	1.383E-01	0.000E+00
M(t):	3.410E-02	3.428E-02	3.388E-02	3.091E-02	2.714E-02	2.251E-02	9.217E-03	0.000E+00

Maximum TDOSE(t): 5.142E-01 mrem/yr at t = 1.030 ± 0.001 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.030 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.079E-04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.037E-03	0.0020
Ra-226	2.131E-01	0.4143	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.279E-04	0.0006
Ra-228	1.712E-01	0.3330	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.461E-04	0.0007
Th-228	1.135E-01	0.2206	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.052E-04	0.0002
Th-230	3.690E-05	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.354E-05	0.0001
Th-232	1.226E-02	0.0238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.343E-04	0.0008
U-234	5.552E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.063E-05	0.0001
U-238	1.705E-03	0.0033	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.403E-05	0.0001
Total	5.119E-01	0.9954	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.349E-03	0.0046

302559

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.115E 04	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.074E-03	0.0021
Ra-226	2.135E 01	0.4173	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.806E-04	0.0005
Ra-228	1.280E 01	0.2503	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.314E-04	0.0006
Th-228	1.652E 01	0.3230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.534E-04	0.0003
Th-230	9.271E-06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.363E-05	0.0001
Th-232	9.913E 06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.084E-04	0.0008
U-234	7.558E 06	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.180E-05	0.0001
U-238	2.323E 03	0.0045	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.643E-05	0.0001
Total	5.092E-01	0.9954	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.369E-03	0.0046

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.185E-03	0.0023
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.137E-01	0.4178
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.284E-01	0.2509
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.654E-01	0.3233
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.290E 05	0.0001
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.183E 04	0.0008
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.935E-05	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.370E-03	0.0046
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.116E-01	1.0000

*Sum of all water independent and dependent pathways.

302560

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.477E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.477E-01
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.110E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.110E-01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.302E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.302E-01
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.899E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.899E-01
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.138E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.138E-02
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.496E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.496E-01
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.477E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.477E-01
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.726E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.726E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.640E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.861E-10	0.0005
Ra-226	7.662E-07	0.4253	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.798E-10	0.0002
Ra-228	4.239E-07	0.2353	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.452E-10	0.0002
Th-228	6.027E-07	0.3345	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.620E-10	0.0001
Th-230	2.023E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.399E-11	0.0000
Th-232	2.283E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.962E-11	0.0000
U-234	2.369E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.899E-11	0.0000
U-238	6.716E-09	0.0037	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.421E-11	0.0000
Total	1.799E-06	0.9989	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.020E-09	0.0011

302561

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.025E-10	0.0005
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.665E-07	0.4255
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.242E-07	0.2355
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.029E-07	0.3347
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.602E-11	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.190E-11	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.136E-11	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.780E-09	0.0038
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.801E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

302562

Summary : Co. ..nt adolescent trespasser; Parcel C Sediment (100% outdoors)
File : TRSED.C

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	1000.00 square meters	Pb-210	1.750E+00
Thickness:	0.10 meters	Ra-226	2.200E+00
Cover Depth:	0.00 meters	Ra-228	1.800E+00
		Th-228	1.650E+00
		Th-230	1.300E+00
		Th-232	1.500E+00
		U-234	1.750E+00
		U-238	1.700E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	9.039E-01	9.037E-01	8.958E-01	8.530E-01	7.819E-01	6.147E-01	0.000E+00	0.000E+00
M(t):	6.026E-02	6.025E-02	5.972E-02	5.687E-02	5.213E-02	4.098E-02	0.000E+00	0.000E+00

Maximum TDOSE(t): 9.039E-01 mrem/yr at t = 0.000E+00 years

302563

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.535E-04	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.440E-03	0.0027
Ra-226	4.269E-01	0.4723	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.612E-04	0.0006
Ra-228	1.920E-01	0.2124	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.971E-04	0.0005
Th-228	2.754E-01	0.3047	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.557E-04	0.0003
Th-230	3.766E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.366E-04	0.0002
Th-232	1.906E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.854E-04	0.0009
U-234	1.718E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.499E-05	0.0001
U-238	4.388E-03	0.0049	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.771E-05	0.0001
Total	8.991E-01	0.9946	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.859E-03	0.0054

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.694E-03	0.0030
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.275E-01	0.4729
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.925E-01	0.2130
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.757E-01	0.3050
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.743E-04	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.045E-04	0.0009
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.122E-04	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.476E-03	0.0050
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.039E-01	1.0000

*Sum of all water independent and dependent pathways.

302564

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.356E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.356E-01
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.220E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.220E-01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.452E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.452E-01
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.165E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.165E-01
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.493E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.493E-01
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.877E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.877E-01
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.356E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.356E-01
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.261E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.261E-01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.728E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.014E-09	0.0006
Ra-226	1.532E-06	0.4804	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.595E-10	0.0002
Ra-228	6.358E-07	0.1994	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.179E-10	0.0002
Th-228	1.004E-06	0.3149	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.367E-10	0.0001
Th-230	8.217E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.685E-11	0.0000
Th-232	4.390E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.696E-11	0.0000
U-234	5.384E-12	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.861E-11	0.0000
U-238	1.268E-08	0.0040	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.213E-10	0.0000
Total	3.185E-06	0.9987	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.052E-09	0.0013

302565

Excess Cancer Risks CNPS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.051E-09	0.0006
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.533E-06	0.4807
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.364E-07	0.1995
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.005E-06	0.3151
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.507E-11	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.135E-11	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.400E-11	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.281E-08	0.0040
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.189E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

302566

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	8.530E+00
Thickness:	2.00 meters	Ra-226	6.750E+00
Cover Depth:	0.00 meters	Pa-228	1.510E+02
		Th-228	1.510E+02
		Th-230	1.040E+01
		Th-232	2.350E+01
		U-234	8.530E+00
		U-238	8.430E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	4.886E+02	4.671E+02	4.124E+02	2.429E+02	1.031E+02	8.901E+01	8.924E+01	8.987E+01
M(t):	3.258E+01	3.114E+01	2.750E+01	1.619E+01	6.871E+00	5.934E+00	5.949E+00	5.991E+00

Maximum TDOSE(t): 4.886E+02 mrem/yr at t = 0.000E+00 years

302567

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.049E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.767E-01	0.0004
Ra-226	1.461E+01	0.0299	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.559E-02	0.0001
Ra-228	1.745E+02	0.3571	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.197E-01	0.0013
Th-228	2.979E+02	0.6097	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.477E-01	0.0007
Th-230	2.481E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.624E-02	0.0000
Th-232	2.429E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.828E-01	0.0004
U-234	6.820E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.880E-03	0.0000
U-238	2.235E-01	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.463E-03	0.0000
Total	4.872E+02	0.9972	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.382E+00	0.0028

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.872E-01	0.0004
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.463E+01	0.0300
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.751E+02	0.3583
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.983E+02	0.6104
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.872E-02	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.853E-01	0.0004
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.562E-03	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.300E-01	0.0005
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.886E+02	1.0000

*Sum of all water independent and dependent pathways.

302568

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.431E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.431E+01
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.924E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.924E+01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.303E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.303E+02
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.303E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.303E+02
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.964E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.964E+01
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.697E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.697E+01
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.431E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.431E+01
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.403E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.403E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	6.430E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.078E-07	0.0001
Ra-226	2.185E-04	0.0305	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.443E-07	0.0000
Ra-228	2.407E-03	0.3361	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.690E-06	0.0004
Th-228	4.527E-03	0.6322	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.475E-06	0.0003
Th-230	2.255E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.816E-08	0.0000
Th-232	2.331E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.525E-08	0.0000
U-234	8.907E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.674E-08	0.0000
U-238	2.692E-06	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.724E-08	0.0000
Total	7.155E-03	0.9992	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.064E-06	0.0008

302569

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.142E-07	0.0001
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.186E-04	0.0305
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.410E-03	0.3365
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.530E-03	0.6325
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.041E-08	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.759E-08	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.763E-08	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.729E-06	0.0004
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.162E-03	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water Ind. == Water-independent Water-dep. == Water-dependent

302570

Contaminated Zone Dimensions	
Area:	10000.00 square meters
Thickness:	2.00 meters
Cover Depth:	0.00 meters

Initial Soil Concentrations, pCi/g	
Pb-210	1.110E+00
Ra-226	1.110E+00
Ra-228	1.270E+00
Th-228	1.150E+00
Th-230	1.410E+00
Th-232	1.030E+00
U-234	1.110E+00
U-238	8.110E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	6.209E+00	6.241E+00	6.223E+00	5.979E+00	5.724E+00	5.707E+00	5.735E+00	5.818E+00
M(t):	4.139E-01	4.160E-01	4.149E-01	3.986E-01	3.816E-01	3.804E-01	3.823E-01	3.879E-01

Maximum TDOSE(t): 6.244E+00 mrem/yr at t = 1.518 ± 0.002 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.518 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.303E-03	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.194E-02	0.0035
Ra-226	2.401E+00	0.3845	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.264E-03	0.0008
Ra-228	2.183E+00	0.3495	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.462E-03	0.0009
Th-228	1.309E+00	0.2097	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.528E-03	0.0002
Th-230	2.342E-03	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.206E-03	0.0004
Th-232	2.796E-01	0.0448	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.814E-03	0.0014
U-234	8.818E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.894E-04	0.0001
U-238	2.136E-02	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.177E-04	0.0001
Total	6.197E+00	0.9925	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.672E-02	0.0075

302571

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.366E-03	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.300E-02	0.0037
Ra-226	2.402E+00	0.3869	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.207E-03	0.0007
Ra-228	1.467E+00	0.2363	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.212E-03	0.0008
Th-228	2.269E+00	0.3654	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.648E-03	0.0004
Th-230	3.364E-04	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.202E-03	0.0004
Th-232	1.064E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.014E-03	0.0013
U-234	8.875E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.953E-04	0.0001
U-238	2.150E-02	0.0035	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.218E-04	0.0001
Total	6.162E+00	0.9925	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.680E-02	0.0075

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.436E-02	0.0039
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.407E+00	0.3876
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.473E+00	0.2372
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.272E+00	0.3659
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.538E-03	0.0004
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.120E-03	0.0013
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.840E-04	0.0002
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.212E-02	0.0036
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.209E+00	1.0000

*Sum of all water independent and dependent pathways.

302572

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.163E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.163E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.163E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.163E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.619E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.619E+00
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.277E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.277E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.018E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.018E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.935E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.935E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.163E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.163E+00
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.311E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.311E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water independent Water dep. = Water dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.368E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.909E-08	0.0009
Ra-226	3.593E-05	0.3945	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.373E-08	0.0003
Ra-228	2.024E-05	0.2223	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.262E-08	0.0002
Th-228	3.448E-05	0.3786	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.885E-08	0.0002
Th-230	3.058E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.818E-09	0.0000
Th-232	1.022E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.422E-09	0.0000
U-234	1.159E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.480E-09	0.0000
U-238	2.590E-07	0.0028	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.583E-09	0.0000
Total	9.091E-05	0.9983	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.576E-07	0.0017

302573

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.992E-08	0.0009
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.595E-05	0.3948
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.027E-05	0.2225
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.450E-05	0.3788
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.123E-09	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.524E-09	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.596E-09	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.625E-07	0.0029
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.107E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

302574

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	3.630E+00
Thickness:	2.00 meters	Ra-226	2.820E+00
Cover Depth:	0.00 meters	Ra-228	1.780E+01
		Th-228	1.780E+01
		Th-230	5.490E+00
		Th-232	7.040E+00
		U-234	3.630E+00
		U-238	2.590E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	6.213E+01	6.032E+01	5.570E+01	4.140E+01	2.960E+01	2.844E+01	2.858E+01	2.878E+01
M(t):	4.142E+00	4.021E+00	3.713E+00	2.760E+00	1.973E+00	1.896E+00	1.905E+00	1.918E+00

Maximum TDOSE(t): 6.213E+01 mrem/yr at t = 0.000E+00 years

302575

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	4.466E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.521E-02	0.0012
Ra-226	6.103E+00	0.0982	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.069E-02	0.0002
Ra-228	2.057E+01	0.3310	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.305E-02	0.0012
Th-228	3.512E+01	0.5652	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.099E-02	0.0007
Th-230	1.310E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.574E-03	0.0001
Th-232	7.275E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.477E-02	0.0009
U-234	2.902E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.928E-03	0.0000
U-238	6.867E-02	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.986E-03	0.0000
Total	6.187E+01	0.9957	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.682E-01	0.0043

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.968E-02	0.0013
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.114E+00	0.0984
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.064E+01	0.3322
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.516E+01	0.5659
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.884E-03	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.550E-02	0.0009
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.218E-03	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.065E-02	0.0011
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.213E+01	1.0000

*Sum of all water independent and dependent pathways.

302576

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.035E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.035E+01
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.037E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.037E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.073E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.073E+01
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.073E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.073E+01
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.565E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.565E+01
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.006E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.006E+01
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.035E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.035E+01
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.381E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.381E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. = Water-independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.736E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.586E-07	0.0003
Ra-226	9.128E-05	0.1002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.028E-08	0.0001
Ra-228	2.837E-04	0.3116	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.171E-07	0.0003
Th-228	5.337E-04	0.5861	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.917E-07	0.0003
Th-230	1.191E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.486E-08	0.0000
Th-232	6.982E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.655E-08	0.0000
U-234	3.791E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.138E-08	0.0000
U-238	8.270E-07	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.144E-08	0.0000
Total	9.095E-04	0.9989	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.819E-07	0.0011

302577

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.614E-07	0.0003
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.134E-05	0.1003
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.841E-04	0.3120
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.340E-04	0.5865
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.605E-08	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.725E-08	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.176E-08	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.384E-07	0.0009
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.105E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

302578

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	8.490E+01
Thickness:	2.00 meters	Ra-226	8.490E+01
Cover Depth:	0.00 meters	Ra-228	2.490E+02
		Th-228	2.490E+02
		Th-230	2.140E+02
		Th-232	8.810E+01
		U-234	3.070E+02
		U-238	3.070E+02

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	9.762E+02	9.491E+02	8.800E+02	6.661E+02	4.897E+02	4.752E+02	4.913E+02	5.369E+02
M(t):	6.508E+01	6.327E+01	5.867E+01	4.440E+01	3.265E+01	3.168E+01	3.275E+01	3.579E+01

Maximum TDOSE(t): 9.762E+02 mrem/yr at t = 0.000E+00 years

302579

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.044E-01	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.759E+00	0.0018
Ra-226	1.837E+02	0.1882	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.218E-01	0.0003
Ra-228	2.877E+02	0.2947	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.022E+00	0.0010
Th-228	4.913E+02	0.5032	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.734E-01	0.0006
Th-230	5.105E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.342E-01	0.0003
Th-232	9.105E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.855E-01	0.0007
U-234	2.455E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.476E-01	0.0003
U-238	8.139E+00	0.0083	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.354E-01	0.0002
Total	9.711E+02	0.9947	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.179E+00	0.0053

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.864E+00	0.0019
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.841E+02	0.1886
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.887E+02	0.2957
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.919E+02	0.5038
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.853E-01	0.0004
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.946E-01	0.0007
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.722E-01	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.375E+00	0.0086
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.762E+02	1.0000

*Sum of all water independent and dependent pathways.

302580

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.420E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.420E+02
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.420E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.420E+02
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.096E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.096E+02
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.096E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.096E+02
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.099E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.099E+02
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.511E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.511E+02
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.749E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.749E+02
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.749E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.749E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	6.400E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.049E-06	0.0004
Ra-226	2.748E-03	0.1922	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.815E-06	0.0001
Ra-228	3.969E-03	0.2776	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.435E-06	0.0003
Th-228	7.466E-03	0.5221	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.080E-06	0.0003
Th-230	4.641E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.794E-07	0.0000
Th-232	8.738E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.071E-07	0.0000
U-234	3.206E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.624E-07	0.0001
U-238	9.803E-05	0.0069	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.356E-06	0.0001
Total	1.428E-02	0.9986	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.948E-05	0.0014

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.113E-06	0.0004
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.750E-03	0.1923
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.974E-03	0.2779
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.470E-03	0.5223
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.258E-07	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.159E-07	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.945E-07	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.938E-05	0.0069
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.430E-02	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water independent Water-dep. = Water-dependent

302582

Contaminated Zone Dimensions	
Area:	10000.00 square meters
Thickness:	2.00 meters
Cover Depth:	0.00 meters

Initial Soil Concentrations, pCi/g	
Pb-210	6.810E+00
Ra 226	6.810E+00
Ra-228	1.560E+01
Th-228	1.610E+01
Th-230	1.160E+01
Th-232	1.650E+01
U-234	2.700E+01
U-238	2.700E+01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	6.572E+01	6.556E+01	6.558E+01	6.642E+01	6.724E+01	6.709E+01	6.704E+01	6.680E+01
M(t):	4.381E+00	4.371E+00	4.372E+00	4.428E+00	4.483E+00	4.473E+00	4.469E+00	4.453E+00

Maximum TDOSE(t): 6.726E+01 mrem/yr at t = 36.55 + 0.04 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 36.55 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	2.689E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.528E-02	0.0007
Ra-226	1.451E+01	0.2157	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.203E-01	0.0018
Ra-228	7.824E-01	0.0116	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.438E-03	0.0000
Th-228	5.618E-05	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.557E-08	0.0000
Th-230	3.967E-01	0.0059	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.028E-02	0.0003
Th-232	5.070E+01	0.7537	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.321E-01	0.0035
U-234	1.417E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.299E-02	0.0002
U-238	4.268E-01	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.234E-02	0.0002
Total	6.681E+01	0.9934	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.447E-01	0.0066

302583

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	8.378E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.411E-01	0.0021
Ra-226	1.474E+01	0.2243	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.581E-02	0.0004
Ra-228	1.802E+01	0.2743	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.402E-02	0.0010
Th-228	3.177E+01	0.4834	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.708E-02	0.0006
Th-230	2.767E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.812E-02	0.0003
Th-232	1.705E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.284E-01	0.0020
U-234	2.159E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.178E-02	0.0003
U-238	7.158E-01	0.0109	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.070E-02	0.0003
Total	6.526E+01	0.9930	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.570E-01	0.0070

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.495E-01	0.0023
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.476E+01	0.2247
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.809E+01	0.2752
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.180E+01	0.4839
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.088E-02	0.0003
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.301E-01	0.0020
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.394E-02	0.0004
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.365E-01	0.0112
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.572E+01	1.0000

*Sum of all water independent and dependent pathways.

302584

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.941E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.941E+01
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.941E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.941E+01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.446E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.446E+01
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.588E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.588E+01
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.306E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.306E+01
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.702E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.702E+01
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.695E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.695E+01
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.695E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.695E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water Ind. = Water-Independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.134E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.852E-07	0.0005
Ra-226	2.204E-04	0.2292	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.456E-07	0.0002
Ra-228	2.487E-04	0.2585	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.779E-07	0.0003
Th-228	4.827E-04	0.5018	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.638E-07	0.0003
Th-230	2.516E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.141E-08	0.0000
Th-232	1.636E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.880E-08	0.0000
U-234	2.819E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.465E-08	0.0001
U-238	8.621E-06	0.0090	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.193E-07	0.0001
Total	9.604E-04	0.9985	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.449E-06	0.0015

302585

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.903E-07	0.0005
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.206E-04	0.2293
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.489E-04	0.2588
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.830E-04	0.5021
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.392E-08	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.043E-08	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.746E-08	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.741E-06	0.0091
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.619E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. == Water-independent Water-dep. == Water-dependent

302586

Dose and Risk Conversion Factor (and Related) Parameter Summary (continued)

Menu	Parameter	Current Value	Default	Parameter Name	Source
Sf-1	Groundshine, surface SF's, 1/yr per (pCi/cm**2):				
Sf-1	Pb-210+D	3.130E-09	3.130E-09	SLPF1(1,1)	a
Sf-1	Ra-226+D	1.470E-06	1.470E-06	SLPF1(2,1)	a
Sf-1	Ra-228+D	5.920E-07	5.920E-07	SLPF1(3,1)	a
Sf-1	Th-228+D	9.470E-07	9.470E-07	SLPF1(4,1)	a
Sf-1	Th-230	4.920E-10	4.920E-10	SLPF1(5,1)	a
Sf-1	Th-232	3.540E-10	3.540E-10	SLPF1(6,1)	a
Sf-1	U-234	4.180E-10	4.180E-10	SLPF1(7,1)	a
Sf-1	U-238+D	1.590E-08	1.590E-08	SLPF1(8,1)	a
Sf-1	Groundshine, volume SF's, 1/yr per (pCi/g):				
Sf-1	Pb-210+D	1.100E-10	1.100E-10	SLPF1(1,2)	a
Sf-1	Ra-226+D	6.700E-06	6.700E-06	SLPF1(2,2)	a
Sf-1	Ra-228+D	3.300E-06	3.300E-06	SLPF1(3,2)	a
Sf-1	Th-228+D	9.900E-07	9.900E-07	SLPF1(4,2)	a
Sf-1	Th-230	4.400E-11	4.400E-11	SLPF1(5,2)	a
Sf-1	Th-232	2.000E-11	2.000E-11	SLPF1(6,2)	a
Sf-1	U-234	2.100E-11	2.100E-11	SLPF1(7,2)	a
Sf-1	U-238+D	5.700E-08	5.700E-08	SLPF1(8,2)	a
Sf-2	Inhalation, slope factors, 1/(pCi):				
Sf-2	Pb-210+D	1.700E-09	1.700E-09	SLPF2(1)	a
Sf-2	Ra-226+D	2.700E-09	2.700E-09	SLPF2(2)	a
Sf-2	Ra-228+D	9.900E-10	9.900E-10	SLPF2(3)	a
Sf-2	Th-228+D	9.700E-08	9.700E-08	SLPF2(4)	a
Sf-2	Th-230	1.700E-08	1.700E-08	SLPF2(5)	a
Sf-2	Th-232	1.900E-08	1.900E-08	SLPF2(6)	a
Sf-2	U-234	1.400E-08	1.400E-08	SLPF2(7)	a
Sf-2	U-238+D	1.200E-08	1.200E-08	SLPF2(8)	a
Sf-3	Ingestion, slope factors, 1/(pCi):				
Sf-3	Pb-210+D	6.800E-10	6.800E-10	SLPF3(1)	a
Sf-3	Ra-226+D	3.000E-10	3.000E-10	SLPF3(2)	a
Sf-3	Ra-228+D	2.500E-10	2.500E-10	SLPF3(3)	a
Sf-3	Th-228+D	2.300E-10	2.300E-10	SLPF3(4)	a
Sf-3	Th-230	3.800E-11	3.800E-11	SLPF3(5)	a
Sf-3	Th-232	3.300E-11	3.300E-11	SLPF3(6)	a
Sf-3	U-234	4.400E-11	4.400E-11	SLPF3(7)	a
Sf-3	U-238+D	6.200E-11	6.200E-11	SLPF3(8)	a
Sf-4	Air immersion, slope factors, 1/yr per (pCi/m**3):				
Sf-4	Pb-210+D	7.900E-12	7.900E-12	SLPF4(1)	a
Sf-4	Ra-226+D	7.900E-09	7.900E-09	SLPF4(2)	a
Sf-4	Ra-228+D	3.140E-09	3.140E-09	SLPF4(3)	a
Sf-4	Th-228+D	5.830E-09	5.830E-09	SLPF4(4)	a
Sf-4	Th-230	1.110E-12	1.110E-12	SLPF4(5)	a
Sf-4	Th-232	5.140E-13	5.140E-13	SLPF4(6)	a
Sf-4	U-234	4.180E-13	4.180E-13	SLPF4(7)	a
Sf-4	U-238+D	7.440E-11	7.440E-11	SLPF4(8)	a
SfRn	Radon inhalation slope factors, 1/(pCi):				
SfRn	Rn-222	1.800E-12	1.800E-12	SLPFRN(1,1)	b

HEAST 1994 ↓
1.0E-9 → HEAST 1995

302587

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD-BASELINE (If different from user input)	Parameter Name
R013	Pb-210	not used	0.000E+00	...	NUCMT(1)
R013	Ra-226	not used	0.000E+00	...	NUCMT(2)
R013	Ra-228	not used	0.000E+00	...	NUCMT(3)
R013	Th-228	not used	0.000E+00	...	NUCMT(4)
R013	Th-230	not used	0.000E+00	...	NUCMT(5)
R013	Th-232	not used	0.000E+00	...	NUCMT(6)
R013	U-234	not used	0.000E+00	...	NUCMT(7)
R013	U-238	not used	0.000E+00	...	NUCMT(8)
R013	Concentration in milk (pCi/L):				
R013	Pb-210	not used	0.000E+00	...	NUCMK(1)
R013	Ra-226	not used	0.000E+00	...	NUCMK(2)
R013	Ra-228	not used	0.000E+00	...	NUCMK(3)
R013	Th-228	not used	0.000E+00	...	NUCMK(4)
R013	Th-230	not used	0.000E+00	...	NUCMK(5)
R013	Th-232	not used	0.000E+00	...	NUCMK(6)
R013	U-234	not used	0.000E+00	...	NUCMK(7)
R013	U-238	not used	0.000E+00	...	NUCMK(8)
R014	Concentration in fish (pCi/kg):				
R014	Pb-210	not used	0.000E+00	...	NUCFSH(1)
R014	Ra-226	not used	0.000E+00	...	NUCFSH(2)
R014	Ra-228	not used	0.000E+00	...	NUCFSH(3)
R014	Th-228	not used	0.000E+00	...	NUCFSH(4)
R014	Th-230	not used	0.000E+00	...	NUCFSH(5)
R014	Th-232	not used	0.000E+00	...	NUCFSH(6)
R014	U-234	not used	0.000E+00	...	NUCFSH(7)
R014	U-238	not used	0.000E+00	...	NUCFSH(8)
R014	Concentration in shell fish (pCi/kg):				
R014	Pb-210	not used	0.000E+00	...	NUCNFSH(1)
R014	Ra-226	not used	0.000E+00	...	NUCNFSH(2)
R014	Ra-228	not used	0.000E+00	...	NUCNFSH(3)
R014	Th-228	not used	0.000E+00	...	NUCNFSH(4)
R014	Th-230	not used	0.000E+00	...	NUCNFSH(5)
R014	Th-232	not used	0.000E+00	...	NUCNFSH(6)
R014	U-234	not used	0.000E+00	...	NUCNFSH(7)
R014	U-238	not used	0.000E+00	...	NUCNFSH(8)
R015	Concentration in drinking water (pCi/L):				
R015	Pb-210	4.480E+00	0.000E+00	...	NUCDW(1)
R015	Ra-226	4.020E+00	0.000E+00	...	NUCDW(2)
R015	Ra-228	2.420E+00	0.000E+00	...	NUCDW(3)
R015	Th-228	1.680E+00	0.000E+00	...	NUCDW(4)
R015	Th-230	1.140E+00	0.000E+00	...	NUCDW(5)
R015	Th-232	9.530E-01	0.000E+00	...	NUCDW(6)
R015	U-234	4.480E+00	0.000E+00	...	NUCDW(7)
R015	U-238	8.300E+00	0.000E+00	...	NUCDW(8)
R015	Concentration in pond water (pCi/L):				
R015	Pb-210	not used	0.000E+00	...	NUCPW(1)

302588

55

Site Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD BASELINE (If different from user input)	Parameter Name
R015	Ra-226	not used	0.000E+00	...	NUCPW(2)
R015	Ra-228	not used	0.000E+00	...	NUCPW(3)
R015	Th-228	not used	0.000E+00	...	NUCPW(4)
R015	Th-230	not used	0.000E+00	...	NUCPW(5)
R015	Th-232	not used	0.000E+00	...	NUCPW(6)
R015	U-234	not used	0.000E+00	...	NUCPW(7)
R015	U-238	not used	0.000E+00	...	NUCPW(8)
R016	Indoor Radon-222 concentration (pCi/m**3)	not used	0.000E+00	...	RN222(1)
R016	Outdoor Radon-222 concentration (pCi/m**3)	not used	0.000E+00	...	RN222(2)
R016	Indoor Radon-220 concentration (pCi/m**3)	not used	0.000E+00	...	RN220(1)
R016	Outdoor Radon-220 concentration (pCi/m**3)	not used	0.000E+00	...	RN220(2)
R016	Equilibrium fraction of Radon-222 daughters	not used	5.000E-01	...	EQ222
R016	Radon-222 daughter concentrations (pCi/m**3):				
R016	Po-218, indoors	not used	0.000E+00	0.000E+00	PO218(1)
R016	Po-218, outdoors	not used	0.000E+00	0.000E+00	PO218(2)
R016	Pb-214, indoors	not used	0.000E+00	0.000E+00	PB214(1)
R016	Pb-214, outdoors	not used	0.000E+00	0.000E+00	PB214(2)
R016	Bi-214, indoors	not used	0.000E+00	0.000E+00	BI214(1)
R016	Bi-214, outdoors	not used	0.000E+00	0.000E+00	BI214(2)
R016	Equilibrium fraction of Radon-220 daughters	not used	-1.000E+00	...	EQ220
R016	Radon-220 daughter concentrations (pCi/m**3):				
R016	Po-216, indoors	not used	0.000E+00	0.000E+00	PO216(1)
R016	Po-216, outdoors	not used	0.000E+00	0.000E+00	PO216(2)
R016	Pb-212, indoors	not used	0.000E+00	0.000E+00	PB212(1)
R016	Pb-212, outdoors	not used	0.000E+00	0.000E+00	PB212(2)
R016	Bi-212, indoors	not used	0.000E+00	0.000E+00	BI212(1)
R016	Bi-212, outdoors	not used	0.000E+00	0.000E+00	BI212(2)
B011	Density of soil (pCi/g)	not used	1.500E+00	...	DENSCZ
B011	Thickness of contaminated soil (m)	not used	1.000E+00	...	THICK
B011	Organic carbon content of soil	not used	2.000E-01	...	FOC
B012	Fruits, vegetables, and grain consumption (kg/d)	not used	5.000E-01	...	DIET3
B012	Meat and poultry consumption (kg/d)	not used	2.500E-01	...	DIET4
B012	Milk consumption (L/d)	not used	1.700E-01	...	DIET5
B012	Fish consumption (kg/d)	not used	1.500E-02	...	DIET6(1)
B012	Other seafood consumption (kg/d)	not used	2.500E-03	...	DIET6(2)
B012	Drinking water intake (L/d)	1.000E+00	1.400E+00	...	DIET7
B012	Incidental water intake (swimming) (L/d)	not used	1.300E-01	...	DIET10
B012	Soil ingestion (child) (g/d)	not used	2.000E-01	...	DIET8(1)
B012	Soil ingestion (adult) (g/d)	not used	1.000E-01	...	DIET8(2)
B013	Inhalation rate indoors (m**3/d)	not used	2.000E+01	...	INHALR(1)
B013	Inhalation rate outdoors (m**3/d)	not used	2.000E+01	...	INHALR(2)
B013	Time fraction outdoors	not used	3.300E-01	...	FOTD
B013	Shielding factor for groundshine	not used	7.000E-01	...	SHF1
B013	Exposure duration for child (yr)	not used	6.000E+00	...	ED(1)
B013	Total exposure duration (yr)	not used	3.000E+01	...	ED(2)

302589

<<<<< Calculation Results with Base Data >>>>>

Amount of Intake Quantities INTK(i,p) for Individual Radionuclides (i) and Pathways (p) as pCi/yr

Radio Nuclide	Inhalation pCi/yr	Plant pCi/yr	Meat pCi/yr	Milk pCi/yr	Fish pCi/yr	Drinking Water pCi/yr	Soil pCi/yr	Radon pCi/yr	Incidental Water pCi/yr	Total* Ingestion pCi/yr
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.120E+03	0.000E+00	0.000E+00	0.000E+00	1.120E+03
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.005E+03	0.000E+00	0.000E+00	0.000E+00	1.005E+03
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.050E+02	0.000E+00	0.000E+00	0.000E+00	6.050E+02
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.200E+02	0.000E+00	0.000E+00	0.000E+00	4.200E+02
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.850E+02	0.000E+00	0.000E+00	0.000E+00	2.850E+02
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.383E+02	0.000E+00	0.000E+00	0.000E+00	2.383E+02
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.120E+03	0.000E+00	0.000E+00	0.000E+00	1.120E+03
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.075E+03	0.000E+00	0.000E+00	0.000E+00	2.075E+03

Note: * Sum of all ingestion pathways.

302590

<<<<< Calculation Results with Base Data >>>>>

Total Dose Components DOSE(i,p) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose

Radio-	Ground		Inhalation		Plant		Meat		Milk		Fish	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.014E+00	0.5872	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.014E+00	0.5872
Ra-226	1.337E+00	0.1305	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.337E+00	0.1305
Ra-228	8.712E-01	0.0851	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.712E-01	0.0851
Th-228	3.394E-01	0.0331	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.394E-01	0.0331
Th-230	1.562E-01	0.0152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.562E-01	0.0152
Th-232	6.504E-01	0.0635	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.504E-01	0.0635
U-234	3.170E-01	0.0309	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.170E-01	0.0309
U-238	5.582E-01	0.0545	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.582E-01	0.0545
Total	1.024E+01	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.024E+01	1.0000

Note: The dose for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

302591

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISK1(i,p) (from Risk/Dose Conversion Factor)
for Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Risk/Dose Conversion Factor = 7.600E-07 risk/mrem Total Exposure Duration = 2.50E+01 years

Radio-	Ground		Inhalation		Plant		Meat		Milk		Fish	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.143E-04	0.5872	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.143E-04	0.5872
Ra-226	2.540E-05	0.1305	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.540E-05	0.1305
Ra-228	1.655E-05	0.0851	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.655E-05	0.0851
Th-228	6.448E-06	0.0331	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.448E-06	0.0331
Th-230	2.967E-06	0.0152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.967E-06	0.0152
Th-232	1.236E-05	0.0635	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.236E-05	0.0635
U-234	6.022E-06	0.0309	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.022E-06	0.0309
U-238	1.061E-05	0.0545	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.061E-05	0.0545
Total	1.946E-04	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.946E-04	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po , Pb , and Bi).

302592

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISK2(i,p) (from Slope Factors) for
Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Total Exposure Duration = 2.50E+01 years

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Fish	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.800E-05	0.5052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.800E-05	0.5052
Ra-226	7.538E-06	0.2000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.538E-06	0.2000
Ra-228	3.781E-06	0.1003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.781E-06	0.1003
Th-228	2.415E-06	0.0641	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.415E-06	0.0641
Th-230	2.707E-07	0.0072	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.707E-07	0.0072
Th-232	1.966E-07	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.966E-07	0.0052
U-234	1.232E-06	0.0327	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.232E-06	0.0327
U-238	3.216E-06	0.0853	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.216E-06	0.0853
Total	4.665E-05	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.665E-05	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

Program execution time = 0.28 seconds

Pb-210 risk recalculated using HEAST 1995 (1.0E-9/pCi)

302593

Site Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD-BASELINE (If different from user input)	Parameter Name
R013	Pb-210	not used	0.000E+00	...	NUCMT(1)
R013	Ra-226	not used	0.000E+00	...	NUCMT(2)
R013	Ra-228	not used	0.000E+00	...	NUCMT(3)
R013	Th-228	not used	0.000E+00	...	NUCMT(4)
R013	Th-230	not used	0.000E+00	...	NUCMT(5)
R013	Th-232	not used	0.000E+00	...	NUCMT(6)
R013	U-234	not used	0.000E+00	...	NUCMT(7)
R013	U-238	not used	0.000E+00	...	NUCMT(8)
R013	Concentration in milk (pCi/L):				
R013	Pb-210	not used	0.000E+00	...	NUCMK(1)
R013	Ra-226	not used	0.000E+00	...	NUCMK(2)
R013	Ra-228	not used	0.000E+00	...	NUCMK(3)
R013	Th-228	not used	0.000E+00	...	NUCMK(4)
R013	Th-230	not used	0.000E+00	...	NUCMK(5)
R013	Th-232	not used	0.000E+00	...	NUCMK(6)
R013	U-234	not used	0.000E+00	...	NUCMK(7)
R013	U-238	not used	0.000E+00	...	NUCMK(8)
R014	Concentration in fish (pCi/kg):				
R014	Pb-210	not used	0.000E+00	...	NUCFSH(1)
R014	Ra-226	not used	0.000E+00	...	NUCFSH(2)
R014	Ra-228	not used	0.000E+00	...	NUCFSH(3)
R014	Th-228	not used	0.000E+00	...	NUCFSH(4)
R014	Th-230	not used	0.000E+00	...	NUCFSH(5)
R014	Th-232	not used	0.000E+00	...	NUCFSH(6)
R014	U-234	not used	0.000E+00	...	NUCFSH(7)
R014	U-238	not used	0.000E+00	...	NUCFSH(8)
R014	Concentration in shell fish (pCi/kg):				
R014	Pb-210	not used	0.000E+00	...	NUCNFSH(1)
R014	Ra-226	not used	0.000E+00	...	NUCNFSH(2)
R014	Ra-228	not used	0.000E+00	...	NUCNFSH(3)
R014	Th-228	not used	0.000E+00	...	NUCNFSH(4)
R014	Th-230	not used	0.000E+00	...	NUCNFSH(5)
R014	Th-232	not used	0.000E+00	...	NUCNFSH(6)
R014	U-234	not used	0.000E+00	...	NUCNFSH(7)
R014	U-238	not used	0.000E+00	...	NUCNFSH(8)
R015	Concentration in drinking water (pCi/L):				
R015	Pb-210	2.870E-01	0.000E+00	...	NUCDW(1)
R015	Ra-226	3.500E-01	0.000E+00	...	NUCDW(2)
R015	Ra-228	9.400E-01	0.000E+00	...	NUCDW(3)
R015	Th-228	6.150E-01	0.000E+00	...	NUCDW(4)
R015	Th-230	2.200E-01	0.000E+00	...	NUCDW(5)
R015	Th-232	2.900E-01	0.000E+00	...	NUCDW(6)
R015	U-234	2.870E-01	0.000E+00	...	NUCDW(7)
R015	U-238	2.900E-01	0.000E+00	...	NUCDW(8)
R015	Concentration in pond water (pCi/L):				
R015	Pb-210	not used	0.000E+00	...	NUCPW(1)

<<<<< Calculation Results with Base Data >>>>>

Amount of Intake Quantities INTK(i,p) for Individual Radionuclides (i)
and Pathways (p) as pCi/yr

Radio Nuclide	Inhalation pCi/yr	Plant pCi/yr	Meat pCi/yr	Milk pCi/yr	Fish pCi/yr	Drinking Water pCi/yr	Soil pCi/yr	Radon pCi/yr	Incidental Water pCi/yr	Total* Ingestion pCi/yr
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.175E+01	0.000E+00	0.000E+00	0.000E+00	7.175E+01
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.750E+01	0.000E+00	0.000E+00	0.000E+00	8.750E+01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.350E+02	0.000E+00	0.000E+00	0.000E+00	2.350E+02
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.538E+02	0.000E+00	0.000E+00	0.000E+00	1.538E+02
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.500E+01	0.000E+00	0.000E+00	0.000E+00	5.500E+01
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.250E+01	0.000E+00	0.000E+00	0.000E+00	7.250E+01
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.175E+01	0.000E+00	0.000E+00	0.000E+00	7.175E+01
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.250E+01	0.000E+00	0.000E+00	0.000E+00	7.250E+01

Note: * Sum of all ingestion pathways.

302595

<<<<< Calculation Results with Base Data >>>>>

Total Dose Components DOSE(i,p) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Fish	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio Nuclide	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.853E-01	0.3127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.853E-01	0.3127
Ra-226	1.164E-01	0.0944	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.164E-01	0.0944
Ra-228	3.384E-01	0.2746	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.384E-01	0.2746
Th-228	1.242E-01	0.1008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.242E-01	0.1008
Th-230	3.014E-02	0.0245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.014E-02	0.0245
Th-232	1.979E-01	0.1606	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.979E-01	0.1606
U-234	2.031E-02	0.0165	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.031E-02	0.0165
U-238	1.950E-02	0.0158	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.950E-02	0.0158
Total	1.232E+00	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.232E+00	1.0000

Note: The dose for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb , and Bi-).

302596

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISKi(i,p) (from Risk/Dose Conversion Factor)
for Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Risk/Dose Conversion Factor = 7.600E-07 risk/mrem Total Exposure Duration = 2.50E+01 years

Radio-	Ground		Inhalation		Plant		Meat		Milk		Fish	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	7.321E-06	0.3127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.321E-06	0.3127
Ra-226	2.211E-06	0.0944	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.211E-06	0.0944
Ra-228	6.430E-06	0.2746	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.430E-06	0.2746
Th-228	2.360E-06	0.1008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.360E-06	0.1008
Th-230	5.727E-07	0.0245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.727E-07	0.0245
Th-232	3.761E-06	0.1606	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.761E-06	0.1606
U-234	3.858E-07	0.0165	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.858E-07	0.0165
U-238	3.705E-07	0.0158	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.705E-07	0.0158
Total	2.341E-05	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.341E-05	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

302597

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISK2(i,p) (from Slope Factors) for
Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Total Exposure Duration = 2.50E+01 years

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Fish risk	Fish fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water risk	Drinking Water fract.	Soil risk	Soil fract.	Radon risk	Radon fract.	Incidental Water risk	Incidental Water fract.	Air Immersion risk	Air Immersion fract.	All Pathways risk	All Pathways fract.
Pb-210	1.794E-06	0.2691	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.794E-06	0.2691
Ra-226	6.562E-07	0.1448	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.562E-07	0.1448
Ra-228	1.469E-06	0.3241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.469E-06	0.3241
Th-228	8.841E-07	0.1951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.841E-07	0.1951
Th-230	5.225E-08	0.0115	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.225E-08	0.0115
Th-232	5.981E-08	0.0132	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.981E-08	0.0132
U-234	7.893E-08	0.0174	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.893E-08	0.0174
U-238	1.124E-07	0.0248	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.124E-07	0.0248
Total	5.106E-06	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.106E-06	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

Program execution time = 0.28 seconds

Pb-210 risk recalculated with HEAST 1995 SF (1E-9/pCi)

302598

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	3.790E+00
Thickness:	2.00 meters	Ra-226	3.890E+00
Cover Depth:	0.00 meters	Ra 228	2.590E+01
		Th 228	2.590E+01
		Th-230	4.080E+00
		Th-232	7.400E+00
		U-234	3.790E+00
		U 238	3.390E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.318E+01	2.238E+01	2.035E+01	1.406E+01	8.854E+00	8.289E+00	8.203E+00	7.917E+00
M(t):	1.545E+00	1.492E+00	1.357E+00	9.371E-01	5.903E-01	5.526E-01	5.469E 01	5.278E-01

Maximum TDOSE(t): 2.318E+01 mrem/yr at t = 0.000E+00 years

302599

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.183E-03	0.0001	1.033E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.349E-02	0.0019
Ra-226	2.136E+00	0.0922	3.930E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.165E-03	0.0004
Ra-228	7.592E+00	0.3276	1.546E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.886E-02	0.0025
Th-228	1.296E+01	0.5594	1.050E-01	0.0045	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.303E-02	0.0014
Th-230	2.469E-04	0.0000	1.563E-02	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.529E-03	0.0002
Th-232	1.940E-04	0.0000	1.426E-01	0.0062	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.188E-02	0.0014
U-234	7.688E-05	0.0000	5.877E-03	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.693E-03	0.0001
U-238	2.280E-02	0.0010	4.699E-03	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.439E-03	0.0001
Total	2.272E+01	0.9802	2.767E-01	0.0119	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.821E-01	0.0079

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.570E-02	0.0020
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.145E+00	0.0925
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.653E+00	0.3302
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.310E+01	0.5654
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.940E-02	0.0008
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.746E-01	0.0075
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.647E-03	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.894E-02	0.0012
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.318E+01	1.0000

*Sum of all water independent and dependent pathways.

302600

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	3.790E+00
Thickness:	2.00 meters	Ra-226	3.890E+00
Cover Depth:	0.00 meters	Ra-228	2.590E+01
		Th-228	2.590E+01
		Th-230	4.080E+00
		Th-232	7.400E+00
		U-234	3.790E+00
		U-238	3.390E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.791E+01	2.709E+01	2.491E+01	1.803E+01	1.227E+01	1.156E+01	1.139E+01	1.096E+01
M(t):	1.861E+00	1.806E+00	1.661E+00	1.202E+00	8.180E-01	7.709E-01	7.596E-01	7.306E-01

Maximum TDOSE(t): 2.791E+01 mrem/yr at t = 0.000E+00 years

302601

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.183E-03	0.0000	1.871E-02	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.349E-02	0.0016
Ra-226	2.136E+00	0.0765	7.120E-03	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.165E-03	0.0003
Ra-228	7.592E+00	0.2720	2.800E-02	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.886E-02	0.0021
Th-228	1.296E+01	0.4645	1.902E+00	0.0681	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.303E-02	0.0012
Th-230	2.469E-04	0.0000	2.831E-01	0.0101	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.529E-03	0.0001
Th-232	1.940E-04	0.0000	2.583E+00	0.0925	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.188E-02	0.0011
U-234	7.688E-05	0.0000	1.065E-01	0.0038	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.693E-03	0.0001
U-238	2.280E-02	0.0008	8.513E-02	0.0030	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.439E-03	0.0001
Total	2.272E+01	0.8139	5.013E+00	0.1796	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.821E-01	0.0065

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.338E-02	0.0023
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.151E+00	0.0771
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.679E+00	0.2751
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.490E+01	0.5338
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.868E-01	0.0103
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.615E+00	0.0937
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.082E-01	0.0039
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.094E-01	0.0039
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.791E+01	1.0000

*Sum of all water independent and dependent pathways.

302602

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	8.066E-01	0.000E+00	0.000E+00	0.000E+00	5.982E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.982E+00
Ra-226	8.279E-01	0.000E+00	0.000E+00	0.000E+00	6.139E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.139E+00
Ra-228	5.512E+00	0.000E+00	0.000E+00	0.000E+00	4.088E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.088E+01
Th-228	5.512E+00	0.000E+00	0.000E+00	0.000E+00	4.088E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.088E+01
Th-230	8.683E-01	0.000E+00	0.000E+00	0.000E+00	6.439E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.439E+00
Th-232	1.575E+00	0.000E+00	0.000E+00	0.000E+00	1.168E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.168E+01
U-234	8.066E-01	0.000E+00	0.000E+00	0.000E+00	5.982E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.982E+00
U-238	7.214E-01	0.000E+00	0.000E+00	0.000E+00	5.350E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.350E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water Independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.899E-11	0.0000	3.146E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.982E-09	0.0004
Ra-226	1.278E-06	0.0913	2.235E-09	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.842E-09	0.0001
Ra-228	4.190E-06	0.2993	5.457E-09	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.022E-08	0.0007
Th-228	7.880E-06	0.5630	5.347E-07	0.0382	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.402E-09	0.0007
Th-230	8.979E-12	0.0000	1.476E-08	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.447E-10	0.0000
Th-232	7.448E-12	0.0000	2.992E-08	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.854E-10	0.0000
U-234	4.016E-12	0.0000	1.129E-08	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.632E-10	0.0000
U-238	1.098E-08	0.0008	8.657E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.317E-10	0.0000
Total	1.336E-05	0.9544	6.101E-07	0.0436	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.867E-08	0.0020

302603

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.156E-09	0.0007
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.282E-06	0.0916
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.205E-06	0.3004
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.425E-06	0.6018
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.501E-08	0.0011
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.031E-08	0.0022
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.156E-08	0.0008
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.997E-08	0.0014
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.400E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water-dep. = Water-dependent

302604

Contaminated Zone Dimensions	
Area:	10000.00 square meters
Thickness:	2.00 meters
Cover Depth:	0.00 meters

Initial Soil Concentrations, pCi/g	
Pb-210	1.110E+00
Ra-226	1.110E+00
Ra-228	1.270E+00
Th-228	1.150E+00
Th-230	1.410E+00
Th-232	1.030E+00
U-234	1.110E+00
U-238	8.110E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.191E+00	2.201E+00	2.196E+00	2.123E+00	2.038E+00	2.005E+00	1.986E+00	1.951E+00
M(t):	1.461E-01	1.467E-01	1.464E-01	1.415E-01	1.359E-01	1.337E-01	1.324E-01	1.300E-01

Maximum TDOSE(t): 2.202E+00 mrem/yr at t = 1.540 ± 0.002 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.540 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.303E-04	0.0001	5.224E-03	0.0024	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.214E-02	0.0055
Ra-226	6.091E-01	0.2766	2.286E-03	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.923E-03	0.0013
Ra-228	5.551E-01	0.2521	3.721E-02	0.0169	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.024E-03	0.0014
Th-228	3.295E-01	0.1496	4.831E-02	0.0219	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.394E-04	0.0004
Th-230	6.015E-04	0.0003	9.781E-02	0.0444	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.222E-03	0.0006
Th-232	7.214E-02	0.0328	3.627E-01	0.1647	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.887E-03	0.0022
U-234	2.202E-05	0.0000	3.050E-02	0.0138	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.849E-04	0.0002
U-238	5.335E-03	0.0024	1.992E-02	0.0090	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.367E-04	0.0002
Total	1.572E+00	0.7140	6.040E-01	0.2743	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.586E-02	0.0117

302605

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.465E-04	0.0002	5.480E-03	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.274E-02	0.0058
Ra-226	6.095E-01	0.2781	2.032E-03	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.330E-03	0.0011
Ra-228	3.723E-01	0.1699	1.373E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.886E-03	0.0013
Th-228	5.756E-01	0.2627	8.443E-02	0.0385	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.467E-03	0.0007
Th-230	8.533E-05	0.0000	9.782E-02	0.0446	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.219E-03	0.0006
Th-232	2.701E-05	0.0000	3.595E-01	0.1640	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.438E-03	0.0020
U-234	2.252E-05	0.0000	3.118E-02	0.0142	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.958E-04	0.0002
U-238	5.455E-03	0.0025	2.037E-02	0.0093	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.443E-04	0.0002
Total	1.563E+00	0.7134	6.022E-01	0.2748	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.592E-02	0.0118

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.856E-02	0.0085
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.138E-01	0.2801
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.765E-01	0.1718
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.615E-01	0.3019
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.913E-02	0.0452
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.640E-01	0.1661
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.170E-02	0.0145
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.617E-02	0.0119
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.191E+00	1.0000

*Sum of all water independent and dependent pathways.

302606

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	2.362E-01	0.000E+00	0.000E+00	0.000E+00	1.752E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.752E+00
Ra-226	2.362E-01	0.000E+00	0.000E+00	0.000E+00	1.752E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.752E+00
Ra-228	2.703E-01	0.000E+00	0.000E+00	0.000E+00	2.004E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.004E+00
Th-228	2.447E-01	0.000E+00	0.000E+00	0.000E+00	1.815E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.815E+00
Th-230	3.001E-01	0.000E+00	0.000E+00	0.000E+00	2.225E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.225E+00
Th-232	2.192E-01	0.000E+00	0.000E+00	0.000E+00	1.626E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.626E+00
U-234	2.362E-01	0.000E+00	0.000E+00	0.000E+00	1.752E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.752E+00
U-238	1.726E-01	0.000E+00	0.000E+00	0.000E+00	1.280E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.280E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water Independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	8.491E-12	0.0000	9.213E-10	0.0010	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.752E-09	0.0018
Ra-226	3.646E-07	0.3773	6.378E-10	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.256E-10	0.0005
Ra-228	2.054E-07	0.2126	2.676E-10	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.011E-10	0.0005
Th-228	3.499E-07	0.3621	2.374E-08	0.0246	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.174E-10	0.0004
Th-230	3.103E-12	0.0000	5.101E-09	0.0053	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.456E-11	0.0001
Th-232	1.037E-12	0.0000	4.165E-09	0.0043	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.364E-11	0.0001
U-234	1.176E-12	0.0000	3.307E-09	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.708E-11	0.0001
U-238	2.628E-09	0.0027	2.071E-09	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.936E-11	0.0001
Total	9.226E-07	0.9548	4.021E-08	0.0416	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.491E-09	0.0036

302607

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.682E 09	0.0028
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.658E 07	0.3785
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.062E 07	0.2134
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.741E 07	0.3871
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.189E-09	0.0054
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.219E-09	0.0044
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.385E-09	0.0035
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.778E 09	0.0049
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.663E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water-dep. = Water-dependent

302608

Summary : Future-Construction worker; Lower Parcel B (25% indoor)
File : CWFUT.B

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	2.470E+00
Thickness:	2.00 meters	Ra-226	2.470E+00
Cover Depth:	0.00 meters	Ra-228	6.890E+00
		Th-228	6.890E+00
		Th-230	2.950E+00
		Th-232	3.850E+00
		U-234	2.470E+00
		U-238	2.000E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	9.116E+00	8.979E+00	8.619E+00	7.479E+00	6.509E+00	6.344E+00	6.267E+00	6.086E+00
M(t):	6.078E-01	5.986E-01	5.746E-01	4.986E-01	4.340E-01	4.229E-01	4.178E-01	4.057E-01

Maximum TDOSE(t): 9.116E+00 mrem/yr at t = 0.000E+00 years

302609

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	7.709E-04	0.0001	1.220E-02	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.834E-02	0.0031
Ra-226	1.356E+00	0.1488	4.521E-03	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.185E-03	0.0006
Ra-228	2.020E+00	0.2215	7.449E-03	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.566E-02	0.0017
Th-228	3.449E+00	0.3783	5.059E-01	0.0555	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.786E-03	0.0010
Th-230	1.785E-04	0.0000	2.047E-01	0.0224	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.551E-03	0.0003
Th-232	1.009E-04	0.0000	1.344E+00	0.1474	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.659E-02	0.0018
U-234	5.011E-05	0.0000	6.939E-02	0.0076	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.103E-03	0.0001
U-238	1.345E-02	0.0015	5.022E-02	0.0055	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.491E-04	0.0001
Total	6.839E+00	0.7502	2.198E+00	0.2411	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.906E-02	0.0087

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.131E-02	0.0045
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.366E+00	0.1498
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.043E+00	0.2241
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.964E+00	0.4348
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.074E-01	0.0227
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.360E+00	0.1492
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.054E-02	0.0077
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.453E-02	0.0071
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.116E+00	1.0000

*Sum of all water independent and dependent pathways.

302610

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	5.257E-01	0.000E+00	0.000E+00	0.000E+00	3.898E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.898E+00
Ra-226	5.257E-01	0.000E+00	0.000E+00	0.000E+00	3.898E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.898E+00
Ra-228	1.466E+00	0.000E+00	0.000E+00	0.000E+00	1.087E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.087E+01
Th-228	1.466E+00	0.000E+00	0.000E+00	0.000E+00	1.087E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.087E+01
Th-230	6.278E-01	0.000E+00	0.000E+00	0.000E+00	4.656E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.656E+00
Th-232	8.193E-01	0.000E+00	0.000E+00	0.000E+00	6.076E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.076E+00
U-234	5.257E-01	0.000E+00	0.000E+00	0.000E+00	3.898E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.898E+00
U-238	4.256E-01	0.000E+00	0.000E+00	0.000E+00	3.156E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.156E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.890E-11	0.0000	2.050E-09	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.898E-09	0.0009
Ra-226	8.113E-07	0.1920	1.419E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.169E-09	0.0003
Ra-228	1.115E-06	0.2638	1.452E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.719E-09	0.0006
Th-228	2.096E-06	0.4961	1.422E-07	0.0337	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.501E-09	0.0006
Th-230	6.492E-12	0.0000	1.067E-08	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.769E-10	0.0000
Th-232	3.875E-12	0.0000	1.557E-08	0.0037	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.005E-10	0.0000
U-234	2.617E-12	0.0000	7.359E-09	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.715E-10	0.0000
U-238	6.481E-09	0.0015	5.108E-09	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.957E-10	0.0000
Total	4.029E-06	0.9534	1.859E-07	0.0440	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.103E-08	0.0026

302611

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.967E-09	0.0014
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.139E-07	0.1926
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.119E-06	0.2647
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.241E-06	0.5304
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.086E-08	0.0026
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.577E-08	0.0037
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.533E-09	0.0018
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.178E-08	0.0028
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.226E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water independent Water-dep. = Water-dependent

302612

Summary : Future-Construction worker; Parcel B & C (25% indoor)
File : CWPUT.B&C

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	2.000E+01
Thickness:	2.00 meters	Pa-226	2.000E+01
Cover Depth:	0.00 meters	Ra-228	4.330E+01
		Th-228	4.330E+01
		Th-230	3.770E+01
		Th-232	1.920E+01
		U-234	3.850E+01
		U-238	3.930E+01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	6.094E+01	5.984E+01	5.696E+01	4.782E+01	3.992E+01	3.836E+01	3.825E+01	3.902E+01
M(t):	4.063E+00	3.989E+00	3.797E+00	3.188E+00	2.662E+00	2.557E+00	2.550E+00	2.601E+00

Maximum TDOSE(t): 6.094E+01 mrem/yr at t = 0.000E+00 years

302613

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.242E-03	0.0001	9.875E-02	0.0016	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.295E-01	0.0038
Ra-226	1.098E+01	0.1802	3.660E-02	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.198E-02	0.0007
Ra-228	1.269E+01	0.2083	4.681E-02	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.841E-02	0.0016
Th-228	2.167E+01	0.3556	3.179E+00	0.0522	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.522E-02	0.0009
Th-230	2.282E-03	0.0000	2.616E+00	0.0429	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.261E-02	0.0005
Th-232	5.034E-04	0.0000	6.701E+00	0.1100	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.273E-02	0.0014
U-234	7.810E-04	0.0000	1.082E+00	0.0177	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.720E-02	0.0003
U-238	2.643E-01	0.0043	9.869E-01	0.0162	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.668E-02	0.0003
Total	4.562E+01	0.7486	1.475E+01	0.2420	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.743E-01	0.0094

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.345E-01	0.0055
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.106E+01	0.1815
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.284E+01	0.2107
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.491E+01	0.4087
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.650E+00	0.0435
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.784E+00	0.1113
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.100E+00	0.0180
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.268E+00	0.0208
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.094E+01	1.0000

*Sum of all water independent and dependent pathways.

302614

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	4.256E+00	0.000E+00	0.000E+00	0.000E+00	3.156E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.156E+01
Ra-226	4.256E+00	0.000E+00	0.000E+00	0.000E+00	3.156E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.156E+01
Ra-228	9.215E+00	0.000E+00	0.000E+00	0.000E+00	6.834E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.834E+01
Th-228	9.215E+00	0.000E+00	0.000E+00	0.000E+00	6.834E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.834E+01
Th-230	8.023E+00	0.000E+00	0.000E+00	0.000E+00	5.950E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.950E+01
Th-232	4.086E+00	0.000E+00	0.000E+00	0.000E+00	3.030E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.030E+01
U-234	8.193E+00	0.000E+00	0.000E+00	0.000E+00	6.076E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.076E+01
U-238	8.364E+00	0.000E+00	0.000E+00	0.000E+00	6.202E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.202E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.530E-10	0.0000	1.660E-08	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.156E-08	0.0011
Ra-226	6.569E-06	0.2320	1.149E-08	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.469E-09	0.0003
Ra-228	7.004E-06	0.2473	9.123E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.708E-08	0.0006
Th-228	1.317E-05	0.4652	8.938E-07	0.0316	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.572E-08	0.0006
Th-230	8.297E-11	0.0000	1.364E-07	0.0048	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.261E-09	0.0001
Th-232	1.932E-11	0.0000	7.764E-08	0.0027	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.000E-09	0.0000
U-234	4.080E-11	0.0000	1.147E-07	0.0041	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.674E-09	0.0001
U-238	1.273E-07	0.0045	1.004E-07	0.0035	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.846E-09	0.0001
Total	2.688E-05	0.9490	1.360E-06	0.0480	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.362E-08	0.0030

302615

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.832E-08	0.0017
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.590E-06	0.2327
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.031E-06	0.2483
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.408E-05	0.4973
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.387E-07	0.0049
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.865E-08	0.0028
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.174E-07	0.0041
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.316E-07	0.0082
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.832E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water-dep. = Water-dependent

302616

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	5.210E+00
Thickness:	2.00 meters	Ra-226	3.830E+00
Cover Depth:	0.00 meters	Ra-228	4.910E+00
		Th-228	4.500E+00
		Th-230	4.410E+00
		Th-232	4.090E+00
		U-234	5.210E+00
		U-238	7.400E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	8.392E+00	8.421E+00	8.398E+00	8.127E+00	7.786E+00	7.577E+00	7.439E+00	7.236E+00
M(t):	5.595E-01	5.614E-01	5.598E-01	5.418E-01	5.191E-01	5.051E-01	4.959E-01	4.824E-01

Maximum TDOSE(t): 8.423E+00 mrem/yr at t = 1.391 ± 0.001 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.391 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.557E-03	0.0002	2.463E-02	0.0029	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.725E-02	0.0068
Ra-226	2.102E+00	0.2495	7.805E-03	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.894E-03	0.0012
Ra-228	2.107E+00	0.2501	1.350E-01	0.0160	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.170E-02	0.0014
Th-228	1.361E+00	0.1615	1.996E-01	0.0237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.466E-03	0.0004
Th-230	1.726E-03	0.0002	3.059E-01	0.0363	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.820E-03	0.0005
Th-232	2.547E-01	0.0302	1.438E+00	0.1707	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.923E-02	0.0023
U-234	1.036E-04	0.0000	1.435E-01	0.0170	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.282E-03	0.0003
U-238	4.880E-02	0.0058	1.822E-01	0.0216	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.080E-03	0.0004
Total	5.876E+00	0.6976	2.437E+00	0.2893	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.107E-01	0.0131

302617

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.626E-03	0.0002	2.572E-02	0.0031	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.978E-02	0.0071
Ra-226	2.103E+00	0.2506	7.010E-03	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.039E-03	0.0010
Ra-228	1.439E+00	0.1715	5.308E-03	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.116E-02	0.0013
Th-228	2.253E+00	0.2684	3.304E-01	0.0394	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.738E-03	0.0007
Th-230	2.669E-04	0.0000	3.060E-01	0.0365	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.814E-03	0.0005
Th-232	1.072E-04	0.0000	1.427E+00	0.1701	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.762E-02	0.0021
U-234	1.057E-04	0.0000	1.464E-01	0.0174	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.327E-03	0.0003
U-238	4.977E-02	0.0059	1.858E-01	0.0221	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.142E-03	0.0004
Total	5.847E+00	0.6967	2.434E+00	0.2900	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.116E-01	0.0133

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.713E-02	0.0104
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.118E+00	0.2524
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.456E+00	0.1735
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.589E+00	0.3085
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.100E-01	0.0369
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.445E+00	0.1722
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.488E-01	0.0177
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.387E-01	0.0284
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.392E+00	1.0000

*Sum of all water independent and dependent pathways.

302618

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.109E+00	0.000E+00	0.000E+00	0.000E+00	8.223E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.223E+00
Ra-226	8.151E-01	0.000E+00	0.000E+00	0.000E+00	6.045E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.045E+00
Ra-228	1.045E+00	0.000E+00	0.000E+00	0.000E+00	7.749E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.749E+00
Th-228	9.577E-01	0.000E+00	0.000E+00	0.000E+00	7.102E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.102E+00
Th-230	9.385E-01	0.000E+00	0.000E+00	0.000E+00	6.960E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.960E+00
Th-232	8.704E-01	0.000E+00	0.000E+00	0.000E+00	6.455E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.455E+00
U-234	1.109E+00	0.000E+00	0.000E+00	0.000E+00	8.223E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.223E+00
U-238	1.575E+00	0.000E+00	0.000E+00	0.000E+00	1.168E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.168E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.986E-11	0.0000	4.324E-09	0.0012	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.223E 09	0.0023
Ra-226	1.258E-06	0.3468	2.201E-09	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.813E-09	0.0005
Ra-228	7.943E-07	0.2189	1.034E-09	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.937E-09	0.0005
Th-228	1.369E-06	0.3774	9.289E-08	0.0256	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.633E-09	0.0005
Th-230	9.705E-12	0.0000	1.595E-08	0.0044	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.645E-10	0.0001
Th-232	4.116E-12	0.0000	1.654E-08	0.0046	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.130E-10	0.0001
U-234	5.521E-12	0.0000	1.552E-08	0.0043	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.618E-10	0.0001
U-238	2.398E-08	0.0066	1.890E-08	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.241E-10	0.0002
Total	3.446E-06	0.9497	1.674E-07	0.0461	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.517E-08	0.0042

302619

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.259E 08	0.0035
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.262E-06	0.3479
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.972E-07	0.2197
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.464E-06	0.4034
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.623E-08	0.0045
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.676E-08	0.0046
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.589E-08	0.0044
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.360E-08	0.0120
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.628E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water-dep. = Water-dependent

302620

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	3.790E+00
Thickness:	2.00 meters	Ra-226	3.890E+00
Cover Depth:	0.00 meters	Ra-228	2.590E+01
		Th-228	2.590E+01
		Th-230	4.080E+00
		Th-232	7.400E+00
		U-234	3.790E+00
		U-238	3.390E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	4.851E+02	4.738E+02	4.480E+02	3.671E+02	3.013E+02	2.938E+02	2.923E+02	2.869E+02
M(t):	3.234E+01	3.159E+01	2.986E+01	2.448E+01	2.009E+01	1.958E+01	1.949E+01	1.913E+01

Maximum TDOSE(t): 4.851E+02 mrem/yr at t = 0.000E+00 years

302621

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.312E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.881E+00	0.0121	0.000E+00	0.0000	0.000E+00	0.0000	6.550E-01	0.0014
Ra-226	2.369E+01	0.0488	0.000E+00	0.0000	1.810E+02	0.3732	4.419E+00	0.0091	0.000E+00	0.0000	0.000E+00	0.0000	1.230E-01	0.0003
Ra-228	8.419E+01	0.1736	0.000E+00	0.0000	0.000E+00	0.0000	3.173E+01	0.0654	0.000E+00	0.0000	0.000E+00	0.0000	8.866E-01	0.0018
Th-228	1.438E+02	0.2964	0.000E+00	0.0000	6.326E+00	0.0130	4.450E-01	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	4.975E-01	0.0010
Th-230	2.738E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.812E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	5.315E-02	0.0001
Th-232	2.152E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.348E-01	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	4.802E-01	0.0010
U-234	8.526E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.743E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.550E-02	0.0001
U-238	2.529E-01	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	4.883E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.168E-02	0.0000
Total	2.519E+02	0.5194	0.000E+00	0.0000	1.873E+02	0.3862	4.306E+01	0.0888	0.000E+00	0.0000	0.000E+00	0.0000	2.743E+00	0.0057

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.549E+00	0.0135
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.092E+02	0.4313
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.168E+02	0.2408
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.510E+02	0.3114
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.040E-01	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.172E-01	0.0019
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.378E-02	0.0002
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.234E-01	0.0007
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.851E+02	1.0000

*Sum of all water independent and dependent pathways.

302622

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	8.090E+02	0.000E+00	0.000E+00	9.010E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.991E+02
Ra-226	0.000E+00	3.323E+03	0.000E+00	0.000E+00	9.247E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.415E+03
Ra-228	0.000E+00	2.203E+04	0.000E+00	0.000E+00	6.157E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.265E+04
Th-228	0.000E+00	5.508E+02	0.000E+00	0.000E+00	6.157E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.166E+03
Th-230	0.000E+00	8.781E+01	0.000E+00	0.000E+00	9.699E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.848E+02
Th-232	0.000E+00	1.593E+02	0.000E+00	0.000E+00	1.759E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.352E+02
U-234	0.000E+00	2.029E+02	0.000E+00	0.000E+00	9.010E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.930E+02
U-238	0.000E+00	1.815E+02	0.000E+00	0.000E+00	8.059E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.621E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	7.560E+05	7.239E+05	5.476E+05	4.427E+05	1.546E+06	1.535E+06	6.981E+03	3.840E+03
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	7.560E+05	7.239E+05	5.476E+05	4.427E+05	1.546E+06	1.535E+06	6.981E+03	3.840E+03

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.646E-09	0.0000	0.000E+00	0.0000	2.427E-05	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	2.703E-06	0.0006
Ra-226	4.251E-04	0.0908	0.000E+00	0.0000	2.990E-05	0.0064	0.000E+00	0.0000	0.000E+00	0.0000	8.323E-07	0.0002
Ra-228	1.394E-03	0.2977	0.000E+00	0.0000	1.653E-04	0.0353	0.000E+00	0.0000	0.000E+00	0.0000	4.618E-06	0.0010
Th-228	2.622E-03	0.5600	0.000E+00	0.0000	3.800E-06	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	4.248E-06	0.0009
Th-230	2.987E-09	0.0000	0.000E+00	0.0000	1.001E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.106E-07	0.0000
Th-232	2.478E-09	0.0000	0.000E+00	0.0000	1.577E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.742E-07	0.0000
U-234	1.336E-09	0.0000	0.000E+00	0.0000	2.679E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.189E-07	0.0000
U-238	3.655E-06	0.0008	0.000E+00	0.0000	3.376E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.499E-07	0.0000
Total	4.444E-03	0.9494	0.000E+00	0.0000	2.241E-04	0.0479	0.000E+00	0.0000	0.000E+00	0.0000	1.295E-05	0.0028

302623

Excess Cancer Risks CNPS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.698E-05	0.0058
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.558E-04	0.0974
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.564E-03	0.3340
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.630E-03	0.5618
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.137E-07	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.343E-07	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.882E-07	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.142E-06	0.0009
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.681E-03	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	4.083E-05	8.036E-05	1.019E-04	1.992E-04	8.813E-06	1.382E-07	8.168E-06	4.262E-06
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	4.083E-05	8.036E-05	1.019E-04	1.992E-04	8.813E-06	1.382E-07	8.168E-06	4.262E-06

Water Ind. == Water Independent Water-dep. == Water-dependent

302624

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.646E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.427E-05	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	2.703E-06	0.0005
Ra-226	4.251E-04	0.0829	0.000E+00	0.0000	4.223E-04	0.0824	2.990E-05	0.0058	0.000E+00	0.0000	0.000E+00	0.0000	8.323E-07	0.0002
Ra-228	1.394E-03	0.2720	0.000E+00	0.0000	0.000E+00	0.0000	1.653E-04	0.0322	0.000E+00	0.0000	0.000E+00	0.0000	4.618E-06	0.0009
Th-228	2.622E-03	0.5116	0.000E+00	0.0000	2.138E-05	0.0042	3.800E-06	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	4.248E-06	0.0008
Th-230	2.987E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.001E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.106E-07	0.0000
Th-232	3.478E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.577E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.742E-07	0.0000
U-234	1.336E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.679E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.189E-07	0.0000
U-238	3.655E-06	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	3.370E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.499E-07	0.0000
Total	4.444E-03	0.8672	0.000E+00	0.0000	4.436E-04	0.0866	2.241E-04	0.0437	0.000E+00	0.0000	0.000E+00	0.0000	1.295E-05	0.0025

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.698E-05	0.0053
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.781E-04	0.1713
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.564E-03	0.3051
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.651E-03	0.5173
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.137E-07	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.343E-07	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.882E-07	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.142E-06	0.0008
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.125E-03	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

302625

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	1.110E+00
Thickness:	2.00 meters	Ra-226	1.110E+00
Cover Depth:	0.00 meters	Ra-228	1.270E+00
		Th-228	1.150E+00
		Th-230	1.410E+00
		Th-232	1.030E+00
		U-234	1.110E+00
		U-238	8.110E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	7.432E+01	7.441E+01	7.470E+01	7.387E+01	7.304E+01	7.313E+01	7.394E+01	7.583E+01
M(t):	4.955E+00	4.960E+00	4.980E+00	4.925E+00	4.870E+00	4.876E+00	4.929E+00	5.056E+00

Maximum TDOSE(t): 7.583E+01 mrem/yr at t = 1.000E+03 years

302626

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.842E 03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.722E+00	0.0232	0.000E+00	0.0000	0.000E+00	0.0000	1.918E-01	0.0026
Ra-226	6.759E+00	0.0909	0.000E+00	0.0000	5.165E+01	0.6949	1.261E+00	0.0170	0.000E+00	0.0000	0.000E+00	0.0000	3.509E-02	0.0005
Pa-228	4.128E+00	0.0555	0.000E+00	0.0000	0.000E+00	0.0000	1.556E+00	0.0209	0.000E+00	0.0000	0.000E+00	0.0000	4.347E-02	0.0006
Th-228	6.384E+00	0.0859	0.000E+00	0.0000	2.809E-01	0.0038	1.976E-02	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	2.209E-02	0.0003
Th-230	9.463E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.663E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.837E-02	0.0002
Th-232	2.995E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.052E-02	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	6.684E-02	0.0009
U-234	2.497E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.682E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	7.467E-03	0.0001
U-238	6.049E-02	0.0008	0.000E+00	0.0000	0.000E+00	0.0000	1.168E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	5.186E-03	0.0001
Total	1.734E+01	0.2333	0.000E+00	0.0000	5.193E+01	0.6987	4.665E+00	0.0628	0.000E+00	0.0000	0.000E+00	0.0000	3.904E-01	0.0053

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.918E+00	0.0258
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.970E+01	0.8033
Pa-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.728E+00	0.0771
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.706E+00	0.0902
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.594E-02	0.0005
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.277E-01	0.0017
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.454E-02	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.736E-02	0.0010
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.432E+01	1.0000

*Sum of all water independent and dependent pathways.

302627

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Pb-210	0.000E+00	2.369E+02	0.000E+00	0.000E+00	2.639E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.633E+02
Ra-226	0.000E+00	9.481E+02	0.000E+00	0.000E+00	2.639E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.745E+02
Ra-228	0.000E+00	1.080E+03	0.000E+00	0.000E+00	3.019E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.111E+03
Th-228	0.000E+00	2.445E+01	0.000E+00	0.000E+00	2.734E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.179E+01
Th-230	0.000E+00	3.035E+01	0.000E+00	0.000E+00	3.352E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.387E+01
Th-232	0.000E+00	2.217E+01	0.000E+00	0.000E+00	2.449E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.665E+01
U-234	0.000E+00	5.944E+01	0.000E+00	0.000E+00	2.639E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.583E+01
U-238	0.000E+00	4.343E+01	0.000E+00	0.000E+00	1.928E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.271E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	2.157E+05	2.066E+05	1.563E+05	1.263E+05	6.865E+04	6.816E+04	3.100E+02	1.705E+02
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	2.157E+05	2.066E+05	1.563E+05	1.263E+05	6.865E+04	6.816E+04	3.100E+02	1.705E+02

Water ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.825E-09	0.0000	0.000E+00	0.0000	7.108E-06	0.0214	0.000E+00	0.0000	0.000E+00	0.0000	7.916E-07	0.0024
Ra-226	1.213E-04	0.3647	0.000E+00	0.0000	8.533E-06	0.0257	0.000E+00	0.0000	0.000E+00	0.0000	2.375E-07	0.0007
Ra-228	6.835E-05	0.2055	0.000E+00	0.0000	8.103E-06	0.0244	0.000E+00	0.0000	0.000E+00	0.0000	2.264E-07	0.0007
Th-228	1.164E-04	0.3500	0.000E+00	0.0000	1.687E-07	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	1.886E-07	0.0006
Th-230	1.032E-09	0.0000	0.000E+00	0.0000	3.460E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	3.821E-08	0.0001
Th-232	3.449E-10	0.0000	0.000E+00	0.0000	2.195E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.424E-08	0.0001
U-234	3.913E-10	0.0000	0.000E+00	0.0000	7.846E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	3.483E-08	0.0001
U-238	8.743E-07	0.0026	0.000E+00	0.0000	8.077E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	3.586E-08	0.0001
Total	3.069E-04	0.9227	0.000E+00	0.0000	2.413E-05	0.0725	0.000E+00	0.0000	0.000E+00	0.0000	1.577E-06	0.0047

302628

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclido	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.902E-06	0.0238
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.301E-04	0.3910
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.668E-05	0.2305
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.168E-04	0.3510
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.384E-08	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.653E-08	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.137E-07	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.909E-07	0.0030
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.326E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	1.165E-05	2.293E-05	2.906E-05	5.684E-05	3.913E-07	6.135E-09	3.627E-07	1.892E-07
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	1.165E-05	2.293E-05	2.906E-05	5.684E-05	3.913E-07	6.135E-09	3.627E-07	1.892E-07

Water ind. = Water-independent Water-dep. = Water-dependent

302629

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.825E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.108E-06	0.0157	0.000E+00	0.0000	0.000E+00	0.0000	7.916E-07	0.0017
Ra-226	1.213E-04	0.2671	0.000E+00	0.0000	1.205E-04	0.2653	8.533E-06	0.0188	0.000E+00	0.0000	0.000E+00	0.0000	2.375E-07	0.0005
Ra-228	6.835E-05	0.1505	0.000E+00	0.0000	0.000E+00	0.0000	8.103E-06	0.0178	0.000E+00	0.0000	0.000E+00	0.0000	2.264E-07	0.0005
Th-228	1.164E-04	0.2564	0.000E+00	0.0000	9.494E-07	0.0021	1.687E-07	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	1.886E-07	0.0004
Th-230	1.032E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.460E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	3.821E-08	0.0001
Th-232	3.449E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.195E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.424E-08	0.0001
U-234	3.913E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.846E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	3.483E-08	0.0001
U-238	8.743E-07	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	8.077E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	3.586E-08	0.0001
Total	3.069E-04	0.6759	0.000E+00	0.0000	1.214E-04	0.2674	2.413E-05	0.0531	0.000E+00	0.0000	0.000E+00	0.0000	1.577E-06	0.0035

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.902E-06	0.0174
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.506E-04	0.5518
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.668E-05	0.1689
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.177E-04	0.2592
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.384E-08	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.653E-08	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.137E-07	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.909E-07	0.0022
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.541E-04	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

302630

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	2.470E+00
Thickness:	2.00 meters	Ra-226	2.470E+00
Cover Depth:	0.00 meters	Ra-228	6.890E+00
		Th-228	6.890E+00
		Th-230	2.950E+00
		Th-232	3.850E+00
		U-234	2.470E+00
		U-238	2.000E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.092E+02	2.074E+02	2.029E+02	1.897E+02	1.799E+02	1.787E+02	1.794E+02	1.810E+02
M(t):	1.394E+01	1.382E+01	1.353E+01	1.264E+01	1.199E+01	1.191E+01	1.196E+01	1.207E+01

Maximum TDOSE(t): 2.092E+02 mrem/yr at t = 0.000E+00 years

302631

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	8.549E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.833E+00	0.0183	0.000E+00	0.0000	0.000E+00	0.0000	4.269E-01	0.0020
Ra-226	1.504E+01	0.0719	0.000E+00	0.0000	1.149E+02	0.5494	2.806E+00	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	7.809E-02	0.0004
Ra-228	2.240E+01	0.1071	0.000E+00	0.0000	0.000E+00	0.0000	8.441E+00	0.0404	0.000E+00	0.0000	0.000E+00	0.0000	2.359E-01	0.0011
Th-228	3.825E+01	0.1828	0.000E+00	0.0000	1.683E+00	0.0080	1.184E-01	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	1.323E-01	0.0006
Th-230	1.980E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.479E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	3.843E-02	0.0002
Th-232	1.119E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.262E-01	0.0011	0.000E+00	0.0000	0.000E+00	0.0000	2.499E-01	0.0012
U-234	5.556E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.743E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.662E-02	0.0001
U-238	1.492E-01	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	2.881E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.279E-02	0.0001
Total	7.585E+01	0.3626	0.000E+00	0.0000	1.166E+02	0.5575	1.553E+01	0.0742	0.000E+00	0.0000	0.000E+00	0.0000	1.191E+00	0.0057

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.268E+00	0.0204
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.329E+02	0.6351
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.107E+01	0.1486
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.018E+01	0.1921
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.520E-02	0.0004
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.772E-01	0.0023
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.460E-02	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.908E-01	0.0009
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.092E+02	1.0000

*Sum of all water independent and dependent pathways.

302632

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	5.272E+02	0.000E+00	0.000E+00	5.872E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.859E+02
Ra-226	0.000E+00	2.110E+03	0.000E+00	0.000E+00	5.872E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.168E+03
Ra-228	0.000E+00	5.862E+03	0.000E+00	0.000E+00	1.638E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.025E+03
Th-228	0.000E+00	1.465E+02	0.000E+00	0.000E+00	1.638E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.103E+02
Th-230	0.000E+00	6.349E+01	0.000E+00	0.000E+00	7.013E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.336E+02
Th-232	0.000E+00	8.286E+01	0.000E+00	0.000E+00	9.152E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.744E+02
U-234	0.000E+00	1.323E+02	0.000E+00	0.000E+00	5.872E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.910E+02
U-238	0.000E+00	1.071E+02	0.000E+00	0.000E+00	4.754E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.546E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	4.801E+05	4.597E+05	3.477E+05	2.811E+05	4.113E+05	4.084E+05	1.857E+03	1.021E+03
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	4.801E+05	4.597E+05	3.477E+05	2.811E+05	4.113E+05	4.084E+05	1.857E+03	1.021E+03

Water-ind. = Water-independent Water-dep. = Water dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	6.286E-09	0.0000	0.000E+00	0.0000	1.582E-05	0.0111	0.000E+00	0.0000	0.000E+00	0.0000	1.762E-06	0.0012
Ra-226	2.699E-04	0.1893	0.000E+00	0.0000	1.899E-05	0.0133	0.000E+00	0.0000	0.000E+00	0.0000	5.285E-07	0.0004
Ra-228	3.708E-04	0.2601	0.000E+00	0.0000	4.396E-05	0.0308	0.000E+00	0.0000	0.000E+00	0.0000	1.228E-06	0.0009
Th-228	6.974E-04	0.4892	0.000E+00	0.0000	1.011E-06	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	1.130E-06	0.0008
Th-230	2.160E-09	0.0000	0.000E+00	0.0000	7.238E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	7.995E-08	0.0001
Th-232	1.289E-09	0.0000	0.000E+00	0.0000	8.203E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	9.061E-08	0.0001
U-234	8.708E-10	0.0000	0.000E+00	0.0000	1.746E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	7.751E-08	0.0001
U-238	2.156E-06	0.0015	0.000E+00	0.0000	1.992E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	8.843E-08	0.0001
Total	1.340E-03	0.9402	0.000E+00	0.0000	8.031E-05	0.0563	0.000E+00	0.0000	0.000E+00	0.0000	4.985E-06	0.0035

302633

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.758E-05	0.0123
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.894E-04	0.2030
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.160E-04	0.2918
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.996E-04	0.4907
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.545E-07	0.0001
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.739E-07	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.530E-07	0.0002
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.444E-06	0.0017
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.426E-03	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	2.592E-05	5.102E-05	6.468E-05	1.265E-04	2.344E-06	3.675E-08	2.173E-06	1.134E-06
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	2.592E-05	5.102E-05	6.468E-05	1.265E-04	2.344E-06	3.675E-08	2.173E-06	1.134E-06

Water Ind. = Water-independent Water-dep. = Water-dependent

302634

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	6.286E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.582E-05	0.0093	0.000E+00	0.0000	0.000E+00	0.0000	1.762E-06	0.0010
Ra-226	2.699E-04	0.1588	0.000E+00	0.0000	2.681E-04	0.1578	1.899E-05	0.0112	0.000E+00	0.0000	0.000E+00	0.0000	5.285E-07	0.0003
Ra-228	3.708E-04	0.2182	0.000E+00	0.0000	0.000E+00	0.0000	4.396E-05	0.0259	0.000E+00	0.0000	0.000E+00	0.0000	1.228E-06	0.0007
Th-228	6.974E-04	0.4104	0.000E+00	0.0000	5.688E-06	0.0033	1.011E-06	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	1.130E-06	0.0007
Th-230	2.160E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.238E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.995E-08	0.0000
Th-232	1.289E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.203E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.061E-08	0.0001
U-234	8.708E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.746E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	7.751E-08	0.0000
U-238	2.156E-06	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	1.992E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	8.843E-08	0.0001
Total	1.340E-03	0.7887	0.000E+00	0.0000	2.738E-04	0.1611	8.031E-05	0.0473	0.000E+00	0.0000	0.000E+00	0.0000	4.985E-06	0.0029

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.758E-05	0.0103
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.575E-04	0.3281
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.160E-04	0.2448
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.053E-04	0.4150
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.545E-07	0.0001
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.739E-07	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.530E-07	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.444E-06	0.0014
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.699E-03	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

302635

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	2.000E+01
Thickness:	2.00 meters	Ra-226	2.000E+01
Cover Depth:	0.00 meters	Ra-228	4.330E+01
		Th-228	4.330E+01
		Th-230	3.770E+01
		Th-232	1.920E+01
		U-234	3.850E+01
		U-238	3.930E+01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.566E+03	1.552E+03	1.517E+03	1.414E+03	1.336E+03	1.352E+03	1.421E+03	1.597E+03
M(t):	1.044E+02	1.035E+02	1.011E+02	9.428E+01	8.905E+01	9.013E+01	9.475E+01	1.064E+02

Maximum TDOSE(t): 1.597E+03 mrem/yr at t = 1.000E+03 years

302636

100

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.922E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.104E+01	0.0198	0.000E+00	0.0000	0.000E+00	0.0000	3.456E+00	0.0022
Ra-226	1.218E+02	0.0778	0.000E+00	0.0000	9.306E+02	0.5942	2.272E+01	0.0145	0.000E+00	0.0000	0.000E+00	0.0000	6.323E-01	0.0004
Ra-228	1.408E+02	0.0899	0.000E+00	0.0000	0.000E+00	0.0000	5.305E+01	0.0339	0.000E+00	0.0000	0.000E+00	0.0000	1.482E+00	0.0009
Th-228	2.404E+02	0.1535	0.000E+00	0.0000	1.058E+01	0.0068	7.440E-01	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	8.317E-01	0.0005
Th-230	2.530E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.447E-01	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	4.911E-01	0.0003
Th-232	5.582E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.128E+00	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	1.246E+00	0.0008
U-234	8.661E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.834E-01	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	2.590E-01	0.0002
U-238	2.931E+00	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	5.661E-01	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	2.513E-01	0.0002
Total	5.059E+02	0.3231	0.000E+00	0.0000	9.412E+02	0.6010	1.103E+02	0.0704	0.000E+00	0.0000	0.000E+00	0.0000	8.650E+00	0.0055

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.456E+01	0.0221
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.076E+03	0.6869
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.953E+02	0.1247
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.525E+02	0.1612
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.611E-01	0.0006
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.380E+00	0.0015
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.511E-01	0.0005
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.749E+00	0.0024
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.566E+03	1.0000

*Sum of all water independent and dependent pathways.

302637

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	4.269E+03	0.000E+00	0.000E+00	4.754E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.744E+03
Ra-226	0.000E+00	1.708E+04	0.000E+00	0.000E+00	4.754E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.756E+04
Ra-228	0.000E+00	3.684E+04	0.000E+00	0.000E+00	1.029E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.787E+04
Th-228	0.000E+00	9.208E+02	0.000E+00	0.000E+00	1.029E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.950E+03
Th-230	0.000E+00	8.114E+02	0.000E+00	0.000E+00	8.962E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.708E+03
Th-232	0.000E+00	4.132E+02	0.000E+00	0.000E+00	4.564E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.697E+02
U-234	0.000E+00	2.062E+03	0.000E+00	0.000E+00	9.152E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.977E+03
U-238	0.000E+00	2.104E+03	0.000E+00	0.000E+00	9.342E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.039E+03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	3.887E+06	3.722E+06	2.816E+06	2.276E+06	2.585E+06	2.566E+06	1.167E+04	6.419E+03
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	3.887E+06	3.722E+06	2.816E+06	2.276E+06	2.585E+06	2.566E+06	1.167E+04	6.419E+03

Water ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.090E-08	0.0000	0.000E+00	0.0000	1.281E-04	0.0134	0.000E+00	0.0000	0.000E+00	0.0000	1.426E-05	0.0015
Ra-226	2.186E-03	0.2288	0.000E+00	0.0000	1.537E-04	0.0161	0.000E+00	0.0000	0.000E+00	0.0000	4.279E-06	0.0004
Ra-228	2.330E-03	0.2440	0.000E+00	0.0000	2.763E-04	0.0289	0.000E+00	0.0000	0.000E+00	0.0000	7.720E-06	0.0008
Th-228	4.383E-03	0.4589	0.000E+00	0.0000	6.353E-06	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	7.102E-06	0.0007
Th-230	2.760E-08	0.0000	0.000E+00	0.0000	9.250E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.022E-06	0.0001
Th-232	6.429E-09	0.0000	0.000E+00	0.0000	4.091E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.519E-07	0.0000
U-234	1.357E-08	0.0000	0.000E+00	0.0000	2.721E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	1.208E-06	0.0001
U-238	4.237E-05	0.0044	0.000E+00	0.0000	3.914E-06	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	1.738E-06	0.0002
Total	8.941E-03	0.9361	0.000E+00	0.0000	5.724E-04	0.0599	0.000E+00	0.0000	0.000E+00	0.0000	3.778E-05	0.0040

302638

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.424E-04	0.0149
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.344E-03	0.2454
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.614E-03	0.2737
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.396E-03	0.4603
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.974E-06	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.674E-07	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.943E-06	0.0004
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.802E-05	0.0050
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.551E-03	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	2.099E-04	4.132E-04	5.237E-04	1.024E-03	1.473E-05	2.310E-07	1.366E-05	7.125E-06
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	2.099E-04	4.132E-04	5.237E-04	1.024E-03	1.473E-05	2.310E-07	1.366E-05	7.125E-06

Water ind. == Water-independent Water-dep. == Water-dependent

302639

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.090E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.281E-04	0.0109	0.000E+00	0.0000	0.000E+00	0.0000	1.426E-05	0.0012
Ra-226	2.186E-03	0.1859	0.000E+00	0.0000	2.171E-03	0.1846	1.537E-04	0.0131	0.000E+00	0.0000	0.000E+00	0.0000	4.279E-06	0.0004
Ra-228	2.330E-03	0.1982	0.000E+00	0.0000	0.000E+00	0.0000	2.763E-04	0.0235	0.000E+00	0.0000	0.000E+00	0.0000	7.720E-06	0.0007
Th-228	4.383E-03	0.3728	0.000E+00	0.0000	3.575E-05	0.0030	6.353E-06	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	7.102E-06	0.0006
Th-230	2.760E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.250E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.022E-06	0.0001
Th-232	6.429E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.091E-07	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.519E-07	0.0000
U-234	1.357E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.721E-06	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.208E-06	0.0001
U-238	4.237E-05	0.0036	0.000E+00	0.0000	0.000E+00	0.0000	3.914E-06	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	1.738E-06	0.0001
Total	8.941E-03	0.7604	0.000E+00	0.0000	2.207E-03	0.1877	5.724E-04	0.0487	0.000E+00	0.0000	0.000E+00	0.0000	3.778E-05	0.0032

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.424E-04	0.0121
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.515E-03	0.3839
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.614E-03	0.2223
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.432E-03	0.3769
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.974E-06	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.674E-07	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.943E-06	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.802E-05	0.0041
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.176E-02	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

302640

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	5.210E+00
Thickness:	2.00 meters	Ra-226	3.830E+00
Cover Depth:	0.00 meters	Ra 228	4.910E+00
		Th-228	4.500E+00
		Th-230	4.410E+00
		Th-232	4.090E+00
		U-234	5.210E+00
		U-238	7.400E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.648E+02	2.650E+02	2.671E+02	2.636E+02	2.594E+02	2.575E+02	2.580E+02	2.595E+02
M(t):	1.766E+01	1.767E+01	1.781E+01	1.757E+01	1.729E+01	1.717E+01	1.720E+01	1.730E+01

Maximum TDOSE(t): 2.672E+02 mrem/yr at t = 2.783 ± 0.003 years

Total Dose Contributions TDOSE(j,p,t) for Individual Radionuclides (j) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.783 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.654E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	7.415E+00	0.0278	0.000E+00	0.0000	0.000E+00	0.0000	8.258E-01	0.0031
Ra-226	2.329E+01	0.0872	0.000E+00	0.0000	1.780E+02	0.6661	4.863E+00	0.0182	0.000E+00	0.0000	0.000E+00	0.0000	1.758E-01	0.0007
Ra-228	2.571E+01	0.0962	0.000E+00	0.0000	6.292E-01	0.0024	4.374E+00	0.0164	0.000E+00	0.0000	0.000E+00	0.0000	1.697E-01	0.0006
Th-228	9.112E+00	0.0341	0.000E+00	0.0000	4.009E-01	0.0015	2.820E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	3.153E-02	0.0001
Th-230	3.531E-02	0.0001	0.000E+00	0.0000	2.472E-01	0.0009	5.842E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	5.764E-02	0.0002
Th-232	6.296E+00	0.0236	0.000E+00	0.0000	1.103E-01	0.0004	1.686E+00	0.0063	0.000E+00	0.0000	0.000E+00	0.0000	3.140E-01	0.0012
U-234	1.127E-03	0.0000	0.000E+00	0.0000	3.611E-06	0.0000	7.591E-02	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	3.370E-02	0.0001
U-238	5.307E-01	0.0020	0.000E+00	0.0000	1.340E-11	0.0000	1.025E-01	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	4.549E-02	0.0002
Total	6.500E+01	0.2433	0.000E+00	0.0000	1.794E+02	0.6713	1.860E+01	0.0696	0.000E+00	0.0000	0.000E+00	0.0000	1.653E+00	0.0062

302641

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.803E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	8.085E+00	0.0305	0.000E+00	0.0000	0.000E+00	0.0000	9.004E-01	0.0034
Ra-226	2.332E+01	0.0881	0.000E+00	0.0000	1.782E+02	0.6729	4.351E+00	0.0164	0.000E+00	0.0000	0.000E+00	0.0000	1.211E-01	0.0005
Ra-228	1.596E+01	0.0603	0.000E+00	0.0000	0.000E+00	0.0000	6.015E+00	0.0227	0.000E+00	0.0000	0.000E+00	0.0000	1.681E-01	0.0006
Th-228	2.498E+01	0.0943	0.000E+00	0.0000	1.099E+00	0.0042	7.732E-02	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	8.643E-02	0.0003
Th-230	2.960E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.201E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	5.745E-02	0.0002
Th-232	1.189E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.403E-01	0.0009	0.000E+00	0.0000	0.000E+00	0.0000	2.654E-01	0.0010
U-234	1.172E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.895E-02	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	3.505E-02	0.0001
U-238	5.520E-01	0.0021	0.000E+00	0.0000	0.000E+00	0.0000	1.066E-01	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	4.732E-02	0.0002
Total	6.484E+01	0.2448	0.000E+00	0.0000	1.793E+02	0.6771	1.901E+01	0.0718	0.000E+00	0.0000	0.000E+00	0.0000	1.681E+00	0.0063

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.003E+00	0.0340
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.060E+02	0.7779
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.214E+01	0.0836
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.624E+01	0.0991
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.124E-01	0.0004
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.069E-01	0.0019
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.152E-01	0.0004
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.059E-01	0.0027
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.648E+02	1.0000

*Sum of all water independent and dependent pathways.

302642

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	1.112E+03	0.000E+00	0.000E+00	1.239E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.236E+03
Ra-226	0.000E+00	3.271E+03	0.000E+00	0.000E+00	9.105E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.362E+03
Ra-228	0.000E+00	4.177E+03	0.000E+00	0.000E+00	1.167E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.294E+03
Th-228	0.000E+00	9.569E+01	0.000E+00	0.000E+00	1.070E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.027E+02
Th-230	0.000E+00	9.492E+01	0.000E+00	0.000E+00	1.048E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.998E+02
Th-232	0.000E+00	8.803E+01	0.000E+00	0.000E+00	9.723E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.853E+02
U-234	0.000E+00	2.790E+02	0.000E+00	0.000E+00	1.239E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.028E+02
U-238	0.000E+00	3.963E+02	0.000E+00	0.000E+00	1.759E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.722E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	7.444E+05	7.128E+05	5.392E+05	4.359E+05	2.686E+05	2.667E+05	1.213E+03	6.671E+02
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	7.444E+05	7.128E+05	5.392E+05	4.359E+05	2.686E+05	2.667E+05	1.213E+03	6.671E+02

Water ind. = Water-independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.326E-08	0.0000	0.000E+00	0.0000	3.336E-05	0.0267	0.000E+00	0.0000	0.000E+00	0.0000	3.716E-06	0.0030
Ra-226	4.185E-04	0.3350	0.000E+00	0.0000	2.944E-05	0.0236	0.000E+00	0.0000	0.000E+00	0.0000	8.194E-07	0.0007
Ra-228	2.642E-04	0.2115	0.000E+00	0.0000	3.133E-05	0.0251	0.000E+00	0.0000	0.000E+00	0.0000	8.754E-07	0.0007
Th-228	4.555E-04	0.3646	0.000E+00	0.0000	6.603E-07	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	7.381E-07	0.0006
Th-230	3.229E-09	0.0000	0.000E+00	0.0000	1.082E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.195E-07	0.0001
Th-232	1.369E-09	0.0000	0.000E+00	0.0000	8.715E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	9.626E-08	0.0001
U-234	1.837E-09	0.0000	0.000E+00	0.0000	3.683E-07	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	1.635E-07	0.0001
U-238	7.977E-06	0.0064	0.000E+00	0.0000	7.370E-07	0.0006	0.000E+00	0.0000	0.000E+00	0.0000	3.272E-07	0.0003
Total	1.146E-03	0.9176	0.000E+00	0.0000	9.609E-05	0.0769	0.000E+00	0.0000	0.000E+00	0.0000	6.855E-06	0.0055

302643

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.709E-05	0.0297
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.488E-04	0.3593
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.964E-04	0.2373
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.569E-04	0.3658
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.309E-07	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.848E-07	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.336E-07	0.0004
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.042E-06	0.0072
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.249E-03	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	4.020E-05	7.912E-05	1.003E-04	1.961E-04	1.531E-06	2.400E-08	1.419E-06	7.405E-07
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	4.020E-05	7.912E-05	1.003E-04	1.961E-04	1.531E-06	2.400E-08	1.419E-06	7.405E-07

Water-ind. = Water Independent Water-dep. = Water-dependent

302644

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.326E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.336E-05	0.0200	0.000E+00	0.0000	0.000E+00	0.0000	3.716E-06	0.0022
Ra-226	4.185E-04	0.2508	0.000E+00	0.0000	4.157E-04	0.2491	2.944E-05	0.0176	0.000E+00	0.0000	0.000E+00	0.0000	8.194E-07	0.0005
Ra-228	2.642E-04	0.1584	0.000E+00	0.0000	0.000E+00	0.0000	3.133E-05	0.0188	0.000E+00	0.0000	0.000E+00	0.0000	8.754E-07	0.0005
Th-228	4.555E-04	0.2730	0.000E+00	0.0000	3.715E-06	0.0022	6.603E-07	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	7.381E-07	0.0004
Th-230	3.229E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.082E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.195E-07	0.0001
Th-232	1.369E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.715E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	9.626E-08	0.0001
U-234	1.837E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.683E-07	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.635E-07	0.0001
U-238	7.977E-06	0.0048	0.000E+00	0.0000	0.000E+00	0.0000	7.370E-07	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	3.272E-07	0.0002
Total	1.146E-03	0.6869	0.000E+00	0.0000	4.195E-04	0.2514	9.609E-05	0.0576	0.000E+00	0.0000	0.000E+00	0.0000	6.855E-06	0.0041

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.709E-05	0.0222
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.645E-04	0.5181
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.964E-04	0.1776
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.606E-04	0.2760
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.309E-07	0.0001
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.848E-07	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.336E-07	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.042E-06	0.0054
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.669E-03	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

302645

Dose and Risk Conversion Factor (and Related) Parameter Summary (continued)

Menu	Parameter	Current Value	Default	Parameter Name	Source
Sf-1	Groundshine, surface SF's, 1/yr per (pCi/cm**2):				
Sf-1	Pb-210+D	3.130E-09	3.130E-09	SLPF1(1,1)	a
Sf-1	Ra-226+D	1.470E-06	1.470E-06	SLPF1(2,1)	a
Sf-1	Ra-228+D	5.920E-07	5.920E-07	SLPF1(3,1)	a
Sf-1	Th-228+D	9.470E-07	9.470E-07	SLPF1(4,1)	a
Sf-1	Th-230	4.920E-10	4.920E-10	SLPF1(5,1)	a
Sf-1	Th-232	3.540E-10	3.540E-10	SLPF1(6,1)	a
Sf-1	U-234	4.180E-10	4.180E-10	SLPF1(7,1)	a
Sf-1	U-238+D	1.590E-08	1.590E-08	SLPF1(8,1)	a
Sf-1	Groundshine, volume SF's, 1/yr per (pCi/g):				
Sf-1	Pb-210+D	1.100E-10	1.100E-10	SLPF1(1,2)	a
Sf-1	Ra-226+D	6.700E-06	6.700E-06	SLPF1(2,2)	a
Sf-1	Ra-228+D	3.300E-06	3.300E-06	SLPF1(3,2)	a
Sf-1	Th-228+D	9.900E-07	9.900E-07	SLPF1(4,2)	a
Sf-1	Th-230	4.400E-11	4.400E-11	SLPF1(5,2)	a
Sf-1	Th-232	2.000E-11	2.000E-11	SLPF1(6,2)	a
Sf-1	U-234	2.100E-11	2.100E-11	SLPF1(7,2)	a
Sf-1	U-238+D	5.700E-08	5.700E-08	SLPF1(8,2)	a
Sf-2	Inhalation, slope factors, 1/(pCi):				
Sf-2	Pb-210+D	1.700E-09	1.700E-09	SLPF2(1)	a
Sf-2	Ra-226+D	2.700E-09	2.700E-09	SLPF2(2)	a
Sf-2	Ra-228+D	9.900E-10	9.900E-10	SLPF2(3)	a
Sf-2	Th-228+D	9.700E-08	9.700E-08	SLPF2(4)	a
Sf-2	Th-230	1.700E-08	1.700E-08	SLPF2(5)	a
Sf-2	Th-232	1.900E-08	1.900E-08	SLPF2(6)	a
Sf-2	U-234	1.400E-08	1.400E-08	SLPF2(7)	a
Sf-2	U-238+D	1.200E-08	1.200E-08	SLPF2(8)	a
Sf-3	Ingestion, slope factors, 1/(pCi):				
Sf-3	Pb-210+D	6.800E-10	6.800E-10	SLPF3(1)	a
Sf-3	Ra-226+D	3.000E-10	3.000E-10	SLPF3(2)	a
Sf-3	Ra-228+D	2.500E-10	2.500E-10	SLPF3(3)	a
Sf-3	Th-228+D	2.300E-10	2.300E-10	SLPF3(4)	a
Sf-3	Th-230	3.800E-11	3.800E-11	SLPF3(5)	a
Sf-3	Th-232	3.300E-11	3.300E-11	SLPF3(6)	a
Sf-3	U-234	4.400E-11	4.400E-11	SLPF3(7)	a
Sf-3	U-238+D	6.200E-11	6.200E-11	SLPF3(8)	a
Sf-4	Air immersion, slope factors, 1/yr per (pCi/m**3):				
Sf-4	Pb-210+D	7.900E-12	7.900E-12	SLPF4(1)	a
Sf-4	Ra-226+D	7.900E-09	7.900E-09	SLPF4(2)	a
Sf-4	Ra-228+D	3.140E-09	3.140E-09	SLPF4(3)	a
Sf-4	Th-228+D	5.830E-09	5.830E-09	SLPF4(4)	a
Sf-4	Th-230	1.110E-12	1.110E-12	SLPF4(5)	a
Sf-4	Th-232	5.140E-13	5.140E-13	SLPF4(6)	a
Sf-4	U-234	4.180E-13	4.180E-13	SLPF4(7)	a
Sf-4	U-238+D	7.440E-11	7.440E-11	SLPF4(8)	a
SfRn	Radon inhalation slope factors, 1/(pCi):				
SfRn	Rn-222	1.800E-12	1.800E-12	SLPFRN(1,1)	b

HEAST 1994

1.0E-9 → HEAST1995

302646

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD-BASELINE (If different from user input)	Parameter Name
R013	Pb-210	not used	0.000E+00	...	NUCMT(1)
R013	Ra-226	not used	0.000E+00	...	NUCMT(2)
R013	Ra-228	not used	0.000E+00	...	NUCMT(3)
R013	Th-228	not used	0.000E+00	...	NUCMT(4)
R013	Th-230	not used	0.000E+00	...	NUCMT(5)
R013	Th-232	not used	0.000E+00	...	NUCMT(6)
R013	U-234	not used	0.000E+00	...	NUCMT(7)
R013	U-238	not used	0.000E+00	...	NUCMT(8)
R013	Concentration in milk (pCi/L):				
R013	Pb-210	not used	0.000E+00	...	NUCMK(1)
R013	Ra-226	not used	0.000E+00	...	NUCMK(2)
R013	Ra-228	not used	0.000E+00	...	NUCMK(3)
R013	Th-228	not used	0.000E+00	...	NUCMK(4)
R013	Th-230	not used	0.000E+00	...	NUCMK(5)
R013	Th-232	not used	0.000E+00	...	NUCMK(6)
R013	U-234	not used	0.000E+00	...	NUCMK(7)
R013	U-238	not used	0.000E+00	...	NUCMK(8)
R014	Concentration in fish (pCi/kg):				
R014	Pb-210	not used	0.000E+00	...	NUCFSH(1)
R014	Ra-226	not used	0.000E+00	...	NUCFSH(2)
R014	Ra-228	not used	0.000E+00	...	NUCFSH(3)
R014	Th-228	not used	0.000E+00	...	NUCFSH(4)
R014	Th-230	not used	0.000E+00	...	NUCFSH(5)
R014	Th-232	not used	0.000E+00	...	NUCFSH(6)
R014	U-234	not used	0.000E+00	...	NUCFSH(7)
R014	U-238	not used	0.000E+00	...	NUCFSH(8)
R014	Concentration in shell fish (pCi/kg):				
R014	Pb-210	not used	0.000E+00	...	NUCNFSH(1)
R014	Ra-226	not used	0.000E+00	...	NUCNFSH(2)
R014	Ra-228	not used	0.000E+00	...	NUCNFSH(3)
R014	Th-228	not used	0.000E+00	...	NUCNFSH(4)
R014	Th-230	not used	0.000E+00	...	NUCNFSH(5)
R014	Th-232	not used	0.000E+00	...	NUCNFSH(6)
R014	U-234	not used	0.000E+00	...	NUCNFSH(7)
R014	U-238	not used	0.000E+00	...	NUCNFSH(8)
R015	Concentration in drinking water (pCi/L):				
R015	Pb-210	4.480E+00	0.000E+00	...	NUCDW(1)
R015	Ra-226	4.020E+00	0.000E+00	...	NUCDW(2)
R015	Ra-228	2.420E+00	0.000E+00	...	NUCDW(3)
R015	Th-228	1.680E+00	0.000E+00	...	NUCDW(4)
R015	Th-230	1.140E+00	0.000E+00	...	NUCDW(5)
R015	Th-232	9.530E-01	0.000E+00	...	NUCDW(6)
R015	U-234	4.480E+00	0.000E+00	...	NUCDW(7)
R015	U-238	8.300E+00	0.000E+00	...	NUCDW(8)
R015	Concentration in pond water (pCi/L):				
R015	Pb-210	not used	0.000E+00	...	NUCPW(1)

302647

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD BASELINE (if different from user input)	Parameter Name
R015	Ra-226	not used	0.000E+00	...	NUCPW(2)
R015	Ra-228	not used	0.000E+00	...	NUCPW(3)
R015	Th-228	not used	0.000E+00	...	NUCPW(4)
R015	Th 230	not used	0.000E+00	...	NUCPW(5)
R015	Th-232	not used	0.000E+00	...	NUCPW(6)
R015	U-234	not used	0.000E+00	...	NUCPW(7)
R015	U 238	not used	0.000E+00	...	NUCPW(8)
R016	Indoor Radon-222 concentration (pCi/m**3)	not used	0.000E+00	...	RN222(1)
R016	Outdoor Radon-222 concentration (pCi/m**3)	not used	0.000E+00	...	RN222(2)
R016	Indoor Radon-220 concentration (pCi/m**3)	not used	0.000E+00	...	RN220(1)
R016	Outdoor Radon-220 concentration (pCi/m**3)	not used	0.000E+00	...	RN220(2)
R016	Equilibrium fraction of Radon-222 daughters	not used	5.000E-01	...	EQ222
R016	Radon-222 daughter concentrations (pCi/m**3):				
R016	Po-218, indoors	not used	0.000E+00	0.000E+00	PO218(1)
R016	Po-218, outdoors	not used	0.000E+00	0.000E+00	PO218(2)
R016	Pb-214, indoors	not used	0.000E+00	0.000E+00	PB214(1)
R016	Pb-214, outdoors	not used	0.000E+00	0.000E+00	PB214(2)
R016	Bi-214, indoors	not used	0.000E+00	0.000E+00	BI214(1)
R016	Bi-214, outdoors	not used	0.000E+00	0.000E+00	BI214(2)
R016	Equilibrium fraction of Radon-220 daughters	not used	-1.000E+00	...	EQ220
R016	Radon-220 daughter concentrations (pCi/m**3):				
R016	Po-216, indoors	not used	0.000E+00	0.000E+00	PO216(1)
R016	Po-216, outdoors	not used	0.000E+00	0.000E+00	PO216(2)
R016	Pb 212, indoors	not used	0.000E+00	0.000E+00	PB212(1)
R016	Pb 212, outdoors	not used	0.000E+00	0.000E+00	PB212(2)
R016	Bi-212, indoors	not used	0.000E+00	0.000E+00	BI212(1)
R016	Bi-212, outdoors	not used	0.000E+00	0.000E+00	BI212(2)
B011	Density of soil (pCi/g)	not used	1.500E+00	...	DENSCZ
B011	Thickness of contaminated soil (m)	not used	1.000E+00	...	THICK
B011	Organic carbon content of soil	not used	2.000E-01	...	FOC
B012	Fruits, vegetables, and grain consumption (kg/d)	not used	5.000E-01	...	DIET3
B012	Meat and poultry consumption (kg/d)	not used	2.500E-01	...	DIET4
B012	Milk consumption (L/d)	not used	1.700E-01	...	DIET5
B012	Fish consumption (kg/d)	not used	1.500E-02	...	DIET6(1)
B012	Other seafood consumption (kg/d)	not used	2.500E-03	...	DIET6(2)
B012	Drinking water intake (L/d)	2.000E+00	1.400E+00	...	DIET7
B012	Incidental water intake (swimming) (L/d)	not used	1.300E-01	...	DIET10
B012	Soil ingestion (child) (g/d)	not used	2.000E-01	...	DIET8(1)
B012	Soil ingestion (adult) (g/d)	not used	1.000E-01	...	DIET8(2)
B013	Inhalation rate indoors (m**3/d)	not used	2.000E+01	...	INHALR(1)
B013	Inhalation rate outdoors (m**3/d)	not used	2.000E+01	...	INHALR(2)
B013	Time fraction outdoors	not used	3.300E-01	...	FOTD
B013	Shielding factor for groundshine	not used	7.000E-01	...	SHF1
B013	Exposure duration for child (yr)	not used	6.000E+00	...	ED(1)
B013	Total exposure duration (yr)	not used	3:000E+01	...	ED(2)

302648

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISK2(i,p) (from Slope Factors) for
Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Total Exposure Duration = 3.00E+01 years

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Fish	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.408E-05	0.5052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.408E-05	0.5052
Ra-226	2.533E-05	0.2000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.533E-05	0.2000
Ra-228	1.270E-05	0.1003	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.270E-05	0.1003
Th-228	8.114E-06	0.0641	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.114E-06	0.0641
Th-230	9.097E-07	0.0072	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.097E-07	0.0072
Th-232	6.604E-07	0.0052	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.604E-07	0.0052
U-234	4.140E-06	0.0327	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.140E-06	0.0327
U-238	1.081E-05	0.0853	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.081E-05	0.0853
Total	1.567E-04	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.567E-04	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

Program execution time = 0.33 seconds

Pb-210 recalculated with HEAST 1995 slope factor 1E-9/pCi

302649

<<<<< Calculation Results with Base Data >>>>>

Amount of Intake Quantities INTK(i,p) for Individual Radionuclides (i) and Pathways (p) as pCi/yr

Radio Nuclide	Inhalation pCi/yr	Plant pCi/yr	Meat pCi/yr	Milk pCi/yr	Fish pCi/yr	Drinking Water pCi/yr	Soil pCi/yr	Radon pCi/yr	Incidental Water pCi/yr	Total* Ingestion pCi/yr
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.136E+03	0.000E+00	0.000E+00	0.000E+00	3.136E+03
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.814E+03	0.000E+00	0.000E+00	0.000E+00	2.814E+03
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.694E+03	0.000E+00	0.000E+00	0.000E+00	1.694E+03
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.176E+03	0.000E+00	0.000E+00	0.000E+00	1.176E+03
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.980E+02	0.000E+00	0.000E+00	0.000E+00	7.980E+02
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.671E+02	0.000E+00	0.000E+00	0.000E+00	6.671E+02
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.136E+03	0.000E+00	0.000E+00	0.000E+00	3.136E+03
U 238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.810E+03	0.000E+00	0.000E+00	0.000E+00	5.810E+03

Note: * Sum of all ingestion pathways.

302650

<<<<< Calculation Results with Base Data >>>>>

Total Dose Components DOSE(i,p) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Fish	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.684E+01	0.5872	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.684E+01	0.5872
Ra-226	3.743E+00	0.1305	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.743E+00	0.1305
Ra-228	2.439E+00	0.0851	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.439E+00	0.0851
Th-228	9.502E-01	0.0331	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.502E-01	0.0331
Th-230	4.373E-01	0.0152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.373E-01	0.0152
Th-232	1.821E+00	0.0635	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.821E+00	0.0635
U-234	8.875E-01	0.0309	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.875E-01	0.0309
U-238	1.563E+00	0.0545	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.563E+00	0.0545
Total	2.868E+01	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.868E+01	1.0000

Note: The dose for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

302651

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISK1(i,p) (from Risk/Dose Conversion Factor)
for Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Risk/Dose Conversion Factor = 7.600E-07 risk/mrem Total Exposure Duration = 3.00E+01 years

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Fish	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.840E-04	0.5872	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.840E-04	0.5872
Ra-226	8.511E-05	0.1305	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.533E-05	0.1305
Ra-228	5.562E-05	0.0851	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.562E-05	0.0851
Th-228	2.166E-05	0.0331	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.166E-05	0.0331
Th-230	9.971E-06	0.0152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.971E-06	0.0152
Th-232	4.152E-05	0.0635	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.152E-05	0.0635
U-234	2.023E-05	0.0309	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.023E-05	0.0309
U-238	3.563E-05	0.0545	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.563E-05	0.0545
Total	6.539E-04	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.539E-04	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

302652

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD-BASELINE (if different from user input)	Parameter Name
R013	Pb-210	not used	0.000E+00	...	NUCMT(1)
R013	Ra-226	not used	0.000E+00	...	NUCMT(2)
R013	Ra-228	not used	0.000E+00	...	NUCMT(3)
R013	Th-228	not used	0.000E+00	...	NUCMT(4)
R013	Th-230	not used	0.000E+00	...	NUCMT(5)
R013	Th-232	not used	0.000E+00	...	NUCMT(6)
R013	U-234	not used	0.000E+00	...	NUCMT(7)
R013	U-238	not used	0.000E+00	...	NUCMT(8)
R013	Concentration in milk (pCi/L):				
R013	Pb-210	not used	0.000E+00	...	NUCMK(1)
R013	Ra-226	not used	0.000E+00	...	NUCMK(2)
R013	Ra-228	not used	0.000E+00	...	NUCMK(3)
R013	Th-228	not used	0.000E+00	...	NUCMK(4)
R013	Th-230	not used	0.000E+00	...	NUCMK(5)
R013	Th-232	not used	0.000E+00	...	NUCMK(6)
R013	U-234	not used	0.000E+00	...	NUCMK(7)
R013	U-238	not used	0.000E+00	...	NUCMK(8)
R014	Concentration in fish (pCi/kg):				
R014	Pb-210	not used	0.000E+00	...	NUCFSH(1)
R014	Ra-226	not used	0.000E+00	...	NUCFSH(2)
R014	Ra-228	not used	0.000E+00	...	NUCFSH(3)
R014	Th-228	not used	0.000E+00	...	NUCFSH(4)
R014	Th-230	not used	0.000E+00	...	NUCFSH(5)
R014	Th-232	not used	0.000E+00	...	NUCFSH(6)
R014	U-234	not used	0.000E+00	...	NUCFSH(7)
R014	U-238	not used	0.000E+00	...	NUCFSH(8)
R014	Concentration in shell fish (pCi/kg):				
R014	Pb-210	not used	0.000E+00	...	NUCNFSH(1)
R014	Ra-226	not used	0.000E+00	...	NUCNFSH(2)
R014	Ra-228	not used	0.000E+00	...	NUCNFSH(3)
R014	Th-228	not used	0.000E+00	...	NUCNFSH(4)
R014	Th-230	not used	0.000E+00	...	NUCNFSH(5)
R014	Th-232	not used	0.000E+00	...	NUCNFSH(6)
R014	U-234	not used	0.000E+00	...	NUCNFSH(7)
R014	U-238	not used	0.000E+00	...	NUCNFSH(8)
R015	Concentration in drinking water (pCi/L):				
R015	Pb-210	2.870E-01	0.000E+00	...	NUCDW(1)
R015	Ra-226	3.500E-01	0.000E+00	...	NUCDW(2)
R015	Ra-228	9.400E-01	0.000E+00	...	NUCDW(3)
R015	Th-228	6.150E-01	0.000E+00	...	NUCDW(4)
R015	Th-230	2.200E-01	0.000E+00	...	NUCDW(5)
R015	Th-232	2.900E-01	0.000E+00	...	NUCDW(6)
R015	U-234	2.870E-01	0.000E+00	...	NUCDW(7)
R015	U-238	2.900E-01	0.000E+00	...	NUCDW(8)
R015	Concentration in pond water (pCi/L):				
R015	Pb-210	not used	0.000E+00	...	NUCPW(1)

302653

<<<<< Calculation Results with Base Data >>>>>

Amount of Intake Quantities INTK(i,p) for Individual Radionuclides (i)
and Pathways (p) as pCi/yr

Radio Nuclide	Inhalation pCi/yr	Plant pCi/yr	Meat pCi/yr	Milk pCi/yr	Fish pCi/yr	Drinking Water pCi/yr	Soil pCi/yr	Radon pCi/yr	Incidental Water pCi/yr	Total* Ingestion pCi/yr
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.009E+02	0.000E+00	0.000E+00	0.000E+00	2.009E+02
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.450E+02	0.000E+00	0.000E+00	0.000E+00	2.450E+02
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.580E+02	0.000E+00	0.000E+00	0.000E+00	6.580E+02
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.305E+02	0.000E+00	0.000E+00	0.000E+00	4.305E+02
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.540E+02	0.000E+00	0.000E+00	0.000E+00	1.540E+02
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.030E+02	0.000E+00	0.000E+00	0.000E+00	2.030E+02
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.009E+02	0.000E+00	0.000E+00	0.000E+00	2.009E+02
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.030E+02	0.000E+00	0.000E+00	0.000E+00	2.030E+02

Note: * Sum of all ingestion pathways.

302654

<<<<< Calculation Results with Base Data >>>>>

Total Dose Components DOSE(i,p) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Fish	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.079E+00	0.3127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.079E+00	0.3127
Ra-226	3.259E-01	0.0944	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.259E-01	0.0944
Ra-228	9.475E-01	0.2746	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.475E-01	0.2746
Th-228	3.478E-01	0.1008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.478E-01	0.1008
Th-230	8.439E-02	0.0245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.439E-02	0.0245
Th-232	5.542E-01	0.1606	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.542E-01	0.1606
U-234	5.685E-02	0.0165	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.685E-02	0.0165
U-238	5.461E-02	0.0158	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.461E-02	0.0158
Total	3.450E+00	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.450E+00	1.0000

Note: The dose for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

302655

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISK1(i,p) (from Risk/Dose Conversion Factor)
for Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Risk/Dose Conversion Factor = 7.600E-07 risk/mrem Total Exposure Duration = 1.00E+01 years

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Fish risk	Fish fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water risk	Drinking Water fract.	Soil risk	Soil fract.	Radon risk	Radon fract.	Incidental Water risk	Incidental Water fract.	Air Immersion risk	Air Immersion fract.	All Pathways risk	All Pathways fract.
Pb-210	2.460E-05	0.3127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.460E-05	0.3127
Ra-226	7.429E-06	0.0944	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.429E-06	0.0944
Ra-228	2.160E-05	0.2746	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.160E-05	0.2746
Th-228	7.931E-06	0.1008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.931E-06	0.1008
Th-230	1.924E-06	0.0245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.924E-06	0.0245
Th-232	1.264E-05	0.1606	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.264E-05	0.1606
U-234	1.296E-06	0.0165	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.296E-06	0.0165
U-238	1.245E-06	0.0158	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.245E-06	0.0158
Total	7.866E-05	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.866E-05	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

302656

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISK2(i,p) (from Slope Factors) for
Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Total Exposure Duration = 3.00E+01 years

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Fish risk	Fish fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water risk	Drinking Water fract.	Soil risk	Soil fract.	Radon risk	Radon fract.	Incidental Water risk	Incidental Water fract.	Air Immersion risk	Air Immersion fract.	All Pathways risk	All Pathways fract.
Pb-210	6.027E-06	0.2691	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.027E-06	0.2691
Ra-226	2.205E-06	0.1448	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.205E-06	0.1448
Ra-228	4.935E-06	0.3241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.935E-06	0.3241
Th-228	2.970E-06	0.1951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.970E-06	0.1951
Th-230	1.756E-07	0.0115	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.756E-07	0.0115
Th-232	2.010E-07	0.0132	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.010E-07	0.0132
U-234	2.652E-07	0.0174	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.652E-07	0.0174
U-238	3.776E-07	0.0248	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.776E-07	0.0248
Total	1.716E-05	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.716E-05	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

Program execution time = 0.33 seconds

Pb-210 risk recalculated with 1995 HEAST SF (1E-9/pCi)

302657

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	3.790E+00
Thickness:	2.00 meters	Ra-226	3.890E+00
Cover Depth:	0.00 meters	Ra-228	2.590E+01
		Th-228	2.590E+01
		Th-230	4.080E+00
		Th-232	7.400E+00
		U-234	3.790E+00
		U-238	3.390E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	4.876E+02	4.778E+02	4.539E+02	3.796E+02	3.186E+02	3.120E+02	3.108E+02	3.054E+02
M(t):	3.251E+01	3.185E+01	3.026E+01	2.531E+01	2.124E+01	2.080E+01	2.072E+01	2.036E+01

Maximum TDOSE(t): 4.876E+02 mrem/yr at t = 0.000E+00 years

302658

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.273E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.651E+00	0.0054	0.000E+00	0.0000	0.000E+00	0.0000	1.310E+00	0.0027
Ra-226	2.299E+01	0.0471	0.000E+00	0.0000	2.112E+02	0.4330	1.992E+00	0.0041	0.000E+00	0.0000	0.000E+00	0.0000	2.460E-01	0.0005
Ra-228	8.172E+01	0.1676	0.000E+00	0.0000	0.000E+00	0.0000	1.430E+01	0.0293	0.000E+00	0.0000	0.000E+00	0.0000	1.773E+00	0.0036
Th-228	1.395E+02	0.2862	0.000E+00	0.0000	7.046E+00	0.0144	2.002E-01	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	9.950E 01	0.0020
Th-230	2.658E 03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.167E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.063E-01	0.0002
Th-232	2.088E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.958E-01	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	9.605E-01	0.0020
U-234	8.275E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.588E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	5.099E-02	0.0001
U-238	2.454E-01	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	2.200E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.336E-02	0.0001
Total	2.445E+02	0.5015	0.000E+00	0.0000	2.182E+02	0.4475	1.941E+01	0.0398	0.000E+00	0.0000	0.000E+00	0.0000	5.485E+00	0.0112

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.974E+00	0.0081
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.364E+02	0.4848
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.779E+01	0.2005
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.478E+02	0.3031
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.306E-01	0.0003
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.158E+00	0.0024
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.770E-02	0.0002
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.108E-01	0.0006
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.876E+02	1.0000

*Sum of all water independent and dependent pathways.

302659

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	3.646E+02	0.000E+00	0.000E+00	1.802E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.448E+02
Ra-226	0.000E+00	1.498E+03	0.000E+00	0.000E+00	1.849E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.683E+03
Ra-228	0.000E+00	9.930E+03	0.000E+00	0.000E+00	1.231E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.116E+04
Th-228	0.000E+00	2.477E+02	0.000E+00	0.000E+00	1.231E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.479E+03
Th-230	0.000E+00	3.954E+01	0.000E+00	0.000E+00	1.940E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.335E+02
Th-232	0.000E+00	7.171E+01	0.000E+00	0.000E+00	3.518E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.235E+02
U-234	0.000E+00	9.144E+01	0.000E+00	0.000E+00	1.802E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.716E+02
U-238	0.000E+00	8.179E+01	0.000E+00	0.000E+00	1.612E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.430E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	8.781E+05	8.444E+05	6.389E+05	5.165E+05	8.059E+05	8.005E+05	7.911E+03	4.479E+03
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	8.781E+05	8.444E+05	6.389E+05	5.165E+05	8.059E+05	8.005E+05	7.911E+03	4.479E+03

Water-ind. == Water-independent Water-dep. == Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.872E-09	0.0000	0.000E+00	0.0000	2.188E-06	0.0025	0.000E+00	0.0000	0.000E+00	0.0000	1.081E-06	0.0012
Ra-226	8.252E-05	0.0929	0.000E+00	0.0000	2.696E-06	0.0030	0.000E+00	0.0000	0.000E+00	0.0000	3.329E-07	0.0004
Ra-228	2.706E-04	0.3047	0.000E+00	0.0000	1.490E-05	0.0168	0.000E+00	0.0000	0.000E+00	0.0000	1.847E-06	0.0021
Th-228	5.089E-04	0.5730	0.000E+00	0.0000	3.419E-07	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	1.699E-06	0.0019
Th-230	5.799E-10	0.0000	0.000E+00	0.0000	9.014E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.423E-08	0.0000
Th-232	4.810E-10	0.0000	0.000E+00	0.0000	1.420E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.966E-08	0.0001
U-234	2.594E-10	0.0000	0.000E+00	0.0000	2.414E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.757E-08	0.0001
U-238	7.094E-07	0.0008	0.000E+00	0.0000	3.043E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.996E-08	0.0001
Total	8.627E-04	0.9714	0.000E+00	0.0000	2.020E-05	0.0227	0.000E+00	0.0000	0.000E+00	0.0000	5.182E-06	0.0058

302660

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.271E-06	0.0037
Pa-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.555E-05	0.0963
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.873E-04	0.3235
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.110E-04	0.5753
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.382E-08	0.0001
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.434E-08	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.197E-08	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.998E-07	0.0009
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.881E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	9.484E-06	1.875E-05	2.377E-05	4.648E-05	9.188E-07	1.441E-08	1.851E-06	9.944E-07
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	9.484E-06	1.875E-05	2.377E-05	4.648E-05	9.188E-07	1.441E-08	1.851E-06	9.944E-07

Water ind. = Water-independent Water-dep. = Water-dependent

302661

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.872E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.188E-06	0.0022	0.000E+00	0.0000	0.000E+00	0.0000	1.081E-06	0.0011
Ra-226	8.252E-05	0.0833	0.000E+00	0.0000	9.848E-05	0.0994	2.696E-06	0.0027	0.000E+00	0.0000	0.000E+00	0.0000	3.329E-07	0.0003
Ra-228	2.706E-04	0.2732	0.000E+00	0.0000	0.000E+00	0.0000	1.490E-05	0.0150	0.000E+00	0.0000	0.000E+00	0.0000	1.847E-06	0.0019
Th-228	5.089E-04	0.5139	0.000E+00	0.0000	3.779E-06	0.0038	3.419E-07	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	1.699E-06	0.0017
Th-230	5.799E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.014E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.423E-08	0.0000
Th-232	4.810E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.420E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.966E-08	0.0001
U-234	2.594E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.414E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.757E-08	0.0000
U-238	7.094E-07	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	3.043E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.996E-08	0.0001
Total	8.627E-04	0.8711	0.000E+00	0.0000	1.023E-04	0.1033	2.020E-05	0.0204	0.000E+00	0.0000	0.000E+00	0.0000	5.182E-06	0.0052

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.271E-06	0.0033
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.840E-04	0.1858
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.873E-04	0.2901
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.147E-04	0.5198
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.382E-08	0.0001
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.434E-08	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.197E-08	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.998E-07	0.0008
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.904E-04	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

302662

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	1.110E+00
Thickness:	2.00 meters	Ra-226	1.110E+00
Cover Depth:	0.00 meters	Ra-228	1.270E+00
		Th-228	1.150E+00
		Th-230	1.410E+00
		Th-232	1.030E+00
		U-234	1.110E+00
		U-238	8.110E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	8.028E+01	8.037E+01	8.046E+01	7.973E+01	7.904E+01	7.929E+01	8.029E+01	8.248E+01
M(t):	5.352E+00	5.358E+00	5.364E+00	5.315E+00	5.269E+00	5.286E+00	5.352E+00	5.499E+00

Maximum TDOSE(t): 8.248E+01 mrem/yr at t = 1.000E+03 years

302663

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	3.729E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.764E-01	0.0097	0.000E+00	0.0000	0.000E+00	0.0000	3.837E-01	0.0048
Ra-226	6.560E+00	0.0817	0.000E+00	0.0000	6.025E+01	0.7506	5.685E-01	0.0071	0.000E+00	0.0000	0.000E+00	0.0000	7.019E-02	0.0009
Ra-228	4.007E+00	0.0499	0.000E+00	0.0000	0.000E+00	0.0000	7.012E-01	0.0087	0.000E+00	0.0000	0.000E+00	0.0000	8.695E-02	0.0011
Th-228	6.196E+00	0.0772	0.000E+00	0.0000	3.128E-01	0.0039	8.888E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	4.418E-02	0.0006
Th-230	9.185E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.487E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	3.674E-02	0.0005
Th-232	2.907E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.725E-02	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	1.337E-01	0.0017
U-234	2.424E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.579E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.493E-02	0.0002
U-238	5.871E-02	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	5.264E-03	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.037E-02	0.0001
Total	1.683E+01	0.2096	0.000E+00	0.0000	6.057E+01	0.7545	2.102E+00	0.0262	0.000E+00	0.0000	0.000E+00	0.0000	7.807E-01	0.0097

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.164E+00	0.0145
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.745E+01	0.8403
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.795E+00	0.0597
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.562E+00	0.0817
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.514E-02	0.0006
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.612E-01	0.0020
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.276E-02	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.435E-02	0.0009
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.028E+01	1.0000

*Sum of all water independent and dependent pathways.

302664

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	1.068E+02	0.000E+00	0.000E+00	5.277E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.596E+02
Pa-226	0.000E+00	4.274E+02	0.000E+00	0.000E+00	5.277E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.802E+02
Ra-228	0.000E+00	4.869E+02	0.000E+00	0.000E+00	6.038E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.473E+02
Th-228	0.000E+00	1.100E+01	0.000E+00	0.000E+00	5.468E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.568E+01
Th-230	0.000E+00	1.366E+01	0.000E+00	0.000E+00	6.704E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.070E+01
Th-232	0.000E+00	9.981E+00	0.000E+00	0.000E+00	4.897E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.895E+01
U-234	0.000E+00	2.678E+01	0.000E+00	0.000E+00	5.277E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.956E+01
U-238	0.000E+00	1.957E+01	0.000E+00	0.000E+00	3.856E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.813E+01

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	2.506E+05	2.410E+05	1.823E+05	1.474E+05	3.578E+04	3.555E+04	3.513E+02	1.989E+02
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	2.506E+05	2.410E+05	1.823E+05	1.474E+05	3.578E+04	3.555E+04	3.513E+02	1.989E+02

Water ind. = Water-independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.484E-10	0.0000	0.000E+00	0.0000	6.407E-07	0.0103	0.000E+00	0.0000	0.000E+00	0.0000	3.166E-07	0.0051
Ra-226	2.355E-05	0.3774	0.000E+00	0.0000	7.693E-07	0.0123	0.000E+00	0.0000	0.000E+00	0.0000	9.499E-08	0.0015
Ra-228	1.327E-05	0.2127	0.000E+00	0.0000	7.304E-07	0.0117	0.000E+00	0.0000	0.000E+00	0.0000	9.057E-08	0.0015
Th-228	2.260E-05	0.3622	0.000E+00	0.0000	1.518E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	7.545E-08	0.0012
Th-230	2.004E-10	0.0000	0.000E+00	0.0000	3.115E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.528E-08	0.0002
Th-232	6.695E-11	0.0000	0.000E+00	0.0000	1.976E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.696E-09	0.0002
U-234	7.596E-11	0.0000	0.000E+00	0.0000	7.070E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.393E-08	0.0002
U-238	1.697E-07	0.0027	0.000E+00	0.0000	7.279E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.434E-08	0.0002
Total	5.958E-05	0.9550	0.000E+00	0.0000	2.175E-06	0.0349	0.000E+00	0.0000	0.000E+00	0.0000	6.309E-07	0.0101

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.579E-07	0.0154
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.441E-05	0.3913
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.409E-05	0.2258
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.269E-05	0.3637
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.860E-08	0.0003
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.174E-08	0.0002
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.108E-08	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.913E-07	0.0031
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.239E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	2.706E-06	5.349E-06	6.782E-06	1.326E-05	4.079E-08	6.398E-10	8.220E-08	4.415E-08
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	2.706E-06	5.349E-06	6.782E-06	1.326E-05	4.079E-08	6.398E-10	8.220E-08	4.415E-08

Water-ind. = Water-independent Water-dep. = Water-dependent

302666

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	5.484E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.407E-07	0.0071	0.000E+00	0.0000	0.000E+00	0.0000	3.166E-07	0.0035
Ra-226	2.355E-05	0.2597	0.000E+00	0.0000	2.810E-05	0.3100	7.693E-07	0.0085	0.000E+00	0.0000	0.000E+00	0.0000	9.499E-08	0.0010
Ra-228	1.327E-05	0.1463	0.000E+00	0.0000	0.000E+00	0.0000	7.304E-07	0.0081	0.000E+00	0.0000	0.000E+00	0.0000	9.057E-08	0.0010
Th-228	2.260E-05	0.2493	0.000E+00	0.0000	1.678E-07	0.0019	1.518E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	7.545E-08	0.0008
Th-230	2.004E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.115E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.528E-08	0.0002
Th-232	6.695E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.976E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.696E-09	0.0001
U-234	7.596E-11	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.070E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.393E-08	0.0002
U-238	1.697E-07	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	7.279E-09	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.434E-08	0.0002
Total	5.958E-05	0.6572	0.000E+00	0.0000	2.827E-05	0.3118	2.175E-06	0.0240	0.000E+00	0.0000	0.000E+00	0.0000	6.309E-07	0.0070

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.579E-07	0.0106
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.251E-05	0.5792
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.409E-05	0.1554
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.286E-05	0.2521
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.860E-08	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.174E-08	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.108E-08	0.0002
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.913E-07	0.0021
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.066E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

302667

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	2.470E+00
Thickness:	2.00 meters	Ra-226	2.470E+00
Cover Depth:	0.00 meters	Ra-228	6.890E+00
		Th-228	6.890E+00
		Th-230	2.950E+00
		Th-232	3.850E+00
		U-234	2.470E+00
		U-238	2.000E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.189E+02	2.174E+02	2.134E+02	2.012E+02	1.917E+02	1.910E+02	1.921E+02	1.942E+02
M(t):	1.460E+01	1.449E+01	1.422E+01	1.341E+01	1.278E+01	1.273E+01	1.281E+01	1.295E+01

Maximum TDOSE(t): 2.189E+02 mrem/yr at t = 0.000E+00 years

302668

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	8.298E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.728E+00	0.0079	0.000E+00	0.0000	0.000E+00	0.0000	8.537E-01	0.0039
Ra-226	1.460E+01	0.0667	0.000E+00	0.0000	1.341E+02	0.6124	1.265E+00	0.0058	0.000E+00	0.0000	0.000E+00	0.0000	1.562E-01	0.0007
Ra-228	2.174E+01	0.0993	0.000E+00	0.0000	0.000E+00	0.0000	3.804E+00	0.0174	0.000E+00	0.0000	0.000E+00	0.0000	4.717E-01	0.0022
Th-228	3.712E+01	0.1695	0.000E+00	0.0000	1.874E+00	0.0086	5.325E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	2.647E-01	0.0012
Th-230	1.922E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.566E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	7.686E-02	0.0004
Th-232	1.086E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.018E-01	0.0005	0.000E+00	0.0000	0.000E+00	0.0000	4.997E-01	0.0023
U-234	5.393E-04	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.687E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	3.323E-02	0.0002
U-238	1.448E-01	0.0007	0.000E+00	0.0000	0.000E+00	0.0000	1.298E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	2.558E-02	0.0001
Total	7.361E+01	0.3362	0.000E+00	0.0000	1.360E+02	0.6209	6.997E+00	0.0320	0.000E+00	0.0000	0.000E+00	0.0000	2.382E+00	0.0109

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.590E+00	0.0118
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.501E+02	0.6855
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.601E+01	0.1188
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.931E+01	0.1796
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.445E-02	0.0004
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.026E-01	0.0028
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.064E-02	0.0002
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.834E-01	0.0008
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.189E+02	1.0000

*Sum of all water independent and dependent pathways.

302669

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	2.376E+02	0.000E+00	0.000E+00	1.174E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.551E+02
Ra-226	0.000E+00	9.511E+02	0.000E+00	0.000E+00	1.174E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.069E+03
Ra-228	0.000E+00	2.642E+03	0.000E+00	0.000E+00	3.276E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.969E+03
Th-228	0.000E+00	6.591E+01	0.000E+00	0.000E+00	3.276E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.935E+02
Th-230	0.000E+00	2.859E+01	0.000E+00	0.000E+00	1.403E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.688E+02
Th-232	0.000E+00	3.731E+01	0.000E+00	0.000E+00	1.830E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.204E+02
U-234	0.000E+00	5.960E+01	0.000E+00	0.000E+00	1.174E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.770E+02
U-238	0.000E+00	4.826E+01	0.000E+00	0.000E+00	9.509E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.433E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	5.576E+05	5.362E+05	4.057E+05	3.279E+05	2.144E+05	2.130E+05	2.105E+03	1.192E+03
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	5.576E+05	5.362E+05	4.057E+05	3.279E+05	2.144E+05	2.130E+05	2.105E+03	1.192E+03

Water Ind. = Water-independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.220E-09	0.0000	0.000E+00	0.0000	1.426E-06	0.0053	0.000E+00	0.0000	0.000E+00	0.0000	7.046E-07	0.0026
Ra-226	5.240E-05	0.1945	0.000E+00	0.0000	1.712E-06	0.0064	0.000E+00	0.0000	0.000E+00	0.0000	2.114E-07	0.0008
Ra-228	7.198E-05	0.2672	0.000E+00	0.0000	3.963E-06	0.0147	0.000E+00	0.0000	0.000E+00	0.0000	4.914E-07	0.0018
Th-228	1.354E-04	0.5025	0.000E+00	0.0000	9.095E-08	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	4.521E-07	0.0017
Th-230	4.193E-10	0.0000	0.000E+00	0.0000	6.518E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.198E-08	0.0001
Th-232	2.502E-10	0.0000	0.000E+00	0.0000	7.387E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.624E-08	0.0001
U-234	1.690E-10	0.0000	0.000E+00	0.0000	1.573E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	3.100E-08	0.0001
U-238	4.185E-07	0.0016	0.000E+00	0.0000	1.795E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	3.537E-08	0.0001
Total	2.602E-04	0.9657	0.000E+00	0.0000	7.239E-06	0.0269	0.000E+00	0.0000	0.000E+00	0.0000	1.994E-06	0.0074

302670

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.132E-06	0.0079
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.432E-05	0.2016
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.643E-05	0.2837
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.359E-04	0.5045
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.891E-08	0.0001
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.388E-08	0.0002
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.690E-08	0.0002
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.719E-07	0.0018
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.694E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNPS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	6.022E-06	1.190E-05	1.509E-05	2.951E-05	2.444E-07	3.833E-09	4.925E-07	2.645E-07
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	6.022E-06	1.190E-05	1.509E-05	2.951E-05	2.444E-07	3.833E-09	4.925E-07	2.645E-07

Water ind. = Water-independent Water-dep. = Water-dependent

302671

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	1.220E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.426E-06	0.0043	0.000E+00	0.0000	0.000E+00	0.0000	7.046E-07	0.0021
Ra-226	5.240E-05	0.1574	0.000E+00	0.0000	6.253E-05	0.1878	1.712E-06	0.0051	0.000E+00	0.0000	0.000E+00	0.0000	2.114E-07	0.0006
Ra-228	7.198E-05	0.2162	0.000E+00	0.0000	0.000E+00	0.0000	3.963E-06	0.0119	0.000E+00	0.0000	0.000E+00	0.0000	4.914E-07	0.0015
Th-228	1.354E-04	0.4066	0.000E+00	0.0000	1.005E-06	0.0030	9.095E-08	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	4.521E-07	0.0014
Th-230	4.193E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.518E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.198E-08	0.0001
Th-232	2.502E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.387E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.624E-08	0.0001
U-234	1.690E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.573E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.100E-08	0.0001
U-238	4.185E-07	0.0013	0.000E+00	0.0000	0.000E+00	0.0000	1.795E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	3.537E-08	0.0001
Total	2.602E-04	0.7814	0.000E+00	0.0000	6.354E-05	0.1908	7.239E-06	0.0217	0.000E+00	0.0000	0.000E+00	0.0000	1.994E-06	0.0060

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.132E-06	0.0064
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.168E-04	0.3510
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.643E-05	0.2296
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.369E-04	0.4113
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.891E-08	0.0001
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.388E-08	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.690E-08	0.0001
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.719E-07	0.0014
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.329E-04	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

302672

Summary : Future-Child Resident; Parcels B & C (87.5% indoor)
File : CHRFT.B&C

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	2.000E+01
Thickness:	2.00 meters	Ra-226	2.000E+01
Cover Depth:	0.00 meters	Ra-228	4.330E+01
		Th-228	4.330E+01
		Th-230	3.770E+01
		Th-232	1.920E+01
		U-234	3.850E+01
		U-238	3.930E+01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.655E+03	1.643E+03	1.612E+03	1.518E+03	1.447E+03	1.467E+03	1.544E+03	1.741E+03
M(t):	1.104E+02	1.095E+02	1.075E+02	1.012E+02	9.645E+01	9.779E+01	1.029E+02	1.161E+02

Maximum TDOSE(t): 1.741E+03 mrem/yr at t = 1.000E+03 years

302673

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	6.719E 02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.399E+01	0.0084	0.000E+00	0.0000	0.000E+00	0.0000	6.913E+00	0.0042
Ra-226	1.182E+02	0.0714	0.000E+00	0.0000	1.086E+03	0.6558	1.024E+01	0.0062	0.000E+00	0.0000	0.000E+00	0.0000	1.265E+00	0.0008
Ra-228	1.366E+02	0.0825	0.000E+00	0.0000	0.000E+00	0.0000	2.391E+01	0.0144	0.000E+00	0.0000	0.000E+00	0.0000	2.964E+00	0.0018
Th-228	2.333E+02	0.1409	0.000E+00	0.0000	1.178E+01	0.0071	3.347E-01	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.663E+00	0.0010
Th-230	2.456E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.002E-01	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	9.822E-01	0.0006
Th-232	5.418E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.079E-01	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	2.492E+00	0.0015
U-234	8.406E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.629E-01	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	5.180E-01	0.0003
U-238	2.845E+00	0.0017	0.000E+00	0.0000	0.000E+00	0.0000	2.551E-01	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	5.026E-01	0.0003
Total	4.911E+02	0.2966	0.000E+00	0.0000	1.097E+03	0.6629	4.970E+01	0.0300	0.000E+00	0.0000	0.000E+00	0.0000	1.730E+01	0.0105

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.097E+01	0.0127
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.215E+03	0.7341
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.635E+02	0.0988
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.471E+02	0.1492
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.207E+00	0.0007
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.005E+00	0.0018
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.893E-01	0.0005
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.603E+00	0.0022
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.655E+03	1.0000

*Sum of all water independent and dependent pathways.

302674

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	1.924E+03	0.000E+00	0.000E+00	9.509E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.875E+03
Ra-226	0.000E+00	7.701E+03	0.000E+00	0.000E+00	9.509E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.652E+03
Ra-228	0.000E+00	1.660E+04	0.000E+00	0.000E+00	2.059E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.866E+04
Th-228	0.000E+00	4.142E+02	0.000E+00	0.000E+00	2.059E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.473E+03
Th-230	0.000E+00	3.653E+02	0.000E+00	0.000E+00	1.792E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.158E+03
Th-232	0.000E+00	1.860E+02	0.000E+00	0.000E+00	9.128E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.099E+03
U-234	0.000E+00	9.289E+02	0.000E+00	0.000E+00	1.830E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.759E+03
U-238	0.000E+00	9.482E+02	0.000E+00	0.000E+00	1.868E+03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.817E+03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	4.515E+06	4.342E+06	3.285E+06	2.655E+06	1.347E+06	1.338E+06	1.323E+04	7.489E+03
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	4.515E+06	4.342E+06	3.285E+06	2.655E+06	1.347E+06	1.338E+06	1.323E+04	7.489E+03

Water ind. = Water-independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio- Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.881E-09	0.0000	0.000E+00	0.0000	1.154E-05	0.0064	0.000E+00	0.0000	0.000E+00	0.0000	5.705E-06	0.0032
Ra-226	4.243E-04	0.2354	0.000E+00	0.0000	1.386E-05	0.0077	0.000E+00	0.0000	0.000E+00	0.0000	1.712E-06	0.0009
Ra-228	4.523E-04	0.2510	0.000E+00	0.0000	2.490E-05	0.0138	0.000E+00	0.0000	0.000E+00	0.0000	3.088E-06	0.0017
Th-228	8.508E-04	0.4721	0.000E+00	0.0000	5.716E-07	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	2.841E-06	0.0016
Th-230	5.358E-09	0.0000	0.000E+00	0.0000	8.329E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.087E-07	0.0002
Th-232	1.248E-09	0.0000	0.000E+00	0.0000	3.684E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.807E-07	0.0001
U-234	2.635E-09	0.0000	0.000E+00	0.0000	2.452E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	4.832E-07	0.0003
U-238	8.224E-06	0.0046	0.000E+00	0.0000	3.527E-07	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	6.951E-07	0.0004
Total	1.736E-03	0.9630	0.000E+00	0.0000	5.160E-05	0.0286	0.000E+00	0.0000	0.000E+00	0.0000	1.511E-05	0.0084

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.726E-05	0.0096
Pa-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.398E-04	0.2440
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.803E-04	0.2665
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.542E-04	0.4739
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.973E-07	0.0003
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.188E-07	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.311E-07	0.0004
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.272E-06	0.0051
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.802E-03	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	4.876E-05	9.638E-05	1.222E-04	2.390E-04	1.536E-06	2.409E-08	3.095E-06	1.662E-06
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	4.876E-05	9.638E-05	1.222E-04	2.390E-04	1.536E-06	2.409E-08	3.095E-06	1.662E-06

Water ind. == Water-independent Water-dep. == Water-dependent

302676

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	9.881E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.154E-05	0.0050	0.000E+00	0.0000	0.000E+00	0.0000	5.705E-06	0.0025
Ra-226	4.243E-04	0.1833	0.000E+00	0.0000	5.063E-04	0.2187	1.386E-05	0.0060	0.000E+00	0.0000	0.000E+00	0.0000	1.712E-06	0.0007
Ra-228	4.523E-04	0.1954	0.000E+00	0.0000	0.000E+00	0.0000	2.490E-05	0.0108	0.000E+00	0.0000	0.000E+00	0.0000	3.088E-06	0.0013
Th-228	8.508E-04	0.3675	0.000E+00	0.0000	6.318E-06	0.0027	5.716E-07	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	2.841E-06	0.0012
Th-230	5.358E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.329E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.087E-07	0.0002
Th-232	1.248E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.684E-08	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.807E-07	0.0001
U-234	2.635E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.452E-07	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	4.832E-07	0.0002
U-238	8.224E-06	0.0036	0.000E+00	0.0000	0.000E+00	0.0000	3.527E-07	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	6.951E-07	0.0003
Total	1.736E-03	0.7497	0.000E+00	0.0000	5.126E-04	0.2214	5.160E-05	0.0223	0.000E+00	0.0000	0.000E+00	0.0000	1.511E-05	0.0065

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.726E-05	0.0075
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.462E-04	0.4087
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.803E-04	0.2075
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.606E-04	0.3717
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.973E-07	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.188E-07	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.311E-07	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.272E-06	0.0040
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.315E-03	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

302677

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	5.210E+00
Thickness:	2.00 meters	Ra-226	3.830E+00
Cover Depth:	0.00 meters	Ra-228	4.910E+00
		Th-228	4.500E+00
		Th-230	4.410E+00
		Th-232	4.090E+00
		U-234	5.210E+00
		U-238	7.400E+00

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.840E+02	2.842E+02	2.849E+02	2.820E+02	2.787E+02	2.779E+02	2.792E+02	2.812E+02
M(t):	1.893E+01	1.895E+01	1.899E+01	1.880E+01	1.858E+01	1.853E+01	1.861E+01	1.875E+01

Maximum TDOSE(t): 2.849E+02 mrem/yr at t = 2.783 ± 0.003 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 2.783 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.605E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	3.342E+00	0.0117	0.000E+00	0.0000	0.000E+00	0.0000	1.651E+00	0.0058
Ra-226	2.261E+01	0.0793	0.000E+00	0.0000	2.076E+02	0.7287	2.193E+00	0.0077	0.000E+00	0.0000	0.000E+00	0.0000	3.515E-01	0.0012
Ra-228	2.496E+01	0.0876	0.000E+00	0.0000	7.009E-01	0.0025	1.972E+00	0.0069	0.000E+00	0.0000	0.000E+00	0.0000	3.393E-01	0.0012
Th-228	8.842E+00	0.0310	0.000E+00	0.0000	4.464E-01	0.0016	1.268E-02	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.305E-02	0.0002
Th-230	3.428E-02	0.0001	0.000E+00	0.0000	2.885E-01	0.0010	2.631E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.153E-01	0.0004
Th-232	6.113E+00	0.0215	0.000E+00	0.0000	1.229E-01	0.0004	7.602E-01	0.0027	0.000E+00	0.0000	0.000E+00	0.0000	6.279E-01	0.0022
U-234	1.094E-03	0.0000	0.000E+00	0.0000	4.215E-06	0.0000	3.420E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	6.740E-02	0.0002
U-238	5.150E-01	0.0018	0.000E+00	0.0000	1.565E-11	0.0000	4.617E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	9.099E-02	0.0003
Total	6.309E+01	0.2214	0.000E+00	0.0000	2.092E+02	0.7342	8.386E+00	0.0294	0.000E+00	0.0000	0.000E+00	0.0000	3.307E+00	0.0116

302678

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	1.750E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	3.644E+00	0.0128	0.000E+00	0.0000	0.000E+00	0.0000	1.801E+00	0.0063
Ra-226	2.264E+01	0.0797	0.000E+00	0.0000	2.079E+02	0.7321	1.961E+00	0.0069	0.000E+00	0.0000	0.000E+00	0.0000	2.422E-01	0.0009
Ra-228	1.549E+01	0.0546	0.000E+00	0.0000	0.000E+00	0.0000	2.711E+00	0.0095	0.000E+00	0.0000	0.000E+00	0.0000	3.362E-01	0.0012
Th-228	2.424E+01	0.0854	0.000E+00	0.0000	1.224E+00	0.0043	3.478E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.729E 01	0.0006
Th-230	2.873E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.342E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	1.149E-01	0.0004
Th-232	1.154E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.082E-01	0.0004	0.000E+00	0.0000	0.000E+00	0.0000	5.309E-01	0.0019
U-234	1.138E-03	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.557E-02	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	7.010E-02	0.0002
U-238	5.357E-01	0.0019	0.000E+00	0.0000	0.000E+00	0.0000	4.803E-02	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	9.464E-02	0.0003
Total	6.293E+01	0.2216	0.000E+00	0.0000	2.091E+02	0.7364	8.566E+00	0.0302	0.000E+00	0.0000	0.000E+00	0.0000	3.363E+00	0.0118

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.462E+00	0.0193
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.327E+02	0.8196
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.854E+01	0.0653
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.568E+01	0.0904
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.412E 01	0.0005
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.403E 01	0.0023
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.068E-01	0.0004
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.784E-01	0.0024
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.840E+02	1.0000

*Sum of all water independent and dependent pathways.

302679

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	0.000E+00	5.012E+02	0.000E+00	0.000E+00	2.477E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.489E+02
Ra-226	0.000E+00	1.475E+03	0.000E+00	0.000E+00	1.821E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.657E+03
Ra-228	0.000E+00	1.883E+03	0.000E+00	0.000E+00	2.334E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.116E+03
Th-228	0.000E+00	4.305E+01	0.000E+00	0.000E+00	2.139E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.570E+02
Th-230	0.000E+00	4.273E+01	0.000E+00	0.000E+00	2.097E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.524E+02
Th-232	0.000E+00	3.963E+01	0.000E+00	0.000E+00	1.945E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.341E+02
U-234	0.000E+00	1.257E+02	0.000E+00	0.000E+00	2.477E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.734E+02
U-238	0.000E+00	1.785E+02	0.000E+00	0.000E+00	3.518E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.304E+02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	8.646E+05	8.314E+05	6.290E+05	5.085E+05	1.400E+05	1.391E+05	1.375E+03	7.783E+02
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	8.646E+05	8.314E+05	6.290E+05	5.085E+05	1.400E+05	1.391E+05	1.375E+03	7.783E+02

Water-ind. = Water-independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.574E-09	0.0000	0.000E+00	0.0000	3.007E-06	0.0129	0.000E+00	0.0000	0.000E+00	0.0000	1.486E-06	0.0064
Ra-226	8.125E-05	0.3473	0.000E+00	0.0000	2.655E-06	0.0113	0.000E+00	0.0000	0.000E+00	0.0000	3.278E-07	0.0014
Ra-228	5.129E-05	0.2193	0.000E+00	0.0000	2.824E-06	0.0121	0.000E+00	0.0000	0.000E+00	0.0000	3.502E-07	0.0015
Th-228	8.842E-05	0.3780	0.000E+00	0.0000	5.940E-08	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	2.952E-07	0.0013
Th-230	6.268E-10	0.0000	0.000E+00	0.0000	9.743E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.780E-08	0.0002
Th-232	2.658E-10	0.0000	0.000E+00	0.0000	7.847E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.850E-08	0.0002
U-234	3.565E-10	0.0000	0.000E+00	0.0000	3.319E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	6.539E-08	0.0003
U-238	1.549E-06	0.0066	0.000E+00	0.0000	6.642E-08	0.0003	0.000E+00	0.0000	0.000E+00	0.0000	1.309E-07	0.0006
Total	2.225E-04	0.9512	0.000E+00	0.0000	8.662E-06	0.0370	0.000E+00	0.0000	0.000E+00	0.0000	2.742E-06	0.0117

302680

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.496E-06	0.0192
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.423E-05	0.3601
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.447E-05	0.2328
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.878E-05	0.3795
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.817E-08	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.662E-08	0.0002
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.894E-08	0.0004
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.746E-06	0.0075
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.339E-04	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	9.337E-06	1.846E-05	2.340E-05	4.577E-05	1.596E-07	2.504E-09	3.217E-07	1.728E-07
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	9.337E-06	1.846E-05	2.340E-05	4.577E-05	1.596E-07	2.504E-09	3.217E-07	1.728E-07

Water Ind. = Water Independent Water dep. = Water-dependent

302681

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.574E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.007E-06	0.0091	0.000E+00	0.0000	0.000E+00	0.0000	1.486E-06	0.0045
Ra-226	8.125E-05	0.2451	0.000E+00	0.0000	9.696E-05	0.2925	2.655E-06	0.0080	0.000E+00	0.0000	0.000E+00	0.0000	3.278E-07	0.0010
Ra-228	5.129E-05	0.1547	0.000E+00	0.0000	0.000E+00	0.0000	2.824E-06	0.0085	0.000E+00	0.0000	0.000E+00	0.0000	3.502E-07	0.0011
Th-228	8.842E-05	0.2667	0.000E+00	0.0000	6.566E-07	0.0020	5.940E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	2.952E-07	0.0009
Th-230	6.268E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.743E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.780E-08	0.0001
Th-232	2.658E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.847E-09	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.850E-08	0.0001
U-234	3.565E-10	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.319E-08	0.0001	0.000E+00	0.0000	0.000E+00	0.0000	6.539E-08	0.0002
U-238	1.549E-06	0.0047	0.000E+00	0.0000	0.000E+00	0.0000	6.642E-08	0.0002	0.000E+00	0.0000	0.000E+00	0.0000	1.309E-07	0.0004
Total	2.225E-04	0.6712	0.000E+00	0.0000	9.762E-05	0.2944	8.662E-06	0.0261	0.000E+00	0.0000	0.000E+00	0.0000	2.742E-06	0.0083

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.496E-06	0.0136
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.812E-04	0.5465
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.447E-05	0.1643
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.943E-05	0.2698
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.817E-08	0.0002
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.662E-08	0.0001
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.894E-08	0.0003
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.746E-06	0.0053
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.315E-04	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

302682

Dose and Risk Conversion Factor (and Related) Parameter Summary (continued)

Menu	Parameter	Current Value	Default	Parameter Name	Source
Sf-1	Groundshine, surface SF's, 1/yr per (pCi/cm**2):				
Sf-1	Pb-210+D	3.130E-09	3.130E-09	SLPF1(1,1)	a
Sf-1	Ra-226+D	1.470E-06	1.470E-06	SLPF1(2,1)	a
Sf-1	Ra-228+D	5.920E-07	5.920E-07	SLPF1(3,1)	a
Sf-1	Th-228+D	9.470E-07	9.470E-07	SLPF1(4,1)	a
Sf-1	Th-230	4.920E-10	4.920E-10	SLPF1(5,1)	a
Sf-1	Th-232	3.540E-10	3.540E-10	SLPF1(6,1)	a
Sf-1	U-234	4.180E-10	4.180E-10	SLPF1(7,1)	a
Sf-1	U-238+D	1.590E-08	1.590E-08	SLPF1(8,1)	a
Sf-1	Groundshine, volume SF's, 1/yr per (pCi/g):				
Sf-1	Pb-210+D	1.100E-10	1.100E-10	SLPF1(1,2)	a
Sf-1	Ra-226+D	6.700E-06	6.700E-06	SLPF1(2,2)	a
Sf-1	Ra-228+D	3.300E-06	3.300E-06	SLPF1(3,2)	a
Sf-1	Th-228+D	9.900E-07	9.900E-07	SLPF1(4,2)	a
Sf-1	Th-230	4.400E-11	4.400E-11	SLPF1(5,2)	a
Sf-1	Th-232	2.000E-11	2.000E-11	SLPF1(6,2)	a
Sf-1	U-234	2.100E-11	2.100E-11	SLPF1(7,2)	a
Sf-1	U-238+D	5.700E-08	5.700E-08	SLPF1(8,2)	a
Sf-2	Inhalation, slope factors, 1/(pCi):				
Sf-2	Pb-210+D	1.700E-09	1.700E-09	SLPF2(1)	a
Sf-2	Ra-226+D	2.700E-09	2.700E-09	SLPF2(2)	a
Sf-2	Ra-228+D	9.900E-10	9.900E-10	SLPF2(3)	a
Sf-2	Th-228+D	9.700E-08	9.700E-08	SLPF2(4)	a
Sf-2	Th-230	1.700E-08	1.700E-08	SLPF2(5)	a
Sf-2	Th-232	1.900E-08	1.900E-08	SLPF2(6)	a
Sf-2	U-234	1.400E-08	1.400E-08	SLPF2(7)	a
Sf-2	U-238+D	1.200E-08	1.200E-08	SLPF2(8)	a
Sf-3	Ingestion, slope factors, 1/(pCi):				
Sf-3	Pb-210+D	6.800E-10	6.800E-10	SLPF3(1)	a
Sf-3	Ra-226+D	3.000E-10	3.000E-10	SLPF3(2)	a
Sf-3	Ra-228+D	2.500E-10	2.500E-10	SLPF3(3)	a
Sf-3	Th-228+D	2.300E-10	2.300E-10	SLPF3(4)	a
Sf-3	Th-230	3.800E-11	3.800E-11	SLPF3(5)	a
Sf-3	Th-232	3.300E-11	3.300E-11	SLPF3(6)	a
Sf-3	U-234	4.400E-11	4.400E-11	SLPF3(7)	a
Sf-3	U-238+D	6.200E-11	6.200E-11	SLPF3(8)	a
Sf-4	Air immersion, slope factors, 1/yr per (pCi/m**3):				
Sf-4	Pb-210+D	7.900E-12	7.900E-12	SLPF4(1)	a
Sf-4	Ra-226+D	7.900E-09	7.900E-09	SLPF4(2)	a
Sf-4	Ra-228+D	3.140E-09	3.140E-09	SLPF4(3)	a
Sf-4	Th-228+D	5.830E-09	5.830E-09	SLPF4(4)	a
Sf-4	Th-230	1.110E-12	1.110E-12	SLPF4(5)	a
Sf-4	Th-232	5.140E-13	5.140E-13	SLPF4(6)	a
Sf-4	U-234	4.180E-13	4.180E-13	SLPF4(7)	a
Sf-4	U-238+D	7.440E-11	7.440E-11	SLPF4(8)	a
SfRn	Radon inhalation slope factors, 1/(pCi):				
SfRn	Rn-222	1.800E-12	1.800E-12	SLPFRN(1,1)	b

HEAST 1994

1.0E-9 ↑ HEAST 1995

302683

150

Site Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD-BASELINE (If different from user input)	Parameter Name
R013	Pb-210	not used	0.000E+00	...	NUCMT(1)
R013	Ra-226	not used	0.000E+00	...	NUCMT(2)
R013	Ra-228	not used	0.000E+00	...	NUCMT(3)
R013	Th-228	not used	0.000E+00	...	NUCMT(4)
R013	Th-230	not used	0.000E+00	...	NUCMT(5)
R013	Th-232	not used	0.000E+00	...	NUCMT(6)
R013	U-234	not used	0.000E+00	...	NUCMT(7)
R013	U-238	not used	0.000E+00	...	NUCMT(8)
R013	Concentration in milk (pCi/L):				
R013	Pb-210	not used	0.000E+00	...	NUCMK(1)
R013	Ra-226	not used	0.000E+00	...	NUCMK(2)
R013	Ra-228	not used	0.000E+00	...	NUCMK(3)
R013	Th-228	not used	0.000E+00	...	NUCMK(4)
R013	Th-230	not used	0.000E+00	...	NUCMK(5)
R013	Th-232	not used	0.000E+00	...	NUCMK(6)
R013	U-234	not used	0.000E+00	...	NUCMK(7)
R013	U-238	not used	0.000E+00	...	NUCMK(8)
R014	Concentration in fish (pCi/kg):				
R014	Pb-210	not used	0.000E+00	...	NUCFSH(1)
R014	Ra-226	not used	0.000E+00	...	NUCFSH(2)
R014	Ra-228	not used	0.000E+00	...	NUCFSH(3)
R014	Th-228	not used	0.000E+00	...	NUCFSH(4)
R014	Th-230	not used	0.000E+00	...	NUCFSH(5)
R014	Th-232	not used	0.000E+00	...	NUCFSH(6)
R014	U-234	not used	0.000E+00	...	NUCFSH(7)
R014	U-238	not used	0.000E+00	...	NUCFSH(8)
R014	Concentration in shell fish (pCi/kg):				
R014	Pb-210	not used	0.000E+00	...	NUCNFSH(1)
R014	Ra-226	not used	0.000E+00	...	NUCNFSH(2)
R014	Ra-228	not used	0.000E+00	...	NUCNFSH(3)
R014	Th-228	not used	0.000E+00	...	NUCNFSH(4)
R014	Th-230	not used	0.000E+00	...	NUCNFSH(5)
R014	Th-232	not used	0.000E+00	...	NUCNFSH(6)
R014	U-234	not used	0.000E+00	...	NUCNFSH(7)
R014	U-238	not used	0.000E+00	...	NUCNFSH(8)
R015	Concentration in drinking water (pCi/L):				
R015	Pb-210	4.480E+00	0.000E+00	...	NUCDW(1)
R015	Ra-226	4.020E+00	0.000E+00	...	NUCDW(2)
R015	Ra-228	2.420E+00	0.000E+00	...	NUCDW(3)
R015	Th-228	1.680E+00	0.000E+00	...	NUCDW(4)
R015	Th-230	1.140E+00	0.000E+00	...	NUCDW(5)
R015	Th-232	9.530E-01	0.000E+00	...	NUCDW(6)
R015	U-234	4.480E+00	0.000E+00	...	NUCDW(7)
R015	U-238	8.300E+00	0.000E+00	...	NUCDW(8)
R015	Concentration in pond water (pCi/L):				
R015	Pb-210	not used	0.000E+00	...	NUCPW(1)

302684

Site Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD BASELINE (If different from user input)	Parameter Name
R015	Ra-226	not used	0.000E+00	...	NUCPW(2)
R015	Ra-228	not used	0.000E+00	...	NUCPW(3)
R015	Th-228	not used	0.000E+00	...	NUCPW(4)
R015	Th-230	not used	0.000E+00	...	NUCPW(5)
R015	Th-232	not used	0.000E+00	...	NUCPW(6)
R015	U-234	not used	0.000E+00	...	NUCPW(7)
R015	U-238	not used	0.000E+00	...	NUCPW(8)
R016	Indoor Radon-222 concentration (pCi/m**3)	not used	0.000E+00	...	RN222(1)
R016	Outdoor Radon-222 concentration (pCi/m**3)	not used	0.000E+00	...	RN222(2)
R016	Indoor Radon-220 concentration (pCi/m**3)	not used	0.000E+00	...	RN220(1)
R016	Outdoor Radon-220 concentration (pCi/m**3)	not used	0.000E+00	...	RN220(2)
R016	Equilibrium fraction of Radon-222 daughters	not used	5.000E-01	...	EQ222
R016	Radon-222 daughter concentrations (pCi/m**3):				
R016	Po-218, indoors	not used	0.000E+00	0.000E+00	PO218(1)
R016	Po-218, outdoors	not used	0.000E+00	0.000E+00	PO218(2)
R016	Pb-214, indoors	not used	0.000E+00	0.000E+00	PB214(1)
R016	Pb-214, outdoors	not used	0.000E+00	0.000E+00	PB214(2)
R016	Bi-214, indoors	not used	0.000E+00	0.000E+00	BI214(1)
R016	Bi-214, outdoors	not used	0.000E+00	0.000E+00	BI214(2)
R016	Equilibrium fraction of Radon-220 daughters	not used	-1.000E+00	...	EQ220
R016	Radon-220 daughter concentrations (pCi/m**3):				
R016	Po-216, indoors	not used	0.000E+00	0.000E+00	PO216(1)
R016	Po-216, outdoors	not used	0.000E+00	0.000E+00	PO216(2)
R016	Pb-212, indoors	not used	0.000E+00	0.000E+00	PB212(1)
R016	Pb-212, outdoors	not used	0.000E+00	0.000E+00	PB212(2)
R016	Bi-212, indoors	not used	0.000E+00	0.000E+00	BI212(1)
R016	Bi-212, outdoors	not used	0.000E+00	0.000E+00	BI212(2)
B011	Density of soil (pCi/g)	not used	1.500E+00	...	DENSOZ
B011	Thickness of contaminated soil (m)	not used	1.000E+00	...	THICK
B011	Organic carbon content of soil	not used	2.000E-01	...	FOC
B012	Fruits, vegetables, and grain consumption (kg/d)	not used	5.000E-01	...	DIET3
B012	Meat and poultry consumption (kg/d)	not used	2.500E-01	...	DIET4
B012	Milk consumption (L/d)	not used	1.700E-01	...	DIET5
B012	Fish consumption (kg/d)	not used	1.500E-02	...	DIET6(1)
B012	Other seafood consumption (kg/d)	not used	2.500E-03	...	DIET6(2)
B012	Drinking water intake (L/d)	1.000E+00	1.400E+00	...	DIET7
B012	Incidental water intake (swimming) (L/d)	not used	1.300E-01	...	DIET10
B012	Soil ingestion (child) (g/d)	not used	2.000E-01	...	DIET8(1)
B012	Soil ingestion (adult) (g/d)	not used	1.000E-01	...	DIET8(2)
B013	Inhalation rate indoors (m**3/d)	not used	2.000E+01	...	INHALR(1)
B013	Inhalation rate outdoors (m**3/d)	not used	2.000E+01	...	INHALR(2)
B013	Time fraction outdoors	not used	3.300E-01	...	FOTD
B013	Shielding factor for groundshine	not used	7.000E-01	...	SHF1
B013	Exposure duration for child (yr)	not used	6.000E+00	...	ED(1)
B013	Total exposure duration (yr)	not used	3.000E+01	...	ED(2)

302685

<<<<< Calculation Results with Base Data >>>>>

Amount of Intake Quantities INTK(i,p) for Individual Radionuclides (i) and Pathways (p) as pCi/yr

Radio Nuclide	Inhalation pCi/yr	Plant pCi/yr	Meat pCi/yr	Milk pCi/yr	Fish pCi/yr	Drinking Water pCi/yr	Soil pCi/yr	Radon pCi/yr	Incidental Water pCi/yr	Total* Ingestion pCi/yr
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.568E+03	0.000E+00	0.000E+00	0.000E+00	1.568E+03
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.407E+03	0.000E+00	0.000E+00	0.000E+00	1.407E+03
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.470E+02	0.000E+00	0.000E+00	0.000E+00	8.470E+02
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.880E+02	0.000E+00	0.000E+00	0.000E+00	5.880E+02
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.990E+02	0.000E+00	0.000E+00	0.000E+00	3.990E+02
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.336E+02	0.000E+00	0.000E+00	0.000E+00	3.336E+02
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.568E+03	0.000E+00	0.000E+00	0.000E+00	1.568E+03
U-238	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.905E+03	0.000E+00	0.000E+00	0.000E+00	2.905E+03

Note: * Sum of all ingestion pathways.

302686

<<<<< Calculation Results with Base Data >>>>>

Total Dose Components DOSE(i,p) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Fish	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio Nuclide	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	8.420E+00	0.5872	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.420E+00	0.5872
Ra-226	1.871E+00	0.1305	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.871E+00	0.1305
Ra-228	1.220E+00	0.0851	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.220E+00	0.0851
Th-228	4.751E-01	0.0331	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.751E-01	0.0331
Th-230	2.187E-01	0.0152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.187E-01	0.0152
Th-232	9.106E-01	0.0635	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.106E-01	0.0635
U-234	4.437E-01	0.0309	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.437E-01	0.0309
U-238	7.814E-01	0.0545	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.814E-01	0.0545
Total	1.434E+01	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.434E+01	1.0000

Note: The dose for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po , Pb , and Bi).

302687

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISKI(i,p) (from Risk/Dose Conversion Factor)
for Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Risk/Dose Conversion Factor = 7.600E-07 risk/mrem Total Exposure Duration = 6.00E+00 years

Radio-	Ground		Inhalation		Plant		Meat		Milk		Fish	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	3.840E-05	0.5872	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.840E-05	0.5872
Ra-226	8.533E-06	0.1305	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.533E-06	0.1305
Ra-228	5.562E-06	0.0851	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.562E-06	0.0851
Th-228	2.166E-06	0.0331	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.166E-06	0.0331
Th-230	9.971E-07	0.0152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.971E-07	0.0152
Th-232	4.152E-06	0.0635	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.152E-06	0.0635
U-234	2.023E-06	0.0309	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.023E-06	0.0309
U-238	3.563E-06	0.0545	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.563E-06	0.0545
Total	6.539E-05	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.539E-05	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

302688

<<<<< Calculation Results with Base Data >>>>>

Total Dose Components DOSE(i,p) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Fish	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	5.394E-01	0.3127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.394E-01	0.3127
Ra-226	1.629E-01	0.0944	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.629E-01	0.0944
Ra-228	4.738E-01	0.2746	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.738E-01	0.2746
Th-228	1.739E-01	0.1008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.739E-01	0.1008
Th-230	4.220E-02	0.0245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.220E-02	0.0245
Th-232	2.771E-01	0.1606	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.771E-01	0.1606
U-234	2.843E-02	0.0165	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.843E-02	0.0165
U-238	2.730E-02	0.0158	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.730E-02	0.0158
Total	1.725E+00	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.725E+00	1.0000

Note: The dose for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

302689

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISK1(i,p) (from Risk/Dose Conversion Factor)
for Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Risk/Dose Conversion Factor = 7.600E-07 risk/mrem Total Exposure Duration = 6.00E+00 years

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Fish	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	2.460E-06	0.3127	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.460E-06	0.3127
Ra-226	7.429E-07	0.0944	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.429E-07	0.0944
Ra-228	2.160E-06	0.2746	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.160E-06	0.2746
Th-228	7.931E-07	0.1008	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.931E-07	0.1008
Th-230	1.924E-07	0.0245	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.924E-07	0.0245
Th-232	1.264E-06	0.1606	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.264E-06	0.1606
U-234	1.296E-07	0.0165	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.296E-07	0.0165
U-238	1.245E-07	0.0158	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.245E-07	0.0158
Total	7.866E-06	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.866E-06	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po- , Pb , and Bi).

302690

<<<<< Calculation Results with Base Data >>>>>

Total Cancer Risk Components RISK2(i,p) (from Slope Factors) for
Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk
Total Exposure Duration = 6.00E+00 years

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Fish	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Radio-Nuclide	Drinking Water		Soil		Radon		Incidental Water		Air Immersion		All Pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	6.024E-07	0.2691	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.024E-07	0.2691
Ra-226	2.205E-07	0.1448	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.205E-07	0.1448
Ra-228	4.935E-07	0.3241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.935E-07	0.3241
Th-228	2.970E-07	0.1951	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.970E-07	0.1951
Th-230	1.756E-08	0.0115	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.756E-08	0.0115
Th-232	2.010E-08	0.0132	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.010E-08	0.0132
U-234	2.652E-08	0.0174	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.652E-08	0.0174
U-238	3.776E-08	0.0248	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.776E-08	0.0248
Total	1.716E-06	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.716E-06	1.0000

Note: The risk for Rn-222 and/or Rn-220 includes contribution from decay daughters (Po-, Pb-, and Bi-).

Program execution time = 0.33 seconds

Pb-210 risk recalculated with HEAST 1995 slope factor (1E-9/pCi)

302691

Contaminated Zone Dimensions	
Area:	10000.00 square meters
Thickness:	2.00 meters
Cover Depth:	0.00 meters

Initial Soil Concentrations, pCi/g	
Pb-210	2.230E+01
Ra-226	2.230E+01
Ra-228	5.810E+01
Th-228	5.810E+01
Th-230	3.530E+01
Th-232	2.460E+01
U-234	4.920E+01
U-238	4.920E+01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	6.616E+01	6.585E+01	6.463E+01	5.982E+01	5.428E+01	4.988E+01	4.690E+01	4.483E+01
M(t):	4.411E+00	4.390E+00	4.309E+00	3.988E+00	3.619E+00	3.325E+00	3.126E+00	2.988E+00

Maximum TDOSE(t): 6.616E+01 mrem/yr at t = 0.000E+00 years

302692

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	4.017E-01	0.0061	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	1.489E-01	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	2.292E-01	0.0035	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	1.556E+01	0.2353	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	8.936E+00	0.1351	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	3.133E+01	0.4735	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	5.043E+00	0.0762	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	4.508E+00	0.0681	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	6.616E+01	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.017E-01	0.0061
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.489E-01	0.0023
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.292E-01	0.0035
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.556E+01	0.2353
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.936E+00	0.1351
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.133E+01	0.4735
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.043E+00	0.0762
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.508E+00	0.0681
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.616E+01	1.0000

*Sum of all water independent and dependent pathways.

302693

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.732E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226	1.732E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	4.511E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-228	4.511E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	2.741E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	1.910E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	3.820E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238	3.820E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water-dep. = Water dependent

Excess Cancer Risks CNPS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	2.026E-06	0.0106	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	1.403E-06	0.0074	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	1.340E-06	0.0070	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	1.313E-04	0.6884	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	1.398E-05	0.0733	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	1.089E-05	0.0571	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	1.605E-05	0.0841	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	1.375E-05	0.0721	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	1.907E-04	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

302694

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	1.110E+00
Thickness:	2.00 meters	Ra-226	1.110E+00
Cover Depth:	0.00 meters	Ra-228	1.270E+00
		Th-228	1.150E+00
		Th-230	1.410E+00
		Th-232	1.030E+00
		U-234	1.110E+00
		U-238	8.110E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	2.197E+00	2.203E+00	2.203E+00	2.168E+00	2.103E+00	2.017E+00	1.946E+00	1.863E+00
M(t):	1.465E-01	1.469E-01	1.468E-01	1.445E-01	1.402E-01	1.344E-01	1.297E-01	1.242E-01

Maximum TDOSE(t): 2.204E+00 mrem/yr at t = 1.865 + 0.002 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.865 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	1.887E-02	0.0086	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	8.532E-03	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	1.518E-01	0.0689	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	1.567E-01	0.0711	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	3.569E-01	0.1619	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	1.328E+00	0.6024	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	1.111E-01	0.0504	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	7.255E-02	0.0329	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	2.204E+00	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

302695

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	2.000E-02	0.0091	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	7.412E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	5.010E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	3.081E-01	0.1402	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	3.569E-01	0.1624	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	1.312E+00	0.5970	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	1.138E-01	0.0518	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	7.431E-02	0.0338	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	2.197E+00	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.000E-02	0.0091
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.412E-03	0.0034
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.010E-03	0.0023
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.081E-01	0.1402
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.569E-01	0.1624
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.312E+00	0.5970
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.138E-01	0.0518
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.431E-02	0.0338
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.197E+00	1.0000

*Sum of all water independent and dependent pathways.

302696

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	8.619E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226	8.619E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	9.861E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-228	8.930E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	1.095E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	7.998E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	8.619E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238	6.297E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water-independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	1.008E-07	0.0229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	6.981E-08	0.0159	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	2.929E-08	0.0067	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	2.599E-06	0.5904	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	5.584E-07	0.1269	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	4.559E-07	0.1036	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	3.620E-07	0.0822	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	2.267E-07	0.0515	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	4.401E-06	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

302697

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	2.230E+01
Thickness:	2.00 meters	Ra-226	2.230E+01
Cover Depth:	0.00 meters	Ra-228	5.810E+01
		Th-228	5.810E+01
		Th-230	3.530E+01
		Th-232	2.460E+01
		U-234	4.920E+01
		U-238	4.920E+01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	5.714E+01	5.687E+01	5.582E+01	5.166E+01	4.688E+01	4.308E+01	4.050E+01	3.871E+01
M(t):	3.809E+00	3.791E+00	3.721E+00	3.444E+00	3.125E+00	2.872E+00	2.700E+00	2.581E+00

Maximum TDOSE(t): 5.714E+01 mrem/yr at t = 0.000E+00 years

302698

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	3.469E-01	0.0061	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	1.286E-01	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	1.979E-01	0.0035	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	1.344E+01	0.2353	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	7.717E+00	0.1351	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	2.705E+01	0.4735	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	4.355E+00	0.0762	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	3.893E+00	0.0681	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	5.714E+01	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.469E 01	0.0061
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.286E 01	0.0023
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.979E-01	0.0035
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.344E+01	0.2353
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.717E+00	0.1351
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.705E+01	0.4735
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.355E+00	0.0762
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.893E+00	0.0681
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.714E+01	1.0000

*Sum of all water independent and dependent pathways.

302699

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	1.495E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226	1.495E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	3.896E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-228	3.896E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	2.367E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	1.650E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	3.299E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238	3.299E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water Ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water Ind. = Water-Independent Water-dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	3.499E-07	0.0106	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	2.423E-07	0.0074	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	2.314E-07	0.0070	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	2.268E-05	0.6884	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	2.415E-06	0.0733	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	1.881E-06	0.0571	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	2.771E-06	0.0841	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	2.376E-06	0.0721	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	3.294E-05	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

302700

Contaminated Zone Dimensions		Initial Soil Concentrations, pCi/g	
Area:	10000.00 square meters	Pb-210	1.110E+00
Thickness:	2.00 meters	Ra-226	1.110E+00
Cover Depth:	0.00 meters	Ra-228	1.270E+00
		Th-228	1.150E+00
		Th-230	1.410E+00
		Th-232	1.030E+00
		U-234	1.110E+00
		U-238	8.110E-01

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 15 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	1.000E+01	3.000E+01	1.000E+02	3.000E+02	1.000E+03
TDOSE(t):	1.898E+00	1.903E+00	1.902E+00	1.872E+00	1.816E+00	1.742E+00	1.680E+00	1.609E+00
M(t):	1.265E-01	1.268E-01	1.268E-01	1.248E-01	1.211E-01	1.161E-01	1.120E-01	1.073E-01

Maximum TDOSE(t): 1.904E+00 mrem/yr at t = 1.861 ± 0.002 years

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.861 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	1.630E-02	0.0086	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	7.367E-03	0.0039	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	1.310E-01	0.0688	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	1.355E-01	0.0712	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	3.082E-01	0.1619	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	1.147E+00	0.6024	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	9.594E-02	0.0504	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	6.266E-02	0.0329	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	1.904E+00	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

302701

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	1.727E-02	0.0091	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	6.402E-03	0.0034	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	4.326E-03	0.0023	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	2.661E-01	0.1402	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	3.083E-01	0.1624	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	1.133E+00	0.5970	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	9.826E-02	0.0518	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	6.418E-02	0.0338	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	1.898E+00	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Pb-210	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.727E-02	0.0091
Ra-226	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.402E-03	0.0034
Ra-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.326E-03	0.0023
Th-228	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.661E-01	0.1402
Th-230	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.083E-01	0.1624
Th-232	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.133E+00	0.5970
U-234	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.826E-02	0.0518
U-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.418E-02	0.0338
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.898E+00	1.0000

*Sum of all water independent and dependent pathways.

302702

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Pb-210	7.444E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-226	7.444E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	8.517E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-228	7.712E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	9.456E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	6.907E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	7.444E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-238	5.439E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water ind. = Water independent Water dep. = Water-dependent

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p) and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Pb-210	0.000E+00	0.0000	1.742E-08	0.0229	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-226	0.000E+00	0.0000	1.206E-08	0.0159	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ra-228	0.000E+00	0.0000	5.059E-09	0.0067	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-228	0.000E+00	0.0000	4.488E-07	0.5904	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-230	0.000E+00	0.0000	9.645E-08	0.1269	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Th-232	0.000E+00	0.0000	7.874E-08	0.1036	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-234	0.000E+00	0.0000	6.253E-08	0.0822	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
U-238	0.000E+00	0.0000	3.916E-08	0.0515	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Total	0.000E+00	0.0000	7.602E-07	1.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000

302703

Appendix O-3

Chemical Risk - Exposure and Risk Summaries

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR AN ADULT OFF-SITE RESIDENT

INHALATION OF CHEMICALS ON RESPIRABLE PARTICULATES

CHEMICAL	CONCENTRATION IN AIR (mg/m^3)	CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS							
Benzo[g,h,i]perylene	2.22E-09	6E-10	Not Available	No Tox Data	Not Applicable		
Phenanthrene	2.45E-09	7E-10	Not Available	No Tox Data	Not Applicable		
PCBs							
PCBs (total)	8.84E-08	3E-08	Not Available	No Tox Data	1E-08	2.00E+00	2E-08
INORGANICS							
Antimony	4.31E-05	1E-05	Not Available	No Tox Data	5E-06	Not Available	No Tox Data
Arsenic	6.21E-05	2E-05	Not Available	No Tox Data	8E-06	1.5E+01	1E-04
Barium	2.06E-06	6E-07	1.00E-04	6E-03	3E-07	Not Available	No Tox Data
Beryllium	1.68E-08	5E-09	Not Available	No Tox Data	2E-09	8.40E+00	2E-08
Cobalt	5.20E-05	1E-05	5.71E-06	3E+00	6E-06	Not Available	No Tox Data
Copper	4.86E-05	1E-05	Not Available	No Tox Data	Not Applicable		
Iron	2.15E-03	6E-04	Not Available	No Tox Data	3E-04	Not Available	No Tox Data
Lead	1.90E-04	5E-05	Not Available	No Tox Data	2E-05	Not Available	No Tox Data
Manganese	8.24E-04	2E-04	1.43E-05	2E+01	Not Applicable		
Mercury	8.59E-08	2E-08	8.57E-05	3E-04	Not Applicable		
Nickel	2.56E-04	7E-05	Not Available	No Tox Data	3E-05	Not Available	No Tox Data
Silver	1.38E-06	4E-07	2.86E-06	1E-01	Not Applicable		
Thallium	4.44E-08	1E-08	Not Available	No Tox Data	Not Applicable		
			HAZARD INDEX:	**2E+01**		**CANCER RISK:**	**1E-04**

CDI of non-carcinogenic chemicals in surface soils via inhalation (adult resident):
(mg/m^3 air * 0.83 m^3/hour * 24 hours/day * 365 days/year * 30 years)/(70 kg * 10950 days)
CDI of carcinogenic chemicals in surface soils via inhalation (adult resident):
(mg/m^3 air * 0.83 m^3/hour * 24 hours/day * 365 days/year * 30 years)/(70 kg * 25550 days)

302705

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT SCENARIO
FOR A CHILD OFF-SITE RESIDENT

INHALATION OF CHEMICALS ON RESPIRABLE PARTICULATES

CHEMICAL	CONCENTRATION IN AIR (mg/m^3)	CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS							
Benzo[g,h,i]perylene	2.22E-09	3E-09	Not Available	No Tox Data	Not Applicable		
Phenanthrene	2.45E-09	3E-09	Not Available	No Tox Data	Not Applicable		
PCBs							
PCBs (total)	8.84E-08	1E-07	Not Available	No Tox Data	1E-08	2.00E+00	2E-08
INORGANICS							
Antimony	4.31E-05	6E-05	Not Available	No Tox Data	5E-06	Not Available	No Tox Data
Arsenic	6.21E-05	8E-05	Not Available	No Tox Data	7E-06	1.5E+01	1E-04
Barium	2.06E-06	3E-06	1.00E-04	3E-02	2E-07	Not Available	No Tox Data
Beryllium	1.68E-08	2E-08	Not Available	No Tox Data	2E-09	8.40E+00	2E-08
Cobalt	5.20E-05	7E-05	5.71E-06	1E+01	6E-06	Not Available	No Tox Data
Copper	4.86E-05	6E-05	Not Available	No Tox Data	Not Applicable		
Iron	2.15E-03	3E-03	Not Available	No Tox Data	2E-04	Not Available	No Tox Data
Lead	1.90E-04	3E-04	Not Available	No Tox Data	2E-05	Not Available	No Tox Data
Manganese	8.24E-04	1E-03	1.43E-05	8E+01	Not Applicable		
Mercury	8.59E-08	1E-07	8.57E-05	1E-03	Not Applicable		
Nickel	2.56E-04	3E-04	Not Available	No Tox Data	3E-05	Not Available	No Tox Data
Silver	1.38E-06	2E-06	2.86E-06	6E-01	Not Applicable		
Thallium	4.44E-08	6E-08	Not Available	No Tox Data	Not Applicable		
			HAZARD INDEX:	**9E+01**		**CANCER RISK:**	**1E-04**

CDI of non-carinogenic chemicals in surface soils via inhalation (child resident):
(mg/m^3 air * 0.83 m^3/hour * 24 hours/day * 365 days/year * 6 years)/(15 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via inhalation (child resident):
(mg/m^3 air * 0.83 m^3/hour * 24 hours/day * 365 days/year * 6 years)/(15 kg * 25550 days)

302706

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF CHEMICALS IN SURFACE SOIL AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	4.00E-03	MAX	2E-09	3E-03	8E-07	2E-10	2.9E-02	6E-12
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	8.30E-02	MAX	5E-08	Not Available	No Tox Data	Not Applicable		
Phenanthrene	7.20E-02	MAX	4E-08	Not Available	No Tox Data	Not Applicable		
INORGANICS								
Antimony	4.16E+02	MAX	2E-04	4.00E-04	6E-01	2E-05	Not Available	No Tox Data
Arsenic	1.79E+03	MAX	1E-03	3.00E-04	3E+00	9E-05	1.50E+00	1E-04
Cobalt	4.66E+03	MAX	3E-03	6.00E-02	4E-02	2E-04	Not Available	No Tox Data
Copper	2.16E+03	MAX	1E-03	3.7E-02	3E-02	Not Applicable		
Iron	1.93E+05	MAX	1E-01	3.00E-01	4E-01	9E-03	Not Available	No Tox Data
Lead	3.71E+03	MAX	2E-03	Not Available	No Tox Data	2E-04	Not Available	No Tox Data
Manganese	5.68E+03	MAX	3E-03	2.3E-02	1E-01	Not Applicable		
Mercury	1.80E+00	MAX	1E-06	Not Available	No Tox Data	Not Applicable		
Nickel	2.89E+04	MAX	2E-02	2E-02	8E-01	1E-03	Not Available	No Tox Data
Silver	1.03E+02	MAX	6E-05	5E-03	1E-02	Not Applicable		
				HAZARD INDEX:	**5E+00**		**CANCER RISK:**	**1E-04**

CDI of noncarcinogenic chemicals in surface soils via ingestion (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 120 days/year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via ingestion (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 120 days/year * 6 years)/(57.7 kg * 25550 days)

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

DERMAL CONTACT WITH CHEMICALS IN SURFACE SOIL AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
INORGANICS									
Arsenic	1.79E+03	MAX	3E-02	6E-04	2.40E-04	3E+00	5E-05	1.88E+00	1E-04
					HAZARD INDEX:	**3E+00**		**CANCER RISK:**	**1E-04**

CDI of noncarcinogenic chemicals in surface soils via dermal contact (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 1970 cm^2/event * 120 events /year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 1970 cm^2/event * 120 events/year * 6 years)/(57.7 kg * 25550 days)

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIO
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF CHEMICALS IN SURFACE SOIL AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	2.19E-01	UCLnorm	1E-07	Not Available	No Tox Data	Not Applicable		
Phenanthrene	2.47E-01	UCLnorm	1E-07	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	9.42E+00	UCLlog	5E-06	2.00E-05	3E-01	5E-07	2.00E+00	9E-07
INORGANICS								
Antimony	4.34E+03	UCLlog	2E-03	4.00E-04	6E+00	2E-04	Not Available	No Tox Data
Arsenic	6.30E+03	MAX	4E-03	3.00E-04	1E+01	3E-04	1.50E+00	5E-04
Cobalt	4.62E+03	MAX	3E-03	6.00E-02	4E-02	2E-04	Not Available	No Tox Data
Copper	4.61E+03	MAX	3E-03	3.7E-02	7E-02	Not Applicable		
Iron	1.85E+05	UCLlog	1E-01	3.00E-01	4E-01	9E-03	Not Available	No Tox Data
Lead	1.96E+04	MAX	1E-02	Not Available	No Tox Data	1E-03	Not Available	No Tox Data
Manganese	9.00E+04	MAX	5E-02	2.3E-02	2E+00	Not Applicable		
Mercury	8.23E+00	UCLlog	5E-06	Not Available	No Tox Data	Not Applicable		
Nickel	2.20E+04	MAX	1E-02	2E-02	6E-01	1E-03	Not Available	No Tox Data
Silver	1.14E+02	MAX	6E-05	5E-03	1E-02	Not Applicable		
Thallium	4.94E+00	UCLlog	3E-06	8.00E-05	4E-02	Not Applicable		
				HAZARD INDEX:	**2E+01**		**CANCER RISK:**	**5E-04**

CDI of noncarcinogenic chemicals in surface soils via ingestion (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 120 days/year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via ingestion (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 120 days/year * 6 years)/(57.7 kg * 25550 days)

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SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

DERMAL CONTACT WITH CHEMICALS IN SURFACE SOIL AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	9.42E+00	UCLlog	1E-01	1E-05	2.00E-05	7E-01	1E-06	2.00E+00	3E-06
INORGANICS									
Arsenic	6.30E+03	MAX	3E-02	2E-03	2.40E-04	9E+00	2E-04	1.88E+00	3E-04
					HAZARD INDEX:	**9E+00**		**CANCER RISK:**	**3E-04**

CDI of noncarcinogenic chemicals in surface soils via dermal contact (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 1970 cm^2/event * 120 events /year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 1970 cm^2/event * 120 events/year * 6 years)/(57.7 kg * 25550 days)

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SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIO
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF CHEMICALS IN SURFACE SOIL AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	2.00E-03	MAX	1E-09	3E-03	4E-07	1E-10	2.9E-02	3E-12
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	6.20E-02	MAX	4E-08	Not Available	No Tox Data	Not Applicable		
Phenanthrene	6.40E-02	MAX	4E-08	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	**2.89E+00**	**MAX**	**2E-06**	**2.00E-05**	**8E-02**	1E-07	2.00E+00	3E-07
INORGANICS								
Antimony	2.43E+03	MAX	1E-03	4.00E-04	3E+00	1E-04	Not Available	No Tox Data
Arsenic	1.44E+03	MAX	8E-04	3.00E-04	3E+00	7E-05	1.50E+00	1E-04
Barium	1.35E+03	MAX	8E-04	7E-02	1E-02	7E-05	Not Available	No Tox Data
Beryllium	1.10E+01	MAX	6E-06	5.00E-03	1E-03	5E-07	4.30E+00	2E-06
Cobalt	7.64E+02	MAX	4E-04	6.00E-02	7E-03	4E-05	Not Available	No Tox Data
Copper	2.07E+03	MAX	1E-03	3.7E-02	3E-02	Not Applicable		
Lead	5.14E+03	MAX	3E-03	Not Available	No Tox Data	3E-04	Not Available	No Tox Data
Manganese	2.93E+03	MAX	2E-03	2.3E-02	7E-02	Not Applicable		
Mercury	6.20E+00	MAX	4E-06	Not Available	No Tox Data	Not Applicable		
Silver	1.10E+02	MAX	6E-05	5E-03	1E-02	Not Applicable		
				HAZARD INDEX:	**6E+00**		**CANCER RISK:**	**1E-04**

CDI of noncarcinogenic chemicals in surface soils via ingestion (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 120 days/year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via ingestion (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 120 days/year * 6 years)/(57.7 kg * 25550 days)

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

DERMAL CONTACT WITH CHEMICALS IN SURFACE SOIL AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	2.89E+00	MAX	1E-01	5E-06	2.00E-05	2E-01	4E-07	2.00E+00	8E-07
INORGANICS									
Arsenic	1.44E+03	MAX	3E-02	5E-04	2.40E-04	2E+00	4E-05	1.88E+00	8E-05
					HAZARD INDEX:	**2E+00**		**CANCER RISK:**	**8E-05**

CDI of noncarcinogenic chemicals in surface soils via dermal contact (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 1970 cm^2/event * 120 events /year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 1970 cm^2/event * 120 events/year * 6 years)/(57.7 kg * 25550 days)

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SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

DERMAL CONTACT WITH CHEMICALS IN SURFACE WATER FROM PARCEL B

CHEMICAL	SURFACE WATER CONCENTRATION (mg/l)		PERMEABILITY COEFFICIENTS (cm/hour)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
INORGANICS									
Aluminum	7.70E+01	MAX	1.0E-03	2E-03	5E-03	3E-01	1E-04	Not Available	No Tox data
Antimony	2.26E+00	MAX	1.0E-03	5E-05	4.00E-05	1E+00	4E-06	Not Available	No Tox data
Arsenic	8.09E+00	MAX	1.0E-03	2E-04	2.40E-04	8E-01	2E-05	1.88E+00	3E-05
Cadmium	8.46E-01	MAX	1.0E-03	2E-05	2.50E-05	8E-01	2E-06	Not Available	No Tox data
Cobalt	4.23E+01	MAX	1.0E-03	9E-04	4.80E-02	2E-02	8E-05	Not Available	No Tox data
Copper	1.71E+01	MAX	1.0E-03	4E-04	1.9E-02	2E-02	Not Applicable		
Iron	7.22E+02	MAX	1.0E-03	2E-02	3.00E-01	5E-02	1E-03	Not Available	No Tox data
Lead	1.18E+00	MAX	1.0E-03	3E-05	Not Available	No Tox data	2E-06	Not Available	No Tox data
Manganese	5.39E+00	MAX	1.0E-03	1E-04	1.15E-03	1E-01	Not Applicable		
Nickel	2.79E+01	MAX	1.0E-03	6E-04	2.00E-03	3E-01	5E-05	Not Available	No Tox data
Zinc	9.12E+01	MAX	1.0E-03	2E-03	1.20E-01	2E-02	Not Applicable		
					HAZARD INDEX:	**4E+00**		**CANCER RISK:**	**3E-05**

CDI of noncarcinogenic chemicals in surface water via dermal contact (adolescent trespasser):
(mg/l water * 1.00E-03 l/cm^3 * PC cm/hour * 1970 cm^2 * 2 hours/day * 120 days/year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in surface water via dermal contact (adolescent trespasser):
(mg/l water * 1.00E-03 l/cm^3 * PC cm/hour * 1970 cm^2 * 2 hours/day * 120 days/year * 6 years)/(57.7 kg * 25550 days)

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF CHEMICALS IN SEDIMENT FROM PARCEL B

CHEMICAL	SEDIMENT CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILES								
Benzene	2.00E-03	MAX	1E-09	3E-03	4E-07	1E-10	2.9E-02	3E-12
PCBs								
PCBs (total)	1.81E+00	MAX	1E-06	2.00E-05	5E-02	9E-08	2.00E+00	2E-07
INORGANICS								
Antimony	5.00E+00	MAX	3E-06	4.00E-04	7E-03	2E-07	Not Available	No Tox data
Arsenic	2.56E+01	MAX	1E-05	3.00E-04	5E-02	1E-06	1.50E+00	2E-06
Copper	1.91E+02	MAX	1E-04	3.7E-02	3E-03	Not Applicable		
Lead	9.42E+01	MAX	5E-05	Not Available	No Tox data	5E-06	Not Available	No Tox data
Nickel	4.34E+01	MAX	2E-05	2E-02	1E-03	2E-06	Not Available	No Tox data
				HAZARD INDEX:	**1E-01**		**CANCER RISK:**	**2E-06**

CDI of noncarcinogenic chemicals in sediment via ingestion (adolescent trespasser):
(mg/kg sediment * 1.00E-06 kg/mg * 100 mg/event * 1 * 120 events/year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in sediment via ingestion (adolescent trespasser):
(mg/kg sediment * 1.00E-06 kg/mg * 100 mg/event * 1 * 120 events/year * 6 years)/(57.7 kg * 25550 days)

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

DERMAL CONTACT WITH CHEMICALS IN SEDIMENT FROM PARCEL B

CHEMICAL	SEDIMENT CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	1.81E+00	MAX	1E-01	3E-06	2.00E-05	1E-01	2E-07	2.00E+00	5E-07
INORGANICS									
Arsenic	2.56E+01	MAX	3E-02	9E-06	2.40E-04	4E-02	7E-07	1.88E+00	1E-06
					HAZARD INDEX:	**2E-01**		**CANCER RISK:**	**2E-06**

CDI of noncarcinogenic chemicals in sediment via dermal contact (adolescent trespasser):
(mg/kg sediment * 1.00E-06 kg/mg * ABS * 1.00 mg/cm^2 * 1970 cm^2/event * 120 events/year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in sediment via dermal contact (adolescent trespasser):
(mg/kg sediment * 1.00E-06 kg/mg * ABS * 1.00 mg/cm^2 * 1970 cm^2/event * 120 events/year * 6 years)/(57.7 kg * 25550 days)

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

DERMAL CONTACT WITH CHEMICALS IN SURFACE WATER FROM PARCEL C

CHEMICAL	SURFACE WATER CONCENTRATION (mg/l)		PERMEABILITY COEFFICIENTS (cm/hour)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
INORGANICS									
Aluminum	2.80E+01	MAX	1.0E-03	6E-04	5E-03	1E-01	5E-05	Not Available	No Tox data
Antimony	1.54E-02	MAX	1.0E-03	3E-07	4.00E-05	9E-03	3E-08	Not Available	No Tox data
Arsenic	2.46E-01	MAX	1.0E-03	6E-06	2.40E-04	2E-02	5E-07	1.88E+00	9E-07
Beryllium	5.50E-03	MAX	1.0E-03	1E-07	5.00E-05	2E-03	1E-08	4.30E+02	5E-06
Cadmium	7.92E-02	MAX	1.0E-03	2E-06	2.50E-05	7E-02	2E-07	Not Available	No Tox data
Copper	4.14E+00	MAX	1.0E-03	9E-05	1.9E-02	5E-03	Not Applicable		
Iron	3.36E+01	MAX	1.0E-03	8E-04	3.00E-01	3E-03	6E-05	Not Available	No Tox data
Lead	3.77E-01	MAX	1.0E-03	8E-06	Not Available	No Tox data	7E-07	Not Available	No Tox data
Manganese	3.81E+00	MAX	1.0E-03	9E-05	1.15E-03	7E-02	Not Applicable		
Zinc	4.89E+00	MAX	1.0E-03	1E-04	1.20E-01	9E-04	Not Applicable		
					HAZARD INDEX:	**3E-01**		**CANCER RISK:**	**5E-06**

CDI of noncarcinogenic chemicals in surface water via dermal contact (adolescent trespasser):
(mg/l water * 1.00E-03 l/cm^3 * PC cm/hour * 1970 cm^2 * 2 hours/day * 120 days/year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in surface water via dermal contact (adolescent trespasser):
(mg/l water * 1.00E-03 l/cm^3 * PC cm/hour * 1970 cm^2 * 2 hours/day * 120 days/year * 6 years)/(57.7 kg * 25550 days)

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SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF CHEMICALS IN SEDIMENT FROM PARCEL C

CHEMICAL	SEDIMENT CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
INORGANICS								
Antimony	8.78E+01	MAX	5E-05	4.00E-04	1E-01	4E-06	Not Available	No Tox data
Arsenic	2.08E+03	MAX	1E-03	3.00E-04	4E+00	1E-04	1.50E+00	2E-04
Copper	4.18E+02	MAX	2E-04	3.7E-02	6E-03	Not Applicable		
Lead	2.84E+03	MAX	2E-03	Not Available	No Tox data	1E-04	Not Available	No Tox data
Mercury	2.10E+00	MAX	1E-06	Not Available	No Tox data	Not Applicable		
				HAZARD INDEX:	4E+00		CANCER RISK:	2E-04

CDI of noncarcinogenic chemicals in sediment via ingestion (adolescent trespasser):
(mg/kg sediment * 1.00E-06 kg/mg * 100 mg/event * 1 * 120 events/year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in sediment via ingestion (adolescent trespasser):
(mg/kg sediment * 1.00E-06 kg/mg * 100 mg/event * 1 * 120 events/year * 6 years)/(57.7 kg * 25550 days)

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SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
CURRENT AND FUTURE SCENARIOS
FOR AN ADOLESCENT TRESPASSER

DERMAL CONTACT WITH CHEMICALS IN SEDIMENT FROM PARCEL C

CHEMICAL	SEDIMENT CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
INORGANICS									
Arsenic	2.08E+03	MAX	3E-02	7E-04	2.40E-04	3E+00	6E-05	1.88E+00	1E-04
					HAZARD INDEX:	**3E+00**		**CANCER RISK:**	**1E-04**

CDI of noncarcinogenic chemicals in sediment via dermal contact (adolescent trespasser):
(mg/kg sediment * 1.00E-06 kg/mg * ABS * 1.00 mg/cm^2 * 1970 cm^2/event * 120 events/year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in sediment via dermal contact (adolescent trespasser):
(mg/kg sediment * 1.00E-06 kg/mg * ABS * 1.00 mg/cm^2 * 1970 cm^2/event * 120 events/year * 6 years)/(57.7 kg * 25550 days)

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADOLESCENT TRESPASSER

INADVERTENT INGESTION OF CHEMICALS IN SURFACE SOIL AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	1.00E-03	MAX	6E-10	3E-03	2E-07	5E-11	2.9E-02	1E-12
SEMI-VOLATILE ORGANICS								
Benzo[a]pyrene	1.27E+00	UCLlog	7E-07	Not Available	No Tox Data	6E-08	7.30E+00	5E-07
Benzo[g,h,i]perylene	8.84E-01	UCLlog	5E-07	Not Available	No Tox Data	Not Applicable		
Dibenz[a,h]anthracene	4.35E-01	UCLlog	2E-07	Not Available	No Tox Data	2E-08	7.30E+00	2E-07
Phenanthrene	2.00E+00	UCLlog	1E-06	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	1.71E-01	UCLlog	1E-07	2.00E-05	5E-03	8E-09	2.00E+00	2E-08
INORGANICS								
Antimony	8.55E+00	UCLlog	5E-06	4.00E-04	1E-02	4E-07	Not Available	No Tox Data
Arsenic	3.68E+02	UCLlog	2E-04	3.00E-04	7E-01	2E-05	1.50E+00	3E-05
Barium	4.41E+02	UCLlog	3E-04	7E-02	4E-03	2E-05	Not Available	No Tox Data
Cobalt	6.63E+02	UCLlog	4E-04	6.00E-02	6E-03	3E-05	Not Available	No Tox Data
Copper	8.65E+02	UCLlog	5E-04	3.7E-02	1E-02	Not Applicable		
Lead	3.14E+02	UCLlog	2E-04	Not Available	No Tox Data	2E-05	Not Available	No Tox Data
Mercury	1.69E+00	UCLlog	1E-06	Not Available	No Tox Data	Not Applicable		
Nickel	3.90E+02	UCLlog	2E-04	2E-02	1E-02	2E-05	Not Available	No Tox Data
Selenium	3.08E+01	UCLlog	2E-05	5.00E-03	4E-03	Not Applicable		
Silver	3.43E+01	MAX	2E-05	5E-03	4E-03	Not Applicable		
				HAZARD INDEX:	**8E-01**		**CANCER RISK:**	**3E-05**

CDI of noncarcinogenic chemicals in surface soils via ingestion (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 120 days/year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via ingestion (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 120 days/year * 6 years)/(57.7 kg * 25550 days)

302719

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADOLESCENT TRESPASSER

DERMAL CONTACT WITH CHEMICALS IN SURFACE SOIL AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	1.71E-01	UCLlog	1E-01	3E-07	2.00E-05	1E-02	2E-08	2.00E+00	5E-08
INORGANICS									
Arsenic	3.68E+02	UCLlog	3E-02	1E-04	2.40E-04	5E-01	1E-05	1.88E+00	2E-05
					HAZARD INDEX:	5E-01		CANCER RISK:	2E-05

CDI of noncarcinogenic chemicals in surface soils via dermal contact (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 1970 cm^2/event * 120 events /year * 6 years)/(57.7 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (adolescent trespasser):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 1970 cm^2/event * 120 events/year * 6 years)/(57.7 kg * 25550 days)

302720

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

INADVERTENT INGESTION OF CHEMICALS IN SURFACE SOIL AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	1.00E-03	MAX	5E-10	3E-03	2E-07	2E-10	2.9E-02	5E-12
SEMI-VOLATILE ORGANICS								
Benzo[a]pyrene	1.27E+00	UCLlog	6E-07	Not Available	No Tox Data	2E-07	7.30E+00	2E-06
Benzo[g,h,i]perylene	8.84E-01	UCLlog	4E-07	Not Available	No Tox Data	Not Applicable		
Dibenz[a,h]anthracene	4.35E-01	UCLlog	2E-07	Not Available	No Tox Data	8E-08	7.30E+00	6E-07
Phenanthrene	2.00E+00	UCLlog	1E-06	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	1.71E-01	UCLlog	8E-08	2.00E-05	4E-03	3E-08	2.00E+00	6E-08
INORGANICS								
Antimony	8.55E+00	UCLlog	4E-06	4.00E-04	1E-02	1E-06	Not Available	No Tox Data
Arsenic	3.68E+02	UCLlog	2E-04	3.00E-04	6E-01	6E-05	1.50E+00	1E-04
Barium	4.41E+02	UCLlog	2E-04	7E-02	3E-03	8E-05	Not Available	No Tox Data
Cobalt	6.63E+02	UCLlog	3E-04	6.00E-02	5E-03	1E-04	Not Available	No Tox Data
Copper	8.65E+02	UCLlog	4E-04	3.7E-02	1E-02	Not Applicable		
Lead	3.14E+02	UCLlog	2E-04	Not Available	No Tox Data	5E-05	Not Available	No Tox Data
Mercury	1.69E+00	UCLlog	8E-07	Not Available	No Tox Data	Not Applicable		
Nickel	3.90E+02	UCLlog	2E-04	2E-02	1E-02	7E-05	Not Available	No Tox Data
Selenium	3.08E+01	UCLlog	2E-05	5.00E-03	3E-03	Not Applicable		
Silver	3.43E+01	MAX	2E-05	5E-03	3E-03	Not Applicable		
				HAZARD INDEX:	**7E-01**		**CANCER RISK:**	**1E-04**

CDI of noncarcinogenic chemicals in subsurface soils via ingestion (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 kg * 9125 days)
CDI of carcinogenic chemicals in subsurface soils via ingestion (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 kg * 25550 days)

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

DERMAL CONTACT WITH CHEMICALS IN SURFACE SOIL AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	1.71E-01	UCLlog	1E-01	6E-07	2.00E-05	3E-02	2E-07	2.00E+00	4E-07
INORGANICS									
Arsenic	3.68E+02	UCLlog	3E-02	3E-04	2.40E-04	1E+00	1E-04	1.88E+00	2E-04
					HAZARD INDEX:	1E+00		CANCER RISK:	2E-04

CDI of noncarcinogenic chemicals in surface soils via dermal contact (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2570 cm^2/event * 250 events /year * 25 years)/(70 kg * 9125 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (site worker):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2570 cm^2/event * 250 events/year * 25 years)/(70 kg * 25550 days)

302722

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

INADVERTENT INGESTION OF CHEMICALS IN SURFACE SOIL AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	4.00E-03	MAX	2E-09	3E-03	7E-07	7E-10	2.9E-02	2E-11
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	8.30E-02	MAX	4E-08	Not Available	No Tox Data	Not Applicable		
Phenanthrene	7.20E-02	MAX	4E-08	Not Available	No Tox Data	Not Applicable		
INORGANICS								
Antimony	4.16E+02	MAX	2E-04	4.00E-04	5E-01	7E-05	Not Available	No Tox Data
Arsenic	1.79E+03	MAX	9E-04	3.00E-04	3E+00	3E-04	1.50E+00	5E-04
Cobalt	4.66E+03	MAX	2E-03	6.00E-02	4E-02	8E-04	Not Available	No Tox Data
Copper	2.16E+03	MAX	1E-03	3.7E-02	3E-02	Not Applicable		
Iron	1.93E+05	MAX	9E-02	3.00E-01	3E-01	3E-02	Not Available	No Tox Data
Lead	3.71E+03	MAX	2E-03	Not Available	No Tox Data	6E-04	Not Available	No Tox Data
Manganese	5.68E+03	MAX	3E-03	2.3E-02	1E-01	Not Applicable		
Mercury	1.80E+00	MAX	9E-07	Not Available	No Tox Data	Not Applicable		
Nickel	2.89E+04	MAX	1E-02	2E-02	7E-01	5E-03	Not Available	No Tox Data
Silver	1.03E+02	MAX	5E-05	5E-03	1E-02	Not Applicable		
				HAZARD INDEX:	**5E+00**		**CANCER RISK:**	**5E-04**

CDI of noncarcinogenic chemicals in subsurface soils via ingestion (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 kg * 9125 days)
CDI of carcinogenic chemicals in subsurface soils via ingestion (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 kg * 25550 days)

302723

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

DERMAL CONTACT WITH CHEMICALS IN SURFACE SOIL AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
INORGANICS									
Arsenic	1.79E+03	MAX	3E-02	1E-03	2.4E-04	6E+00	5E-04	1.9E+00	9E-04
					HAZARD INDEX:	6E+00		CANCER RISK:	9E-04

CDI of noncarcinogenic chemicals in surface soils via dermal contact (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2570 cm^2/event * 250 events /year * 25 years)/(70 kg * 9125 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (site worker):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2570 cm^2/event * 250 events/year * 25 years)/(70 kg * 25550 days)

302724

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

INADVERTENT INGESTION OF CHEMICALS IN SURFACE SOIL AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	2.19E-01	UCLnorm	1E-07	Not Available	No Tox Data	Not Applicable		
Phenanthrene	2.47E-01	UCLnorm	1E-07	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	9.42E+00	UCLlog	5E-06	2.00E-05	2E-01	2E-06	2.00E+00	3E-06
INORGANICS								
Antimony	4.34E+03	UCLlog	2E-03	4.00E-04	5E+00	8E-04	Not Available	No Tox Data
Arsenic	6.30E+03	MAX	3E-03	3.00E-04	1E+01	1E-03	1.50E+00	2E-03
Cobalt	4.62E+03	MAX	2E-03	6.00E-02	4E-02	8E-04	Not Available	No Tox Data
Copper	4.61E+03	MAX	2E-03	3.7E-02	6E-02	Not Applicable		
Iron	1.85E+05	UCLlog	9E-02	3.00E-01	3E-01	3E-02	Not Available	No Tox Data
Lead	1.96E+04	MAX	1E-02	Not Available	No Tox Data	3E-03	Not Available	No Tox Data
Manganese	9.00E+04	MAX	4E-02	2.3E-02	2E+00	Not Applicable		
Mercury	8.23E+00	UCLlog	4E-06	Not Available	No Tox Data	Not Applicable		
Nickel	2.20E+04	MAX	1E-02	2E-02	5E-01	4E-03	Not Available	No Tox Data
Silver	1.14E+02	MAX	6E-05	5E-03	1E-02	Not Applicable		
Thallium	4.94E+00	UCLlog	2E-06	8.00E-05	3E-02	Not Applicable		
				HAZARD INDEX:	**2E+01**		**CANCER RISK:**	**2E-03**

CDI of noncarcinogenic chemicals in subsurface soils via ingestion (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 kg * 9125 days)
CDI of carcinogenic chemicals in subsurface soils via ingestion (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 kg * 25550 days)

302725

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

DERMAL CONTACT WITH CHEMICALS IN SURFACE SOIL AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	9.42E+00	UCLlog	1E-01	3E-05	2.00E-05	2E+00	1E-05	2.00E+00	2E-05
INORGANICS									
Arsenic	6.30E+03	MAX	3E-02	5E-03	2.40E-04	2E+01	2E-03	1.88E+00	3E-03
					HAZARD INDEX:	2E+01		CANCER RISK:	3E-03

CDI of noncarcinogenic chemicals in surface soils via dermal contact (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2570 cm^2/event * 250 events /year * 25 years)/(70 kg * 9125 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (site worker):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2570 cm^2/event * 250 events/year * 25 years)/(70 kg * 25550 days)

302726

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FUTURE SCENARIO: FOR A SITE WORKER

INADVERTENT INGESTION OF CHEMICALS IN SURFACE SOIL AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	2.00E-03	MAX	1E-09	3E-03	3E-07	3E-10	2.9E-02	1E-11
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	6.20E-02	MAX	3E-08	Not Available	No Tox Data	Not Applicable		
Phenanthrene	6.40E-02	MAX	3E-08	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	2.89E+00	MAX	1E-06	2.00E-05	7E-02	5E-07	2.00E+00	1E-06
INORGANICS								
Antimony	2.43E+03	MAX	1E-03	4.00E-04	3E+00	4E-04	Not Available	No Tox Data
Arsenic	1.44E+03	MAX	7E-04	3.00E-04	2E+00	3E-04	1.50E+00	4E-04
Barium	1.35E+03	MAX	7E-04	7E-02	9E-03	2E-04	Not Available	No Tox Data
Beryllium	1.10E+01	MAX	5E-06	5.00E-03	1E-03	2E-06	4.30E+00	8E-06
Cobalt	7.64E+02	MAX	4E-04	6.00E-02	6E-03	1E-04	Not Available	No Tox Data
Copper	2.07E+03	MAX	1E-03	3.7E-02	3E-02	Not Applicable		
Lead	5.14E+03	MAX	3E-03	Not Available	No Tox Data	9E-04	Not Available	No Tox Data
Manganese	2.93E+03	MAX	1E-03	2.3E-02	6E-02	Not Applicable		
Mercury	6.20E+00	MAX	3E-06	Not Available	No Tox Data	Not Applicable		
Silver	1.10E+02	MAX	5E-05	5E-03	1E-02	Not Applicable		
				HAZARD INDEX:	6E+00		CANCER RISK:	4E-04

CDI of noncarcinogenic chemicals in subsurface soils via ingestion (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 kg * 9125 days)
CDI of carcinogenic chemicals in subsurface soils via ingestion (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 50 mg/day * 1 * 250 days/year * 25 years)/(70 kg * 25550 days)

302727

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

DERMAL CONTACT WITH CHEMICALS IN SURFACE SOIL AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	2.89E+00	MAX	1E-01	1E-05	2.00E-05	5E-01	4E-06	2.00E+00	7E-06
INORGANICS									
Arsenic	1.44E+03	MAX	3E-02	1E-03	2.40E-04	5E+00	4E-04	1.88E+00	7E-04
					HAZARD INDEX:	5E+00		CANCER RISK:	7E-04

CDI of noncarcinogenic chemicals in surface soils via dermal contact (site worker):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2570 cm^2/event * 250 events /year * 25 years)/(70 kg * 9125 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (site worker):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2570 cm^2/event * 250 events/year * 25 years)/(70 kg * 25550 days)

302728

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

INGESTION OF CHEMICALS IN GROUNDWATER

CHEMICAL	WATER CONCENTRATION (mg/l)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUIOTENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS							
Benzene	9.39E-02 UCLlog	9E-04	3E-03	3E-01	3E-04	2.9E-02	1E-05
1,1-Dichloroethene	9.27E-02 UCLlog	9E-04	9E-03	1E-01	3E-04	6E-01	2E-04
1,2-Dichloroethene (total)	1.86E+01 UCLlog	2E-01	9.00E-03	2E+01	7E-02	Not Available	No Tox Data
Methylene chloride	6.92E-01 UCLlog	7E-03	6E-02	1E-01	2E-03	7.5E-03	2E-05
1,1,1-Trichloroethane	9.08E-01 UCLlog	9E-03	2E-02	4E-01	Not Applicable		
Trichloroethene	3.08E+00 UCLlog	3E-02	6.00E-03	5E+00	1E-02	1.10E-02	1E-04
Tetrachloroethene	1.45E+00 UCLlog	1E-02	1E-02	1E+00	5E-03	5.20E-02	3E-04
Vinyl chloride	1.21E-01 UCLlog	1E-03	Not Available	No Tox Data	4E-04	1.90E+00	8E-04
SEMI - VOLATILES ORGANICS							
Phenanthrene	1.08E-02 UCLlog	1E-04	Not Available	No Tox Data	Not Applicable		
INORGANICS							
Antimony	3.89E-01 UCLlog	4E-03	4.00E-04	1E+01	1E-03	Not Available	No Tox Data
Arsenic	4.95E-01 UCLlog	5E-03	3.00E-04	2E+01	2E-03	1.50E+00	3E-03
Cadmium	5.08E-02 UCLlog	5E-04	5E-04	1E+00	2E-04	Not Available	No Tox Data
Calcium	1.72E+02 UCLlog	2E+00	Not available	No Tox Data	6E-01	Not Available	No Tox Data
Copper	3.47E+00 UCLlog	3E-02	3.7E-02	9E-01	Not Applicable		
Lead	5.07E-01 UCLlog	5E-03	Not available	No Tox Data	2E-03	Not Available	No Tox Data
Magnesium	4.19E+01 UCLlog	4E-01	Not available	No Tox Data	1E-01	Not Available	No Tox Data
Mercury	1.02E-03 UCLlog	1E-05	Not available	No Tox Data	Not Applicable		
Nickel	1.87E+00 UCLlog	2E-02	2E-02	9E-01	7E-03	Not Available	No Tox Data
Sodium	3.58E+02 UCLlog	4E+00	Not Available	No Tox Data	1E+00	Not Available	No Tox Data
			HAZARD INDEX:	**6E+01**		**CANCER RISK:**	**4E-03**

CDI for noncarcinogenic chemicals in groundwater via ingestion (site worker):
(mg/l water * 1 l/day * 250 days/year * 25 years)/(70 kg * 9125 days)
CDI for carcinogenic chemicals in groundwater via ingestion (site worker):
(mg/l water * 1 l/day * 250 days/year * 25 years)/(70 kg * 25550 days)

302729

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A SITE WORKER

DERMAL CONTACT WITH CHEMICALS IN GROUNDWATER

CHEMICAL	WATER CONCENTRATION (mg/l)		PERMEABILITY COEFFICIENT (cm/hour)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS									
Benzene	9.39E-02	UCLlog	2.1E-02	6E-06	3E-03	2E-03	2E-06	2.9E-02	6E-08
1,1-Dichloroethene	9.27E-02	UCLlog	1.6E-02	4E-06	9E-03	5E-04	2E-06	6E-01	1E-06
1,2-Dichloroethene (total)	1.86E+01	UCLlog	1.0E-02	6E-04	9.00E-03	6E-02	2E-04	Not Available	No Tox Data
Methylene chloride	6.92E-01	UCLlog	4.5E-03	9E-06	6E-02	2E-04	3E-06	7.5E-03	3E-08
1,1,1-Trichloroethane	9.08E-01	UCLlog	1.7E-02	5E-05	2E-02	2E-03	Not Applicable		
Trichloroethene	3.08E+00	UCLlog	1.6E-02	1E-04	6.00E-03	2E-02	5E-05	1.1E-02	6E-07
Tetrachloroethene	1.45E+00	UCLlog	4.8E-02	2E-04	1E-02	2E-02	7E-05	5.2E-02	4E-06
Vinyl chloride	1.21E-01	UCLlog	7.3E-03	3E-06	Not Available	No Tox Data	9E-07	1.9E+00	2E-06
SEMI - VOLATILES ORGANICS									
Phenanthrene	1.08E-02	UCLlog	2.7E-01	1E-05	Not Available	No Tox Data	Not Applicable		
INORGANICS									
Antimony	3.89E-01	UCLlog	1.0E-03	2E-06	4.00E-05	5E-02	5E-07	Not Available	No Tox Data
Arsenic	4.95E-01	UCLlog	1.0E-03	2E-06	2.40E-04	1E-02	7E-07	1.88E+00	1E-06
Cadmium	5.08E-02	UCLlog	1.0E-03	3E-07	2.5E-05	1E-02	7E-08	Not Available	No Tox Data
Calcium	1.72E+02	UCLlog	1.0E-03	9E-04	Not available	No Tox Data	2E-04	Not Available	No Tox Data
Copper	3.47E+00	UCLlog	1.0E-03	2E-05	1.9E-02	9E-04	Not Applicable		
Lead	5.07E-01	UCLlog	1.0E-03	3E-06	Not available	No Tox Data	7E-07	Not Available	No Tox Data
Magnesium	4.19E+01	UCLlog	1.0E-03	2E-04	Not available	No Tox Data	6E-05	Not Available	No Tox Data
Mercury	1.02E-03	UCLlog	1.0E-03	5E-09	Not available	No Tox Data	Not Applicable		
Nickel	1.87E+00	UCLlog	1.0E-03	9E-06	2E-03	5E-03	3E-06	Not Available	No Tox Data
Sodium	3.58E+02	UCLlog	1.0E-03	2E-03	Not Available	No Tox Data	5E-04	Not Available	No Tox Data
					HAZARD INDEX:	**2E-01**		**CANCER RISK:**	**9E-06**

CDI for noncarcinogenic chemicals in groundwater via dermal contact (site worker):
(mg/l water (0.6 times for VOCs)* 1.00E-03 l/cm^3 * PC cm/hour * 2570 cm^2 * 0.2 hours/day * 250 days/year * 25 years)/(70 kg * 9125 days)
CDI for carcinogenic chemicals in groundwater via dermal contact (site worker):
(mg/l water (0.6 times for VOCs)* 1.00E-03 l/cm^3 * PC cm/hour * 2570 cm^2 * 0.2 hours/day * 250 days/year * 25 years)/(70 kg * 25550 days)

302730

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	1.00E-03	MAX	1E-09	3E-03	4E-07	2E-11	2.9E-02	5E-13
SEMI-VOLATILE ORGANICS								
Benzo[a]anthracene	7.65E-01	UCLlog	9E-07	Not Available	No Tox Data	1E-08	7.30E-01	9E-09
Benzo[a]pyrene	1.02E+00	UCLlog	1E-06	Not Available	No Tox Data	2E-08	7.30E+00	1E-07
Benzo[b]fluoranthene	2.38E+00	UCLlog	3E-06	Not Available	No Tox Data	4E-08	7.30E-01	3E-08
Benzo[g,h,i]perylene	8.69E-01	UCLlog	1E-06	Not Available	No Tox Data	Not Applicable		
Dibenz[a,h]anthracene	4.40E-01	UCLlog	5E-07	Not Available	No Tox Data	7E-09	7.30E+00	5E-08
Indeno[1,2,3-cd]pyrene	8.78E-01	UCLlog	1E-06	Not Available	No Tox Data	1E-08	7.30E-01	1E-08
Phenanthrene	2.63E+00	UCLlog	3E-06	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	9.51E-02	UCLlog	1E-07	2.00E-05	5E-03	2E-09	2.00E+00	3E-09
INORGANICS								
Antimony	5.85E+00	UCLlog	7E-06	4.00E-04	2E-02	9E-08	Not Available	No Tox Data
Arsenic	1.68E+02	UCLlog	2E-04	3.00E-04	6E-01	3E-06	1.50E+00	4E-06
Barium	2.03E+02	UCLlog	2E-04	7E-02	3E-03	3E-06	Not Available	No Tox Data
Cobalt	1.58E+02	UCLlog	2E-04	6.00E-02	3E-03	3E-06	Not Available	No Tox Data
Copper	2.88E+02	UCLlog	3E-04	3.7E-02	9E-03	Not Applicable		
Lead	2.34E+02	UCLlog	3E-04	Not Available	No Tox Data	4E-06	Not Available	No Tox Data
Mercury	7.79E-01	UCLlog	9E-07	Not Available	No Tox Data	Not Applicable		
Nickel	1.41E+02	UCLlog	2E-04	2E-02	8E-03	2E-06	Not Available	No Tox Data
Selenium	1.61E+01	UCLlog	2E-05	5.00E-03	4E-03	Not Applicable		
Silver	2.02E+01	UCLlog	2E-05	5E-03	5E-03	Not Applicable		
				HAZARD INDEX:	**7E-01**		**CANCER RISK:**	**4E-06**

CDI of noncarcinogenic chemicals in subsurface soils via ingestion (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 480 mg/day * 1 * 60 days/year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals in subsurface soils via ingestion (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 480 mg/day * 1 * 60 days/year * 1 year)/(70 kg * 25550 days)

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	9.51E-02	UCLlog	1E-01	8E-08	2.00E-05	4.0E-03	1E-09	2.00E+00	2E-09
INORGANICS									
Arsenic	1.68E+02	UCLlog	3E-02	3E-05	2.40E-04	1E-01	4E-07	1.88E+00	8E-07
					HAZARD INDEX:	**1E-01**		**CANCER RISK:**	**8E-07**

CDI of noncarcinogenic chemicals in surface soils via dermal contact (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2570 cm^2/event * 60 events /year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (construction worker):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2570 cm^2/event * 60 events/year * 1 year)/(70 kg * 25550 days)

302732

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RESPIRABLE PARTICULATE MATTER FROM ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CONCENTRATION IN AIR (mg/m3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS									
Benzo[a]anthracene	7.65E-01	UCLlog	1.02E-06	4E-08	Not Available	No Tox Data	6E-10	Not Available	No Tox Data
Benzo[a]pyrene	1.02E+00	UCLlog	1.37E-06	6E-08	Not Available	No Tox Data	8E-10	Not Available	No Tox Data
Benzo[b]fluoranthene	2.38E+00	UCLlog	3.19E-06	1E-07	Not Available	No Tox Data	2E-09	Not Available	No Tox Data
Benzo[g,h,i]perylene	8.69E-01	UCLlog	1.16E-06	5E-08	Not Available	No Tox Data	Not Applicable		
Dibenz[a,h]anthracene	4.40E-01	UCLlog	5.90E-07	3E-08	Not Available	No Tox Data	4E-10	Not Available	No Tox Data
Indeno[1,2,3-cd]pyrene	8.78E-01	UCLlog	1.18E-06	5E-08	Not Available	No Tox Data	7E-10	Not Available	No Tox Data
Phenanthrene	2.63E+00	UCLlog	3.53E-06	2E-07	Not Available	No Tox Data	Not Applicable		
PCBs									
PCBs (total)	9.51E-02	UCLlog	1.27E-07	6E-09	Not Available	No Tox Data	8E-11	2.00E+00	2E-10
INORGANICS									
Antimony	5.85E+00	UCLlog	7.83E-06	3E-07	Not Available	No Tox Data	5E-09	Not Available	No Tox Data
Arsenic	1.68E+02	UCLlog	2.26E-04	1E-05	Not Available	No Tox Data	1E-07	1.5E+01	2E-06
Barium	2.03E+02	UCLlog	2.72E-04	1E-05	1E-04	1E-01	2E-07	Not Available	No Tox Data
Cobalt	1.58E+02	UCLlog	2.11E-04	9E-06	5.71E-06	2E+00	1E-07	Not Available	No Tox Data
Copper	2.88E+02	UCLlog	3.86E-04	2E-05	Not Available	No Tox Data	Not Applicable		
Lead	2.34E+02	UCLlog	3.14E-04	1E-05	Not Available	No Tox Data	2E-07	Not Available	No Tox Data
Mercury	7.79E-01	UCLlog	1.04E-06	5E-08	8.57E-05	5E-04	Not Applicable		
Nickel	1.41E+02	UCLlog	1.89E-04	8E-06	Not Available	No Tox Data	1E-07	Not Available	No Tox Data
Selenium	1.61E+01	UCLlog	2.16E-05	9E-07	Not Available	No Tox Data	Not Applicable	Not Available	
Silver	2.02E+01	UCLlog	2.71E-05	1E-06	2.86E-06	4E-01	Not Applicable		
					HAZARD INDEX	**2E+00**		**CANCER RISK:**	**2E-06**

CDI of noncarcinogenic chemicals via inhalation of particulate matter (construction worker):
(mg/kg * 1.34E-06 kg/m^3 * 2.3 m^3/hour * 8 hours/day * 60 days/year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals via inhalation of particulate matter (construction worker):
(mg/kg *1.34E-06 kg/m^3 * 2.3 m^3/hour * 8 hours/day * 60 days/year * 1 year)/(70 kg * 25550 days)

302733

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	4.00E-03	MAX	5E-09	3E-03	2E-06	6E-11	2.9E-02	2E-12
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	8.30E-02	MAX	9E-08	Not Available	No Tox Data	Not Applicable		
Phenanthrene	8.60E-02	MAX	1E-07	Not Available	No Tox Data	Not Applicable		
INORGANICS								
Antimony	4.16E+02	MAX	5E-04	4.00E-04	1E+00	7E-06	Not Available	No Tox Data
Arsenic	1.79E+03	MAX	2E-03	3.00E-04	7E+00	3E-05	1.50E+00	4E-05
Cobalt	4.66E+03	MAX	5E-03	6.00E-02	9E-02	8E-05	Not Available	No Tox Data
Copper	2.16E+03	MAX	2E-03	3.7E-02	7E-02	Not Applicable		
Lead	3.71E+03	MAX	4E-03	Not Available	No Tox Data	6E-05	Not Available	No Tox Data
Manganese	2.25E+03	UCLlog	3E-03	2.3E-02	1E-01	Not Applicable		
Mercury	1.80E+00	MAX	2E-06	Not Available	No Tox Data	Not Applicable		
Nickel	2.89E+04	MAX	3E-02	2E-02	2E+00	5E-04	Not Available	No Tox Data
Silver	1.03E+02	MAX	1E-04	5E-03	2E-02	Not Applicable		
				HAZARD INDEX:	**1E+01**		**CANCER RISK:**	**4E-05**

CDI of noncarcinogenic chemicals in subsurface soils via ingestion (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 480 mg/day * 1 * 60 days/year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals in subsurface soils via ingestion (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 480 mg/day * 1 * 60 days/year * 1 year)/(70 kg * 25550 days)

302734

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
INORGANICS									
Arsenic	1.79E+03	MAX	3E-02	3E-04	2.40E-04	1E+00	5E-06	1.88E+00	9E-06
					HAZARD INDEX:	**1E+00**		**CANCER RISK:**	**9E-06**

CDI of noncarcinogenic chemicals in surface soils via dermal contact (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2570 cm^2/event * 60 events /year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (construction worker):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2570 cm^2/event * 60 events/year * 1 year)/(70 kg * 25550 days)

302735

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RESPIRABLE PARTICULATE MATTER FROM ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CONCENTRATION IN AIR (mg/m3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS									
Benzo[g,h,i]perylene	8.30E-02	MAX	1.11E-07	5E-09	Not Available	No Tox Data	Not Applicable		
Phenanthrene	8.60E-02	MAX	1.15E-07	5E-09	Not Available	No Tox Data	Not Applicable		
INORGANICS									
Antimony	4.16E+02	MAX	5.57E-04	2E-05	Not Available	No Tox Data	3E-07	Not Available	No Tox Data
Arsenic	1.79E+03	MAX	2.40E-03	1E-04	Not Available	No Tox Data	1E-06	1.5E+01	2E-05
Cobalt	4.66E+03	MAX	6.24E-03	3E-04	5.71E-06	5E+01	4E-06	Not Available	No Tox Data
Copper	2.16E+03	MAX	2.89E-03	1E-04	Not Available	No Tox Data	Not Applicable		
Lead	3.71E+03	MAX	4.97E-03	2E-04	Not Available	No Tox Data	3E-06	Not Available	No Tox Data
Manganese	2.25E+03	UCLlog	3.02E-03	1E-04	1.43E-05	9E+00	Not Applicable		
Mercury	1.80E+00	MAX	2.41E-06	1E-07	8.57E-05	1E-03	Not Applicable		
Nickel	2.89E+04	MAX	3.87E-02	2E-03	Not Available	No Tox Data	2E-05	Not Available	No Tox Data
Silver	1.03E+02	MAX	1.38E-04	6E-06	2.86E-06	2E+00	Not Applicable		
					HAZARD INDEX	**6E+01**		**CANCER RISK:**	**2E-05**

CDI of noncarcinogenic chemicals via inhalation of particulate matter (construction worker):
(mg/kg * 1.34E-06 kg/m^3 * 2.3 m^3/hour * 8 hours/day * 60 days/year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals via inhalation of particulate matter (construction worker):
(mg/kg *1.34E-06 kg/m^3 * 2.3 m^3/hour * 8 hours/day * 60 days/year * 1 year)/(70 kg * 25550 days)

302736

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	2.66E-01	UCLlog	3E-07	Not Available	No Tox Data	Not Applicable		
Phenanthrene	3.00E-01	UCLlog	3E-07	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	1.26E+00	UCLlog	1E-06	2.00E-05	7E-02	2E-08	2.00E+00	4E-08
INORGANICS								
Antimony	1.12E+03	UCLlog	1E-03	4.00E-04	3E+00	2E-05	Not Available	No Tox Data
Arsenic	6.30E+03	MAX	7E-03	3.00E-04	2E+01	1E-04	1.50E+00	2E-04
Cobalt	1.05E+03	UCLlog	1E-03	6.00E-02	2E-02	2E-05	Not Available	No Tox Data
Copper	4.61E+03	MAX	5E-03	3.7E-02	1E-01	Not Applicable		
Iron	8.33E+04	UCLlog	9E-02	3.00E-01	3E-01	1E-03	Not Available	No Tox Data
Lead	1.96E+04	MAX	2E-02	Not Available	No Tox Data	3E-04	Not Available	No Tox Data
Manganese	1.99E+04	UCLlog	2E-02	2.3E-02	1E+00	Not Applicable		
Mercury	2.98E+00	UCLlog	3E-06	Not Available	No Tox Data	Not Applicable		
Nickel	1.57E+03	UCLlog	2E-03	2E-02	9E-02	3E-05	Not Available	No Tox Data
Silver	1.14E+02	MAX	1E-04	5E-03	3E-02	Not Applicable		
				HAZARD INDEX:	**3E+01**		**CANCER RISK:**	**2E-04**

CDI of noncarcinogenic chemicals in subsurface soils via ingestion (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 480 mg/day * 1 * 60 days/year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals in subsurface soils via ingestion (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 480 mg/day * 1 * 60 days/year * 1 year)/(70 kg * 25550 days)

302737

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	1.26E+00	UCLlog	1E-01	1E-06	2.00E-05	5E-02	2E-08	2.00E+00	3E-08
INORGANICS									
Arsenic	6.30E+03	UCL	3E-02	1E-03	2.40E-04	5E+00	2E-05	1.88E+00	3E-05
					HAZARD INDEX:	**5E+00**		**CANCER RISK:**	**3E-05**

CDI of noncarcinogenic chemicals in surface soils via dermal contact (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2570 cm^2/event * 60 events /year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (construction worker):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2570 cm^2/event * 60 events/year * 1 year)/(70 kg * 25550 days)

302738

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RESPIRABLE PARTICULATE MATTER FROM ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CONCENTRATION IN AIR (mg/m3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS									
Benzo[g,h,i]perylene	2.66E-01	UCLlog	3.57E-07	2E-08	Not Available	No Tox Data	Not Applicable		
Phenanthrene	3.00E-01	UCLlog	4.02E-07	2E-08	Not Available	No Tox Data	Not Applicable		
PCBs									
PCBs (total)	1.26E+00	UCLlog	1.69E-06	7E-08	Not Available	No Tox Data	1E-09	2.00E+00	2E-09
INORGANICS									
Antimony	1.12E+03	UCLlog	1.50E-03	6E-05	Not Available	No Tox Data	9E-07	Not Available	No Tox Data
Arsenic	6.30E+03	MAX	8.44E-03	4E-04	Not Available	No Tox Data	5E-06	1.5E+01	8E-05
Cobalt	1.05E+03	UCLlog	1.41E-03	6E-05	5.71E-06	1E+01	9E-07	Not Available	No Tox Data
Copper	4.61E+03	MAX	6.18E-03	3E-04	Not Available	No Tox Data	Not Applicable		
Iron	8.33E+04	UCLlog	1.12E-01	5E-03	Not Available	No Tox Data	7E-05	Not Available	No Tox Data
Lead	1.96E+04	MAX	2.63E-02	1E-03	Not Available	No Tox Data	2E-05	Not Available	No Tox Data
Manganese	1.99E+04	UCLlog	2.67E-02	1E-03	1.43E-05	8E+01	Not Applicable		
Mercury	2.98E+00	UCLlog	3.99E-06	2E-07	8.57E-05	2E-03	Not Applicable		
Nickel	1.57E+03	UCLlog	2.11E-03	9E-05	Not Available	No Tox Data	1E-06	Not Available	No Tox Data
Silver	1.14E+02	MAX	1.53E-04	7E-06	2.86E-06	2E+00	Not Applicable		
					HAZARD INDEX	**9E+01**		**CANCER RISK:**	**8E-05**

CDI of noncarcinogenic chemicals via inhalation of particulate matter (construction worker):
(mg/kg * 1.34E-06 kg/m^3 * 2.3 m^3/hour * 8 hours/day * 60 days/year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals via inhalation of particulate matter (construction worker):
(mg/kg *1.34E-06 kg/m^3 * 2.3 m^3/hour * 8 hours/day * 60 days/year * 1 year)/(70 kg * 25550 days)

302739

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	2.00E-03	MAX	2E-09	3E-03	8E-07	3E-11	2.9E-02	9E-13
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	3.20E-01	MAX	4E-07	Not Available	No Tox Data	Not Applicable		
Phenanthrene	3.20E-01	MAX	4E-07	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	1.12E+00	UCLlog	1E-06	2.00E-05	6E-02	2E-08	2.00E+00	4E-08
INORGANICS								
Antimony	3.49E+03	MAX	4E-03	4.00E-04	1E+01	6E-05	Not Available	No Tox Data
Arsenic	2.95E+03	MAX	3E-03	3.00E-04	1E+01	5E-05	1.50E+00	7E-05
Barium	8.52E+02	UCLlog	1E-03	7E-02	1E-02	1E-05	Not Available	No Tox Data
Beryllium	1.33E+00	UCLlog	1E-06	5.00E-03	3E-04	2E-08	4.30E+00	9E-08
Cobalt	7.64E+02	MAX	9E-04	6.00E-02	1E-02	1E-05	Not Available	No Tox Data
Copper	6.74E+03	MAX	8E-03	3.7E-02	2E-01	Not Applicable		
Iron	6.93E+04	UCLnorm	8E-02	3.00E-01	3E-01	1E-03	Not Available	No Tox Data
Lead	5.14E+03	MAX	6E-03	Not Available	No Tox Data	8E-05	Not Available	No Tox Data
Manganese	2.79E+03	UCLlog	3E-03	2.3E-02	1E-01	Not Applicable		
Mercury	2.95E+01	MAX	3E-05	Not Available	No Tox Data	Not Applicable		
Silver	1.10E+02	MAX	1E-04	5E-03	2E-02	Not Applicable		
				HAZARD INDEX:	**2E+01**		**CANCER RISK:**	**7E-05**

CDI of noncarcinogenic chemicals in subsurface soils via ingestion (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 480 mg/day * 1 * 60 days/year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals in subsurface soils via ingestion (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 480 mg/day * 1 * 60 days/year * 1 year)/(70 kg * 25550 days)

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	1.12E+00	UCLlog	1E-01	9E-07	2.00E-05	5E-02	1E-08	2.00E+00	3E-08
INORGANICS									
Arsenic	2.95E+03	MAX	3E-02	5E-04	2.40E-04	2E+00	8E-06	1.88E+00	1E-05
					HAZARD INDEX:	**2E+00**		**CANCER RISK:**	**1E-05**

CDI of noncarcinogenic chemicals in surface soils via dermal contact (construction worker):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2570 cm^2/event * 60 events /year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (construction worker):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2570 cm^2/event * 60 events/year * 1 year)/(70 kg * 25550 days)

302741

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CONSTRUCTION WORKER

INHALATION OF RESPIRABLE PARTICULATE MATTER FROM ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CONCENTRATION IN AIR (mg/m3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS									
Benzo[g,h,i]perylene	3.20E-01	MAX	4.29E-07	2E-08	Not Available	No Tox Data	Not Applicable		
Phenanthrene	3.20E-01	MAX	4.29E-07	2E-08	Not Available	No Tox Data	Not Applicable		
PCBs									
PCBs (total)	1.12E+00	UCLlog	1.50E-06	6E-08	Not Available	No Tox Data	9E-10	2.00E+00	2E-09
INORGANICS									
Antimony	3.49E+03	MAX	4.68E-03	2E-04	Not Available	No Tox Data	3E-06	Not Available	No Tox Data
Arsenic	2.95E+03	MAX	3.95E-03	2E-04	Not Available	No Tox Data	2E-06	1.5E+01	4E-05
Barium	8.52E+02	UCLlog	1.14E-03	5E-05	1.00E-04	5E-01	7E-07	Not Available	No Tox Data
Beryllium	1.33E+00	UCLlog	1.78E-06	8E-08	Not Available	No Tox Data	1E-09	8.40E+00	9E-09
Cobalt	7.64E+02	MAX	1.02E-03	4E-05	5.71E-06	8E+00	6E-07	Not Available	No Tox Data
Copper	6.74E+03	MAX	9.03E-03	4E-04	Not Available	No Tox Data	Not Applicable		
Iron	6.93E+04	UCLnorm	9.29E-02	4E-03	Not Available	No Tox Data	6E-05	Not Available	No Tox Data
Lead	5.14E+03	MAX	6.89E-03	3E-04	Not Available	No Tox Data	4E-06	Not Available	No Tox Data
Manganese	2.79E+03	UCLlog	3.74E-03	2E-04	1.43E-05	1E+01	Not Applicable		
Mercury	2.95E+01	MAX	3.95E-05	2E-06	8.57E-05	2E-02	Not Applicable		
Silver	1.10E+02	MAX	1.47E-04	6E-06	2.86E-06	2E+00	Not Applicable		
					HAZARD INDEX:	**2E+01**		**CANCER RISK:**	**4E-05**

CDI of noncarcinogenic chemicals via inhalation of particulate matter (construction worker):
(mg/kg * 1.34E-06 kg/m^3 * 2.3 m^3/hour * 8 hours/day * 60 days/year * 1 year)/(70 kg * 365 days)
CDI of carcinogenic chemicals via inhalation of particulate matter (construction worker):
(mg/kg *1.34E-06 kg/m^3 * 2.3 m^3/hour * 8 hours/day * 60 days/year * 1 year)/(70 kg * 25550 days)

302742

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	1.00E-03	MAX	1E-09	3E-03	5E-07	5E-10	2.9E-02	1E-11
SEMI-VOLATILE ORGANICS								
Benzo[a]anthracene	7.65E-01	UCLlog	1E-06	Not Available	No Tox Data	4E-07	7.30E-01	3E-07
Benzo[a]pyrene	1.02E+00	UCLlog	1E-06	Not Available	No Tox Data	5E-07	7.30E+00	3E-06
Benzo[b]fluoranthene	2.38E+00	UCLlog	3E-06	Not Available	No Tox Data	1E-06	7.30E-01	8E-07
Benzo[g,h,i]perylene	8.69E-01	UCLlog	1E-06	Not Available	No Tox Data	Not Applicable		
Dibenz[a,h]anthracene	4.40E-01	UCLlog	6E-07	Not Available	No Tox Data	2E-07	7.30E+00	2E-06
Indeno[1,2,3-cd]pyrene	8.78E-01	UCLlog	1E-06	Not Available	No Tox Data	4E-07	7.30E-01	3E-07
Phenanthrene	2.63E+00	UCLlog	4E-06	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	9.51E-02	UCLlog	1E-07	2.00E-05	7E-03	4E-08	2.00E+00	9E-08
INORGANICS								
Antimony	5.85E+00	UCLlog	8E-06	4.00E-04	2E-02	3E-06	Not Available	No Tox Data
Arsenic	1.68E+02	UCLlog	2E-04	3.00E-04	8E-01	8E-05	1.50E+00	1E-04
Barium	2.03E+02	UCLlog	3E-04	7E-02	4E-03	1E-04	Not Available	No Tox Data
Cobalt	1.58E+02	UCLlog	2E-04	6.00E-02	4E-03	7E-05	Not Available	No Tox Data
Copper	2.88E+02	UCLlog	4E-04	3.7E-02	1E-02	Not Applicable		
Lead	2.34E+02	UCLlog	3E-04	Not Available	No Tox Data	1E-04	Not Available	No Tox Data
Mercury	7.79E-01	UCLlog	1E-06	Not Available	No Tox Data	Not Applicable		
Nickel	1.41E+02	UCLlog	2E-04	2E-02	1E-02	7E-05	Not Available	No Tox Data
Selenium	1.61E+01	UCLlog	2E-05	5.00E-03	4E-03	Not Applicable		
Silver	2.02E+01	UCLlog	3E-05	5E-03	6E-03	Not Applicable		
				HAZARD INDEX:	8E-01		CANCER RISK:	1E-04

CDI of non-carcinogenic chemicals in surface soils via ingestion (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 350 days/year * 30 years)/(70 kg * 10950 days)
CDI of carcinogenic chemicals in surface soils via ingestion (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 350 days/year * 24 years)/(70 kg * 25550 days)

302743

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	9.51E-02	UCLlog	1E-01	4E-07	2.00E-05	2E-02	2E-07	2.00E+00	3E-07
INORGANICS									
Arsenic	1.68E+02	UCLlog	3E-02	2E-04	2.40E-04	7E-01	6E-05	1.88E+00	1E-04
					HAZARD INDEX:	**7E-01**		**CANCER RISK:**	**1E-04**

CDI of non-carcinogenic chemicals in surface soils via dermal contact (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2425 cm^2/event * 350 events /year * 30 years)/(70 kg * 10950 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (adult resident):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2425 cm^2/event * 350 events/year * 24 years)/(70 kg * 25550 days)

302744

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	4.00E-03	MAX	5E-09	3E-03	2E-06	2E-09	2.9E-02	5E-11
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	8.30E-02	MAX	1E-07	Not Available	No Tox Data	Not Applicable		
Phenanthrene	8.60E-02	MAX	1E-07	Not Available	No Tox Data	Not Applicable		
INORGANICS								
Antimony	4.16E+02	MAX	6E-04	4.00E-04	1E+00	2E-04	Not Available	No Tox Data
Arsenic	1.79E+03	MAX	2E-03	3.00E-04	8E+00	8E-04	1.50E+00	1E-03
Cobalt	4.66E+03	MAX	6E-03	6.00E-02	1E-01	2E-03	Not Available	No Tox Data
Copper	2.16E+03	MAX	3E-03	3.7E-02	8E-02	Not Applicable		
Lead	3.71E+03	MAX	5E-03	Not Available	No Tox Data	2E-03	Not Available	No Tox Data
Manganese	2.25E+03	UCLlog	3E-03	2.3E-02	1E-01	Not Applicable		
Mercury	1.80E+00	MAX	2E-06	Not Available	No Tox Data	Not Applicable		
Nickel	2.89E+04	MAX	4E-02	2E-02	2E+00	1E-02	Not Available	No Tox Data
Silver	1.03E+02	MAX	1E-04	5E-03	3E-02	Not Applicable		
				HAZARD INDEX:	**1E+01**		**CANCER RISK:**	**1E-03**

CDI of non-carcinogenic chemicals in surface soils via ingestion (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 350 days/year * 30 years)/(70 kg * 10950 days)
CDI of carcinogenic chemicals in surface soils via ingestion (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 350 days/year * 24 years)/(70 kg * 25550 days)

302745

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
INORGANICS									
Arsenic	1.79E+03	MAX	3E-02	2E-03	2.40E-04	7E+00	6E-04	1.88E+00	1E-03
					HAZARD INDEX:	**7E+00**		**CANCER RISK:**	**1E-03**

CDI of non-carcinogenic chemicals in surface soils via dermal contact (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2425 cm^2/event * 350 events /year * 30 years)/(70 kg * 10950 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (adult resident):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2425 cm^2/event * 350 events/year * 24 years)/(70 kg * 25550 days)

302746

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	2.66E-01	UCLlog	4E-07	Not Available	No Tox Data	Not Applicable		
Phenanthrene	3.00E-01	UCLlog	4E-07	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	1.26E+00	UCLlog	2E-06	2.00E-05	9E-02	6E-07	2.00E+00	1E-06
INORGANICS								
Antimony	1.12E+03	UCLlog	2E-03	4.00E-04	4E+00	5E-04	Not Available	No Tox Data
Arsenic	6.30E+03	MAX	9E-03	3.00E-04	3E+01	3E-03	1.50E+00	4E-03
Cobalt	1.05E+03	UCLlog	1E-03	6.00E-02	2E-02	5E-04	Not Available	No Tox Data
Copper	4.61E+03	MAX	6E-03	3.7E-02	2E-01	Not Applicable		
Iron	8.33E+04	UCLlog	1E-01	3.00E-01	4E-01	4E-02	Not Available	No Tox Data
Lead	1.96E+04	MAX	3E-02	Not Available	No Tox Data	9E-03	Not Available	No Tox Data
Manganese	1.99E+04	UCLlog	3E-02	2.3E-02	1E+00	Not Applicable		
Mercury	2.98E+00	UCLlog	4E-06	Not Available	No Tox Data	Not Applicable		
Nickel	1.57E+03	UCLlog	2E-03	2E-02	1E-01	7E-04	Not Available	No Tox Data
Silver	1.14E+02	MAX	2E-04	5E-03	3E-02	Not Applicable		
				HAZARD INDEX:	**3E+01**		**CANCER RISK:**	**4E-03**

CDI of non-carcinogenic chemicals in surface soils via ingestion (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 350 days/year * 30 years)/(70 kg * 10950 days)
CDI of carcinogenic chemicals in surface soils via ingestion (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 350 days/year * 24 years)/(70 kg * 25550 days)

302747

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	1.26E+00	UCLlog	1E-01	6E-06	2.00E-05	3E-01	2E-06	2.00E+00	4E-06
INORGANICS									
Arsenic	6.30E+03	MAX	3E-02	6E-03	2.40E-04	3E+01	2E-03	1.88E+00	4E-03
					HAZARD INDEX:	**3E+01**		**CANCER RISK:**	**4E-03**

CDI of non-carcinogenic chemicals in surface soils via dermal contact (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2425 cm^2/event * 350 events /year * 30 years)/(70 kg * 10950 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (adult resident):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2425 cm^2/event * 350 events/year * 24 years)/(70 kg * 25550 days)

302748

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	2.00E-03	MAX	3E-09	3E-03	9E-07	9E-10	2.9E-02	3E-11
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	3.20E-01	MAX	4E-07	Not Available	No Tox Data	Not Applicable		
Phenanthrene	3.20E-01	MAX	4E-07	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	1.12E+00	UCLlog	2E-06	2.00E-05	8E-02	5E-07	2.00E+00	1E-06
INORGANICS								
Antimony	3.49E+03	MAX	5E-03	4.00E-04	1E+01	2E-03	Not Available	No Tox Data
Arsenic	2.95E+03	MAX	4E-03	3.00E-04	1E+01	1E-03	1.50E+00	2E-03
Barium	8.52E+02	UCLlog	1E-03	7E-02	2E-02	4E-04	Not Available	No Tox Data
Beryllium	1.33E+00	UCLlog	2E-06	5.00E-03	4E-04	6E-07	4.30E+00	3E-06
Cobalt	7.64E+02	MAX	1E-03	6.00E-02	2E-02	4E-04	Not Available	No Tox Data
Copper	6.74E+03	MAX	9E-03	3.7E-02	2E-01	Not Applicable		
Iron	6.93E+04	UCLnorm	9E-02	3.00E-01	3E-01	3E-02	Not Available	No Tox Data
Lead	5.14E+03	MAX	7E-03	Not Available	No Tox Data	2E-03	Not Available	No Tox Data
Manganese	2.79E+03	UCLlog	4E-03	2.3E-02	2E-01	Not Applicable		
Mercury	2.95E+01	MAX	4E-05	Not Available	No Tox Data	Not Applicable		
Silver	1.10E+02	MAX	2E-04	5E-03	3E-02	Not Applicable		
					HAZARD INDEX:	**3E+01**	**CANCER RISK:**	**2E-03**

CDI of non-carcinogenic chemicals in surface soils via ingestion (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 350 days/year * 30 years)/(70 kg * 10950 days)
CDI of carcinogenic chemicals in surface soils via ingestion (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 100 mg/day * 1 * 350 days/year * 24 years)/(70 kg * 25550 days)

302749

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	1.12E+00	UCLlog	1E-01	5E-06	2.00E-05	3E-01	2E-06	2.00E+00	4E-06
INORGANICS									
Arsenic	2.95E+03	MAX	3E-02	3E-03	2.40E-04	1E+01	1E-03	1.88E+00	2E-03
					HAZARD INDEX:	**1E+01**		**CANCER RISK:**	**2E-03**

CDI of non-carcinogenic chemicals in surface soils via dermal contact (adult resident):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 2425 cm^2/event * 350 events /year * 30 years)/(70 kg * 10950 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (adult resident):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 2425 cm^2/event * 350 events/year * 24 years)/(70 kg * 25550 days)

302750

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INGESTION OF CHEMICALS IN GROUNDWATER								
CHEMICAL	WATER CONCENTRATION (mg/l)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUIOTENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	9.39E-02	UCLlog	3E-03	3E-03	9E-01	1E-03	2.9E-02	3E-05
1,1-Dichloroethene	9.27E-02	UCLlog	3E-03	9E-03	3E-01	1E-03	6E-01	7E-04
1,2-Dichloroethene (total)	1.86E+01	UCLlog	5E-01	9.00E-03	6E+01	2E-01	Not Available	No Tox Data
Methylene chloride	6.92E-01	UCLlog	2E-02	6E-02	3E-01	8E-03	7.5E-03	6E-05
1,1,1-Trichloroethane	9.08E-01	UCLlog	2E-02	2E-02	1E+00	Not Applicable		
Trichloroethene	3.08E+00	UCLlog	8E-02	6.00E-03	1E+01	4E-02	1.10E-02	4E-04
Tetrachloroethene	1.45E+00	UCLlog	4E-02	1E-02	4E+00	2E-02	5.20E-02	9E-04
Vinyl chloride	1.21E-01	UCLlog	3E-03	Not Available	No Tox Data	1E-03	1.90E+00	3E-03
SEMI - VOLATILES ORGANICS								
Phenanthrene	1.08E-02	UCLlog	3E-04	Not Available	No Tox Data	Not Applicable		
INORGANICS								
Antimony	3.89E-01	UCLlog	1E-02	4.00E-04	3E+01	5E-03	Not Available	No Tox Data
Arsenic	4.95E-01	UCLlog	1E-02	3.00E-04	5E+01	6E-03	1.50E+00	9E-03
Cadmium	5.08E-02	UCLlog	1E-03	5E-04	3E+00	6E-04	Not Available	No Tox Data
Calcium	1.72E+02	UCLlog	5E+00	Not available	No Tox Data	2E+00	Not Available	No Tox Data
Copper	3.47E+00	UCLlog	1E-01	3.7E-02	3E+00	Not Applicable		
Lead	5.07E-01	UCLlog	1E-02	Not available	No Tox Data	6E-03	Not Available	No Tox Data
Magnesium	4.19E+01	UCLlog	1E+00	Not available	No Tox Data	5E-01	Not Available	No Tox Data
Mercury	1.02E-03	UCLlog	3E-05	Not available	No Tox Data	Not Applicable		
Nickel	1.87E+00	UCLlog	5E-02	2E-02	3E+00	2E-02	Not Available	No Tox Data
Sodium	3.58E+02	UCLlog	1E+01	Not Available	No Tox Data	4E+00	Not Available	No Tox Data
				HAZARD INDEX:	**2E+02**		**CANCER RISK:**	**1E-02**

CDI for noncarcinogenic chemicals in groundwater via ingestion (adult resident):
(mg/l water * 2 l/day * 350 days/year * 30 years)/(70 kg * 10950 days)
CDI for carcinogenic chemicals in groundwater via ingestion (adult resident):
(mg/l water * 2 l/day * 350 days/year * 30 years)/(70 kg * 25550 days)

302751

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

DERMAL CONTACT WITH CHEMICALS IN GROUNDWATER

CHEMICAL	WATER CONCENTRATION (mg/l)	PERMEABILITY COEFFICIENT (cm/hour)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	9.39E-02 UCLlog	2.1E-02	6E-05	3E-03	2E-02	3E-05	2.9E-02	8E-07
1,1-Dichloroethene	9.27E-02 UCLlog	1.6E-02	5E-05	9E-03	5E-03	2E-05	6E-01	1E-05
1,2-Dichloroethene (total)	1.86E+01 UCLlog	1.0E-02	6E-03	9.00E-03	7E-01	3E-03	Not Available	No Tox Data
Methylene chloride	6.92E-01 UCLlog	4.5E-03	1E-04	6E-02	2E-03	4E-05	7.5E-03	3E-07
1,1,1-Trichloroethane	9.08E-01 UCLlog	1.7E-02	5E-04	2E-02	2E-02	Not Applicable		
Trichloroethene	3.08E+00 UCLlog	1.6E-02	2E-03	6.00E-03	3E-01	7E-04	1.1E-02	7E-06
Tetrachloroethene	1.45E+00 UCLlog	4.8E-02	2E-03	1E-02	2E-01	9E-04	5.2E-02	5E-05
Vinyl chloride	1.21E-01 UCLlog	7.3E-03	3E-05	Not Available	No Tox Data	1E-05	1.9E+00	2E-05
SEMI - VOLATILES ORGANICS								
Phenanthrene	1.08E-02 UCLlog	2.7E-01	2E-04	Not Available	No Tox Data	Not Applicable		
INORGANICS								
Antimony	3.89E-01 UCLlog	1.0E-03	2E-05	4.00E-05	5E-01	9E-06	Not Available	No Tox Data
Arsenic	4.95E-01 UCLlog	1.0E-03	3E-05	2.40E-04	1E-01	1E-05	1.88E+00	2E-05
Cadmium	5.08E-02 UCLlog	1.0E-03	3E-06	2.5E-05	1E-01	1E-06	Not Available	No Tox Data
Calcium	1.72E+02 UCLlog	1.0E-03	9E-03	Not available	No Tox Data	4E-03	Not Available	No Tox Data
Copper	3.47E+00 UCLlog	1.0E-03	2E-04	1.9E-02	1E-02	Not Applicable		
Lead	5.07E-01 UCLlog	1.0E-03	3E-05	Not available	No Tox Data	1E-05	Not Available	No Tox Data
Magnesium	4.19E+01 UCLlog	1.0E-03	2E-03	Not available	No Tox Data	1E-03	Not Available	No Tox Data
Mercury	1.02E-03 UCLlog	1.0E-03	5E-08	Not available	No Tox Data	Not Applicable		
Nickel	1.87E+00 UCLlog	1.0E-03	1E-04	2E-03	5E-02	4E-05	Not Available	No Tox Data
Sodium	3.58E+02 UCLlog	1.0E-03	2E-02	Not Available	No Tox Data	8E-03	Not Available	No Tox Data
				HAZARD INDEX:	**2E+00**		**CANCER RISK:**	**1E-04**

CDI for noncarcinogenic chemicals in groundwater via dermal contact (adult resident):
(mg/l water (0.6 times for VOCs)* 1.00E-03 l/cm^3 * PC cm/hour * 19400 cm^2 * 0.2 hours/day * 350 days/year * 30 years)/(70 kg * 10950 days)
CDI for carcinogenic chemicals in groundwater via dermal contact (adult resident):
(mg/l water (0.6 times for VOCs)* 1.00E-03 l/cm^3 * PC cm/hour * 19400 cm^2 * 0.2 hours/day * 350 days/year * 30 years)/(70 kg * 25550 days)

302752

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR AN ADULT RESIDENT

INHALATION OF CHEMICALS VOLATILIZED FROM GROUNDWATER

CHEMICAL	WATER CONCENTRATION (mg/l)	CONCENTRATION IN AIR (mg/m^3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	9.39E-02 UCLlog	2.77E-01	6E-04	2E-03	4E-01	3E-04	2.9E-02	8E-06
1,1-Dichloroethene	9.27E-02 UCLlog	2.85E-01	6E-04	Not Available	No Tox Data	3E-04	1.20E+00	3E-04
1,2-Dichloroethene (total)	1.86E+01 UCLlog	6.02E+01	1E-01	Not Available	No Tox Data	6E-02	Not Available	No Tox Data
Methylene chloride	6.92E-01 UCLlog	2.29E+00	5E-03	8.60E-01	6E-03	2E-03	1.6E-03	4E-06
1,1,1-Trichloroethane	9.08E-01 UCLlog	2.50E+00	6E-03	2.86E-01	2E-02	Not Applicable		
Trichloroethene	3.08E+00 UCLlog	8.67E+00	2E-02	Not Available	No Tox Data	8E-03	6.00E-03	5E-05
Tetrachloroethene	1.45E+00 UCLlog	3.80E+00	9E-03	Not Available	No Tox Data	4E-03	2.00E-03	7E-06
Vinyl chloride	1.21E-01 UCLlog	8.89E-02	2E-04	Not Available	No Tox Data	9E-05	3.00E-01	3E-05
				HAZARD INDEX:	4E-01		CANCER RISK:	4E-04

CDI for noncarcinogenic chemicals in groundwater via inhalation (adult resident):
(mg/m^3 air * 0.83 m^3/hour * 0.2 hours/day * 350 days/year * 30 years)/(70 kg * 10950 days)
CDI for carcinogenic chemicals in groundwater via inhalation (adult resident):
(mg/m^3 air * 0.83 m^3/hour * 0.2 hours/day * 350 days/year * 30 years)/(70 kg * 25550 days)

302753

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	1.00E-03	MAX	1E-08	3E-03	4E-06	1E-09	2.9E-02	3E-11
SEMI-VOLATILE ORGANICS								
Benzo[a]anthracene	7.65E-01	UCLlog	1E-05	Not Available	No Tox Data	8E-07	7.30E-01	6E-07
Benzo[a]pyrene	1.02E+00	UCLlog	1E-05	Not Available	No Tox Data	1E-06	7.30E+00	8E-06
Benzo[b]fluoranthene	2.38E+00	UCLlog	3E-05	Not Available	No Tox Data	3E-06	7.30E-01	2E-06
Benzo[g,h,i]perylene	8.69E-01	UCLlog	1E-05	Not Available	No Tox Data	Not Applicable		
Dibenz[a,h]anthracene	4.40E-01	UCLlog	6E-06	Not Available	No Tox Data	5E-07	7.30E+00	4E-06
Indeno[1,2,3-cd]pyrene	8.78E-01	UCLlog	1E-05	Not Available	No Tox Data	1E-06	7.30E-01	7E-07
Phenanthrene	2.63E+00	UCLlog	3E-05	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	9.51E-02	UCLlog	1E-06	2.00E-05	6E-02	1E-07	2.00E+00	2E-07
INORGANICS								
Antimony	5.85E+00	UCLlog	7E-05	4.00E-04	2E-01	6E-06	Not Available	No Tox Data
Arsenic	1.68E+02	UCLlog	2E-03	3.00E-04	7E+00	2E-04	1.50E+00	3E-04
Barium	2.03E+02	UCLlog	3E-03	7E-02	4E-02	2E-04	Not Available	No Tox Data
Cobalt	1.58E+02	UCLlog	2E-03	6.00E-02	3E-02	2E-04	Not Available	No Tox Data
Copper	2.88E+02	UCLlog	4E-03	3.7E-02	1E-01	Not Applicable		
Lead	2.34E+02	UCLlog	3E-03	Not Available	No Tox Data	3E-04	Not Available	No Tox Data
Mercury	7.79E-01	UCLlog	1E-05	Not Available	No Tox Data	Not Applicable		
Nickel	1.41E+02	UCLlog	2E-03	2E-02	9E-02	2E-04	Not Available	No Tox Data
Selenium	1.61E+01	UCLlog	2E-04	5.00E-03	4E-02	Not Applicable		
Silver	2.02E+01	UCLlog	3E-04	5E-03	5E-02	Not Applicable		
				HAZARD INDEX:	8E+00		CANCER RISK:	3E-04

CDI of non-carinogenic chemicals in surface soils via ingestion (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 200 mg/day * 1 * 350 days/year * 6 years)/(15 kg * 2190 days)
CDI of carcinogenic chemicals in surface soil via ingestion (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 200 mg/day * 1 * 350 days/year * 6 years)/(15 kg * 25550 days)

302754

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA A

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	9.51E-02	UCLlog	1E-01	7E-07	2.00E-05	4E-02	6E-08	2.00E+00	1E-07
INORGANICS									
Arsenic	1.68E+02	UCLlog	3E-02	3E-04	2.40E-04	1E+00	2E-05	1.88E+00	5E-05
					HAZARD INDEX:	**1E+00**		**CANCER RISK:**	**5E-05**

CDI of non-carcinogenic chemicals in surface soils via dermal contact (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 872.5 cm^2/event * 350 events /year * 6 years)/(15 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (child resident):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 872.5 cm^2/event * 350 events/year * 6 years)/(15 kg * 25550 days)

302755

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	4.00E-03	MAX	5E-08	3E-03	2E-05	4E-09	2.9E-02	1E-10
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	8.30E-02	MAX	1E-06	Not Available	No Tox Data	Not Applicable		
Phenanthrene	8.60E-02	MAX	1E-06	Not Available	No Tox Data	Not Applicable		
INORGANICS								
Antimony	4.16E+02	MAX	5E-03	4.00E-04	1E+01	5E-04	Not Available	No Tox Data
Arsenic	1.79E+03	MAX	2E-02	3.00E-04	8E+01	2E-03	1.50E+00	3E-03
Cobalt	4.66E+03	MAX	6E-02	6.00E-02	1E+00	5E-03	Not Available	No Tox Data
Copper	2.16E+03	MAX	3E-02	3.7E-02	7E-01	Not Applicable		
Lead	3.71E+03	MAX	5E-02	Not Available	No Tox Data	4E-03	Not Available	No Tox Data
Manganese	2.25E+03	UCLlog	3E-02	2.3E-02	1E+00	Not Applicable		
Mercury	1.80E+00	MAX	2E-05	Not Available	No Tox Data	Not Applicable		
Nickel	2.89E+04	MAX	4E-01	2E-02	2E+01	3E-02	Not Available	No Tox Data
Silver	1.03E+02	MAX	1E-03	5E-03	3E-01	Not Applicable		
				HAZARD INDEX:	**1E+02**		**CANCER RISK:**	**3E-03**

CDI of non-carinogenic chemicals in surface soils via ingestion (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 200 mg/day * 1 * 350 days/year * 6 years)/(15 kg * 2190 days)
CDI of carcinogenic chemicals in surface soil via ingestion (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 200 mg/day * 1 * 350 days/year * 6 years)/(15 kg * 25550 days)

302756

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA B

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
INORGANICS									
Arsenic	1.79E+03	MAX	3E-02	3E-03	2.40E-04	1E+01	3E-04	1.88E+00	5E-04
					HAZARD INDEX:	**1E+01**		**CANCER RISK:**	**5E-04**

CDI of non-carcinogenic chemicals in surface soils via dermal contact (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 872.5 cm^2/event * 350 events /year * 6 years)/(15 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (child resident):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 872.5 cm^2/event * 350 events/year * 6 years)/(15 kg * 25550 days)

302757

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	2.66E-01	UCLlog	3E-06	Not Available	No Tox Data	Not Applicable		
Phenanthrene	3.00E-01	UCLlog	4E-06	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	1.26E+00	UCLlog	2E-05	2.00E-05	8E-01	1E-06	2.00E+00	3E-06
INORGANICS								
Antimony	1.12E+03	UCLlog	1E-02	4.00E-04	4E+01	1E-03	Not Available	No Tox Data
Arsenic	6.30E+03	MAX	8E-02	3.00E-04	3E+02	7E-03	1.50E+00	1E-02
Cobalt	1.05E+03	UCLlog	1E-02	6.00E-02	2E-01	1E-03	Not Available	No Tox Data
Copper	4.61E+03	MAX	6E-02	3.7E-02	2E+00	Not Applicable		
Iron	8.33E+04	UCLlog	1E+00	3.00E-01	4E+00	9E-02	Not Available	No Tox Data
Lead	1.96E+04	MAX	3E-01	Not Available	No Tox Data	2E-02	Not Available	No Tox Data
Manganese	1.99E+04	UCLlog	3E-01	2.3E-02	1E+01	Not Applicable		
Mercury	2.98E+00	UCLlog	4E-05	Not Available	No Tox Data	Not Applicable		
Nickel	1.57E+03	UCLlog	2E-02	2E-02	1E+00	2E-03	Not Available	No Tox Data
Silver	1.14E+02	MAX	1E-03	5E-03	3E-01	Not Applicable		
				HAZARD INDEX:	**3E+02**		**CANCER RISK:**	**1E-02**

CDI of non-carinogenic chemicals in surface soils via ingestion (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 200 mg/day * 1 * 350 days/year * 6 years)/(15 kg * 2190 days)
CDI of carcinogenic chemicals in surface soil via ingestion (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 200 mg/day * 1 * 350 days/year * 6 years)/(15 kg * 25550 days)

3027758

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA B&C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	1.26E+00	UCLlog	1E-01	1E-05	2.00E-05	5E-01	8E-07	2.00E+00	2E-06
INORGANICS									
Arsenic	6.30E+03	MAX	3E-02	1E-02	2.40E-04	4E+01	9E-04	1.88E+00	2E-03
					HAZARD INDEX:	**4E+01**		**CANCER RISK:**	**2E-03**

CDI of non-carcinogenic chemicals in surface soils via dermal contact (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 872.5 cm^2/event * 350 events /year * 6 years)/(15 kg * 2190 days)
CDI of carcinogenic chemicals in surface soils via dermal contact (child resident):
(mg/kg soil * 1.00E-06 kg/mg *1.00 mg/cm^2 * ABS * 872.5 cm^2/event * 350 events/year * 6 years)/(15 kg * 25550 days)

302759

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INADVERTENT INGESTION OF CHEMICALS IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	2.00E-03	MAX	3E-08	3E-03	9E-06	2E-09	2.9E-02	6E-11
SEMI-VOLATILE ORGANICS								
Benzo[g,h,i]perylene	3.20E-01	MAX	4E-06	Not Available	No Tox Data	Not Applicable		
Phenanthrene	3.20E-01	MAX	4E-06	Not Available	No Tox Data	Not Applicable		
PCBs								
PCBs (total)	1.12E+00	UCLlog	1E-05	2.00E-05	7E-01	1E-06	2.00E+00	2E-06
INORGANICS								
Antimony	3.49E+03	MAX	4E-02	4.00E-04	1E+02	4E-03	Not Available	No Tox Data
Arsenic	2.95E+03	MAX	4E-02	3.00E-04	1E+02	3E-03	1.50E+00	5E-03
Barium	8.52E+02	UCLlog	1E-02	7E-02	2E-01	9E-04	Not Available	No Tox Data
Beryllium	1.33E+00	UCLlog	2E-05	5.00E-03	3E-03	1E-06	4.30E+00	6E-06
Cobalt	7.64E+02	MAX	1E-02	6.00E-02	2E-01	8E-04	Not Available	No Tox Data
Copper	6.74E+03	MAX	9E-02	3.7E-02	2E+00	Not Applicable		
Iron	6.93E+04	UCLnorm	9E-01	3.00E-01	3E+00	8E-02	Not Available	No Tox Data
Lead	5.14E+03	MAX	7E-02	Not Available	No Tox Data	6E-03	Not Available	No Tox Data
Manganese	2.79E+03	UCLlog	4E-02	2.3E-02	2E+00	Not Applicable		
Mercury	2.95E+01	MAX	4E-04	Not Available	No Tox Data	Not Applicable		
Silver	1.10E+02	MAX	1E-03	5E-03	3E-01	Not Applicable		
				HAZARD INDEX:	**2E+02**		**CANCER RISK:**	**5E-03**

CDI of non-carinogenic chemicals in surface soils via ingestion (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 200 mg/day * 1 * 350 days/year * 6 years)/(15 kg * 2190 days)
CDI of carcinogenic chemicals in surface soil via ingestion (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 200 mg/day * 1 * 350 days/year * 6 years)/(15 kg * 25550 days)

302760

SUMMARY OF NON-CARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

DERMAL CONTACT WITH CHEMICALS IN ALL SOILS AT AREA C

CHEMICAL	SOIL CONCENTRATION (mg/kg)		ABSORPTION FACTOR (unitless)	CDI for NON-CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
PCBs									
PCBs (total)	1.12E+00	UCLlog	1E-01	9E-06	2.00E-05	4E-01	7E-07	2.00E+00	1E-06
INORGANICS									
Arsenic	2.95E+03	MAX	3E-02	5E-03	2.40E-04	2E+01	4E-04	1.88E+00	8E-04
					HAZARD INDEX:	**2E+01**		**CANCER RISK:**	**8E-04**

CDI of non-carinogenic chemicals in surface soils via dermal contact (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 872.5 cm^2/event * 350 events/year * 6 years)/(15 kg * 2190 days)
CDI of carcinogenic chemicals in surface soil via dermal contact (child resident):
(mg/kg soil * 1.00E-06 kg/mg * 1.00 mg/cm^2 * ABS * 872.5 cm^2/event * 350 events/year * 6 years)/(15 kg * 25550 days)

302761

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INGESTION OF CHEMICALS IN GROUNDWATER								
CHEMICAL	WATER CONCENTRATION (mg/l)		CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUIOTENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	9.39E-02	UCLlog	6E-03	3E-03	2E+00	5E-04	2.9E-02	1E-05
1,1-Dichloroethene	9.27E-02	UCLlog	6E-03	9E-03	7E-01	5E-04	6E-01	3E-04
1,2-Dichloroethene (total)	1.86E+01	UCLlog	1E+00	9.00E-03	1E+02	1E-01	Not Available	No Tox Data
Methylene chloride	6.92E-01	UCLlog	4E-02	6E-02	7E-01	4E-03	7.5E-03	3E-05
1,1,1-Trichloroethane	9.08E-01	UCLlog	6E-02	2E-02	3E+00	Not Applicable		
Trichloroethene	3.08E+00	UCLlog	2E-01	6.00E-03	3E+01	2E-02	1.10E-02	2E-04
Tetrachloroethene	1.45E+00	UCLlog	9E-02	1E-02	9E+00	8E-03	5.20E-02	4E-04
Vinyl chloride	1.21E-01	UCLlog	8E-03	Not Available	No Tox Data	7E-04	1.90E+00	1E-03
SEMI - VOLATILES ORGANICS								
Phenanthrene	1.08E-02	UCLlog	7E-04	Not Available	No Tox Data	Not Applicable		
INORGANICS								
Antimony	3.89E-01	UCLlog	2E-02	4.00E-04	6E+01	2E-03	Not Available	No Tox Data
Arsenic	4.95E-01	UCLlog	3E-02	3.00E-04	1E+02	3E-03	1.50E+00	4E-03
Cadmium	5.08E-02	UCLlog	3E-03	5E-04	6E+00	3E-04	Not Available	No Tox Data
Calcium	1.72E+02	UCLlog	1E+01	Not available	No Tox Data	9E-01	Not Available	No Tox Data
Copper	3.47E+00	UCLlog	2E-01	3.7E-02	6E+00	Not Applicable		
Lead	5.07E-01	UCLlog	3E-02	Not available	No Tox Data	3E-03	Not Available	No Tox Data
Magnesium	4.19E+01	UCLlog	3E+00	Not available	No Tox Data	2E-01	Not Available	No Tox Data
Mercury	1.02E-03	UCLlog	7E-05	Not available	No Tox Data	Not Applicable		
Nickel	1.87E+00	UCLlog	1E-01	2E-02	6E+00	1E-02	Not Available	No Tox Data
Sodium	3.58E+02	UCLlog	2E+01	Not Available	No Tox Data	2E+00	Not Available	No Tox Data
				HAZARD INDEX:	**4E+02**		**CANCER RISK:**	**6E-03**

CDI for noncarcinogenic chemicals in groundwater via ingestion (child resident):
(mg/l water * 1 l/day * 350 days/year * 6 years)/(15 kg * 2190 days)
CDI for carcinogenic chemicals in groundwater via ingestion (child resident):
(mg/l water * 1 l/day * 350 days/year * 6 years)/(15 kg * 25550 days)

302762

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

DERMAL CONTACT WITH CHEMICALS IN GROUNDWATER

CHEMICAL	WATER CONCENTRATION (mg/l)		PERMEABILITY COEFFICIENT (cm/hour)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	ADJUSTED ORAL SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS									
Benzene	9.39E-02	UCLlog	2.1E-02	1E-04	3E-03	4E-02	9E-06	2.9E-02	3E-07
1,1-Dichloroethene	9.27E-02	UCLlog	1.6E-02	8E-05	9E-03	9E-03	7E-06	6E-01	4E-06
1,2-Dichloroethene (total)	1.86E+01	UCLlog	1.0E-02	1E-02	9.00E-03	1E+00	9E-04	Not Available	No Tox Data
Methylene chloride	6.92E-01	UCLlog	4.5E-03	2E-04	6E-02	3E-03	1E-05	7.5E-03	1E-07
1,1,1-Trichloroethane	9.08E-01	UCLlog	1.7E-02	8E-04	2E-02	4E-02	Not Applicable		
Trichloroethene	3.08E+00	UCLlog	1.6E-02	3E-03	6.00E-03	4E-01	2E-04	1.1E-02	2E-06
Tetrachloroethene	1.45E+00	UCLlog	4.8E-02	4E-03	1E-02	4E-01	3E-04	5.2E-02	2E-05
Vinyl chloride	1.21E-01	UCLlog	7.3E-03	5E-05	Not Available	No Tox Data	4E-06	1.9E+00	8E-06
SEMI - VOLATILES ORGANICS									
Phenanthrene	1.08E-02	UCLlog	2.7E-01	2E-04	Not Available	No Tox Data	Not Applicable		
INORGANICS									
Antimony	3.89E-01	UCLlog	1.0E-03	3E-05	4.00E-05	9E-01	3E-06	Not Available	No Tox Data
Arsenic	4.95E-01	UCLlog	1.0E-03	4E-05	2.40E-04	2E-01	4E-06	1.88E+00	7E-06
Cadmium	5.08E-02	UCLlog	1.0E-03	5E-06	2.5E-05	2E-01	4E-07	Not Available	No Tox Data
Calcium	1.72E+02	UCLlog	1.0E-03	2E-02	Not available	No Tox Data	1E-03	Not Available	No Tox Data
Copper	3.47E+00	UCLlog	1.0E-03	3E-04	1.9E-02	2E-02	Not Applicable		
Lead	5.07E-01	UCLlog	1.0E-03	5E-05	Not available	No Tox Data	4E-06	Not Available	No Tox Data
Magnesium	4.19E+01	UCLlog	1.0E-03	4E-03	Not available	No Tox Data	3E-04	Not Available	No Tox Data
Mercury	1.02E-03	UCLlog	1.0E-03	9E-08	Not available	No Tox Data	Not Applicable		
Nickel	1.87E+00	UCLlog	1.0E-03	2E-04	2E-03	8E-02	1E-05	Not Available	No Tox Data
Sodium	3.58E+02	UCLlog	1.0E-03	3E-02	Not Available	No Tox Data	3E-03	Not Available	No Tox Data
					HAZARD INDEX:	**3E+00**		**CANCER RISK:**	**4E-05**

CDI for noncarcinogenic chemicals in groundwater via dermal contact (child resident):
(mg/l water (0.6 times for VOCs)* 1.00E-03 l/cm^3 * PC cm/hour * 6980 cm^2 * 0.2 hours/day * 350 days/year * 6 years)/(15 kg * 2190 days)
CDI for carcinogenic chemicals in groundwater via dermal contact (child resident):
(mg/l water (0.6 times for VOCs)* 1.00E-03 l/cm^3 * PC cm/hour * 6980 cm^2 * 0.2 hours/day * 350 days/year * 6 years)/(15 kg * 25550 days)

302763

SUMMARY OF NONCARCINOGENIC AND CARCINOGENIC HEALTH RISKS
FUTURE SCENARIO
FOR A CHILD RESIDENT

INHALATION OF CHEMICALS VOLATILIZED FROM GROUNDWATER

CHEMICAL	WATER CONCENTRATION (mg/l)	CONCENTRATION IN AIR (mg/m^3)	CDI for NONCARCINOGENIC EFFECTS (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT	CDI for CARCINOGENIC EFFECTS (mg/kg-day)	INHALATION SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK
VOLATILE ORGANICS								
Benzene	9.39E-02 UCLlog	2.77E-01	3E-03	2E-03	2E+00	3E-04	2.9E-02	7E-06
1,1-Dichloroethene	9.27E-02 UCLlog	2.85E-01	3E-03	Not Available	No Tox Data	3E-04	1.20E+00	3E-04
1,2-Dichloroethene (total)	1.86E+01 UCLlog	6.02E+01	6E-01	Not Available	No Tox Data	5E-02	Not Available	No Tox Data
Methylene chloride	6.92E-01 UCLlog	2.29E+00	2E-02	8.60E-01	3E-02	2E-03	1.6E-03	3E-06
1,1,1-Trichloroethane	9.08E-01 UCLlog	2.50E+00	3E-02	2.86E-01	9E-02	Not Applicable		
Trichloroethene	3.08E+00 UCLlog	8.67E+00	9E-02	Not Available	No Tox Data	8E-03	6.00E-03	5E-05
Tetrachloroethene	1.45E+00 UCLlog	3.80E+00	4E-02	Not Available	No Tox Data	3E-03	2.00E-03	7E-06
Vinyl chloride	1.21E-01 UCLlog	8.89E-02	9E-04	Not Available	No Tox Data	8E-05	3.00E-01	2E-05
				HAZARD INDEX:	**2E+00**		**CANCER RISK:**	**4E-04**

CDI for noncarcinogenic chemicals in groundwater via inhalation (child resident):
(mg/m^3 air * 0.83 m^3/hour * 0.2 hours/day * 350 days/year * 6 years)/(15 kg * 2190 days)
CDI for carcinogenic chemicals in groundwater via inhalation (child resident):
(mg/m^3 air * 0.83 m^3/hour * 0.2 hours/day * 350 days/year * 6 years)/(15 kg * 25550 days)

302764

Appendix O-4

Toxicological Profiles

ToxFAQs

Aluminum

September 1995

Agency for Toxic Substances and Disease Registry

This fact sheet answers the most frequently asked health questions about aluminum. For more information, you may call 404-639-6000. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Everyone is exposed to low levels of aluminum from food, air, and water. Exposure to high levels of aluminum affects breathing, the nervous system, and bones. High levels can also cause birth defects. Aluminum has been found in at least 489 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What is aluminum?
(Pronounced a-loo'mi-num)

Aluminum occurs naturally and makes up about 8% of the surface of the earth. It is always found combined with other elements in the earth such as minerals and rocks.

Aluminum metal is silver-white and flexible. It is often used in cooking utensils, containers, appliances, and building materials.

It is used in several forms including aluminum nitrate, aluminum oxide, aluminum hydroxide (used in antacids), aluminum chlorohydrate (used in deodorants), and aluminum sulfate (used to treat drinking water). It is used in paints and fireworks, and to produce glass, rubber, and ceramics.

What happens to aluminum when it enters the environment?

- It binds to particles in the air.
- It can dissolve in lakes, streams, and rivers depending on the quality of the water.
- Acid rain may dissolve aluminum from soil and rocks.
- It can be taken up into some plants from soil.

How might I be exposed to aluminum?

- Eating small amounts of aluminum in food

302766

- Breathing higher levels of aluminum dust in workplace air
- Drinking water with high levels of aluminum near waste sites, manufacturing plants, or areas naturally high in aluminum
- Eating substances containing high levels of aluminum (such as antacids)
- Very little enters your body from aluminum cooking utensils.

How can aluminum affect my health?

Low-level exposure to aluminum from food, air, water, or contact with skin is not thought to harm your health. Aluminum, however, is not a necessary substance for our bodies and too much may be harmful.

People who are exposed to high levels of aluminum in air may have respiratory problems including coughing and asthma from breathing dust.

Some studies with high levels in mice and rabbits show that aluminum may harm young animals more because it can cause delays in skeletal and neurologic development.

Aluminum has been linked to Alzheimer's disease because those patients have high levels of aluminum in their brains. We do not know whether aluminum causes the disease or whether the buildup of aluminum happens to people who already have the disease.

Infants and adults who received large doses of aluminum as a treatment for another problem developed bone diseases, which suggests that aluminum may cause skeletal problems.

Some sensitive people develop skin rashes from using aluminum chlorohydrate deodorants.

There is no evidence that aluminum affects reproduction in people or animals.

How likely is aluminum to cause cancer?

The Department of Health and Human Services has not classified aluminum for carcinogenicity.

The International Agency for Research on Cancer and the Environmental Protection Agency (EPA) have not classified aluminum for carcinogenicity.

The available information has not shown that aluminum is a potential carcinogen.

Is there a medical test to show whether I've been exposed to aluminum?

There are tests to measure aluminum in blood, urine, and feces. The amount in your urine can tell you whether you have been exposed to higher than normal levels of aluminum.

Tests can also detect aluminum in your hair and fingernails. These tests are not routinely performed at your doctor's office, but your doctor can take blood, urine, or tissue samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

EPA requires that spills into the environment of 5,000 pounds or more of aluminum sulfate be reported. Special regulations are set for aluminum phosphide because it is a pesticide.

EPA recommends that the concentration of aluminum in drinking water not exceed 0.2 parts of aluminum per million parts of water (0.2 ppm) because of taste and odor problems.

The Food and Drug Administration (FDA) has determined that aluminum cooking utensils, aluminum foil, antiperspirants, antacids, and other aluminum products are generally safe.

The Occupational Safety and Health Administration (OSHA) set a maximum concentration limit for aluminum dust in workplace air of 15 milligrams of aluminum per cubic meter of air (15 mg/m^3) for an 8-hour workday over a 40-hour week.

The National Institute for Occupational Safety and Health (NIOSH) has recommended a limit of 10 mg/m^3 in workplace air for up to a 10-hour workday over a 40-hour workweek.

Glossary

Alzheimer's disease:
A disease of the nervous system that causes mental deterioration.
Carcinogenicity:
Ability to cause cancer.
Milligram (mg):
One thousandth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for aluminum. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop E-29
Atlanta, GA 30333
Phone: 404-639-6000
FAX: 404-639-6315

U.S. Department of Health and Human Services
Public Health Service
Agency for Toxic Substances and Disease Registry

Link to ATSDR Science Corner

Link to ATSDR Home Page

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ToxFAQs

Antimony

September 1995

Agency for Toxic Substances and Disease Registry

This fact sheet answers the most frequently asked health questions about antimony. For more information, you may call 404-639-6000. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to antimony occurs in the workplace or from skin contact with soil at hazardous waste sites. Breathing high levels of antimony for a long time can irritate the eyes and lungs, and can cause problems with the lungs, heart, and stomach. This chemical has been found in at least 403 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What is antimony?
(Pronounced an'ti-mo-nee)

Antimony is a silvery-white metal that is found in the earth's crust. Antimony ores are mined and then mixed with other metals to form antimony alloys or combined with oxygen to form antimony oxide.

Little antimony is currently mined in the United States. It is brought into this country from other countries for processing. However, there are companies in the United States that produce antimony as a by-product of smelting lead and other metals.

Antimony isn't used alone because it breaks easily, but when mixed into alloys, it is used in lead storage batteries, solder, sheet and pipe metal, bearings, castings, and pewter. Antimony oxide is added to textiles and plastics to prevent them from catching fire. It is also used in paints, ceramics, and fireworks, and as enamels for plastics, metal, and glass.

What happens to antimony when it enters the environment?

- Antimony is released to the environment from natural sources and from industry.
- In the air, antimony is attached to very small particles that may stay in the air for many days.
- Most antimony ends up in soil, where it attaches strongly to particles that contain iron, manganese, or aluminum.
- Antimony is found at low levels in some rivers, lakes, and streams.

How might I be exposed to antimony?

- Because antimony is found naturally in the environment, the general population is exposed to low levels of it every day, primarily in food, drinking water, and air.
- It may be found in air near industries that process or release it, such as smelters, coal-fired plants,

302770

and refuse incinerators.
- In polluted areas containing high levels of antimony, it may be found in the air, water, and soil.
- Workers in industries that process it or use antimony ore may be exposed to higher levels.

How can antimony affect my health?

Exposure to antimony at high levels can result in a variety of adverse health effects.

Breathing high levels for a long time can irritate your eyes and lungs and can cause heart and lung problems, stomach pain, diarrhea, vomiting, and stomach ulcers.

In short-term studies, animals that breathed very high levels of antimony died. Animals that breathed high levels had lung, heart, liver, and kidney damage. In long-term studies, animals that breathed very low levels of antimony had eye irritation, hair loss, lung damage, and heart problems. Problems with fertility were also noted. In animal studies, problems with fertility have been seen when rats breathed very high levels of antimony for a few months.

Ingesting large doses of antimony can cause vomiting. We don't know what other effects may be caused by ingesting it. Long-term animal studies have reported liver damage and blood changes when animals ingested antimony. Antimony can irritate the skin if it is left on it.

Antimony can have beneficial effects when used for medical reasons. It has been used as a medicine to treat people infected with parasites.

How likely is antimony to cause cancer?

The Department of Health and Human Services, the International Agency for Research on Cancer, and the Environmental Protection Agency (EPA) have not classified antimony as to its human carcinogenicity.

Lung cancer has been observed in some studies of rats that breathed high levels of antimony. No human studies are available. We don't know whether antimony will cause cancer in people.

Is there a medical test to show whether I've been exposed to antimony?

Tests are available to measure antimony levels in the body. Antimony can be measured in the urine, feces, and blood for several days after exposure. However, these tests cannot tell you how much antimony you have been exposed to or whether you will experience any health effects. Some tests are not usually performed in most doctors' offices and may require special equipment to conduct them.

Has the federal government made recommendations to protect human health?

The EPA allows 0.006 parts of antimony per million parts of drinking water (0.006 ppm). The EPA requires that discharges or spills into the environment of 5,000 pounds or more of antimony be reported.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 0.5 milligrams of antimony per cubic meter of air (0.5 mg/m^3) for an 8-hour workday, 40-hour workweek.

The American Conference of Governmental Industrial Hygienists (ACGIH) and the National Institute for Occupational Safety and Health (NIOSH) currently recommend the same guidelines for the workplace as OSHA.

Glossary

Carcinogenicity:
Ability to cause cancer.

302771

Ingestion:
Taking food or drink into your body.
Long-term:
Lasting one year or more.
Milligram (mg):
One thousandth of a gram.
Parasite:
An organism living in or on another organism.
PPM:
Parts per million.
Short-term:
Lasting 14 days or less.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for antimony. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop E-29
Atlanta, GA 30333
Phone: 404-639-6000
FAX: 404-639-6315

U.S. Department of Health and Human Services
Public Health Service
Agency for Toxic Substances and Disease Registry

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302772

ToxFAQs

Arsenic

April 1993

Agency for Toxic Substances and Disease Registry

This fact sheet answers the most frequently asked health questions about arsenic. For more information, you may call 404-639-6000. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to higher than average levels of arsenic happens mostly in the workplace, near hazardous waste sites, or in areas with high natural levels. Arsenic is a powerful poison. At high levels, it can cause death or illness. This chemical has been found in at least 781 of 1,300 National Priorities List sites identified by the Environmental Protection Agency.

What is arsenic?
(Pronounced ar' se-nik)

Arsenic is found in nature at low levels. It's mostly in compounds with oxygen, chlorine, and sulfur. These are called inorganic arsenic compounds. Arsenic in plants and animals combines with carbon and hydrogen. This is called organic arsenic. Organic arsenic is usually less harmful than inorganic arsenic.

Most arsenic compounds have no smell or special taste.

Inorganic arsenic compounds are mainly used to preserve wood. They are also used to make insecticides and weed killers. You can check the labels of treated wood and insecticides to see if they contain arsenic.

Copper and lead ores contain small amounts of arsenic.

What happens to arsenic when it enters the environment?

- ☐ It doesn't evaporate.
- ☐ Most arsenic compounds can dissolve in water.
- ☐ It gets into air when contaminated materials are burned.
- ☐ It settles from the air to the ground.
- ☐ It doesn't break down, but can change from one form to another.
- ☐ Fish and shellfish build up organic arsenic in their tissues, but most of the arsenic in fish isn't toxic.

302773

How might I be exposed to arsenic?

- Breathing sawdust or burning smoke from wood containing arsenic
- Breathing workplace air
- Ingesting contaminated water, soil, or air at waste sites
- Ingesting contaminated water, soil, or air near areas naturally high in arsenic

How can arsenic affect my health?

Inorganic arsenic is a human poison. Organic arsenic is less harmful.

High levels of inorganic arsenic in food or water can be fatal. A high level is 60 parts of arsenic per million parts of food or water (60 ppm). Arsenic damages many tissues including nerves, stomach and intestines, and skin. Breathing high levels can give you a sore throat and irritated lungs.

Lower levels of exposure to inorganic arsenic may cause:

- Nausea, vomiting, and diarrhea
- Decreased production of red and white blood cells
- Abnormal heart rhythm
- Blood vessel damage
- A "pins and needles" sensation in hands and feet

Long term exposure to inorganic arsenic may lead to a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso.

Direct skin contact may cause redness and swelling.

How likely is arsenic to cause cancer?

The Department of Health and Human Services (DHHS) has determined that arsenic is a known carcinogen. Breathing inorganic arsenic increases the risk of lung cancer. Ingesting inorganic arsenic increases the risk of skin cancer and tumors of the bladder, kidney, liver, and lung.

Is there a medical test to show whether I've been exposed to arsenic?

Tests can measure your exposure to high levels of arsenic. These tests are not routinely performed in a doctor's office.

Arsenic can be measured in your urine. This is the most reliable test for arsenic exposure. Since arsenic stays in the body only short time, you must have the test soon after exposure.

Tests on hair or fingernails can measure your exposure to highlevels of arsenic over the past 6-12 months. These tests are not very useful for low level exposures.

These tests do not predict whether you will have any harmful health effects.

Has the federal government made recommendations to protect human health?

The Environmental Protection Agency (EPA) sets limits on the amount of arsenic that industrial sources can release. It restricted or canceled many uses of arsenic in pesticides and may restrict more. EPA set a limit of 0.05 parts per million (ppm) for arsenic in drinking water. EPA may lower this further.

The Occupational Safety and Health Administration (OSHA) established a maximum permissible exposure limit for workplace airborne arsenic of 10 micrograms per cubic meter ($\mu g/m^3$).

Glossary

Carcinogen:
Substance that can cause cancer.
Ingesting:
Taking food or drink into your body.
PPM:
Parts per million.
Microgram (μg):
One millionth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological profile for arsenic. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Case studies in environmental medicine: Arsenic toxicity. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns. For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop E-29
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302775

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ToxFAQs

Cadmium

April 1993

Agency for Toxic Substances and Disease Registry

This fact sheet answers the most frequently asked health questions about cadmium For more information, you may call 404- 639-6000. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to cadmium happens mostly in the workplace where cadmium products are made. The general population is exposed from breathing cigarette smoke or eating cadmium contaminated foods. Cadmium damages the lungs, can cause kidney disease, and may irritate the digestive tract. Cadmium has been found in at least 388 of 1,300 National Priorities List sites identified by the Environmental Protection Agency.

What is cadmium?
Pronounced (cad' me-um)

Cadmium is a natural element in the earth's crust. It is usually found as a mineral combined with other elements such as oxygen (cadmium oxide), chlorine (cadmium chloride), or sulfur (cadmium sulfate, cadmium sulfide). It doesn't have a definite taste or odor.

All soils and rocks, including coal and mineral fertilizers, have some cadmium in them. The cadmium that industry uses is extracted during the production of other metals like zinc, lead, and copper.

Cadmium does not corrode easily and has many uses. In industry and consumer products, it is used for batteries, pigments, metal coatings, and plastics.

What happens to cadmium when it enters the environment?

- Cadmium enters air from mining, industry, and burning coal and household wastes.
- Cadmium particles in air can travel long distances before falling to the ground or water.
- It enters water and soil from waste disposal and spills or leaks at hazardous waste sites.
- It binds strongly to soil particles.
- Some cadmium dissolves in water.
- It doesn't break down in the environment, but can change forms.
- Fish, plants, and animals take up cadmium from the environment.

- Cadmium stays in the body a very long time and can build up from many years of exposure to low levels.

How might I be exposed to cadmium?

- Breathing contaminated workplace air (battery manufacturing, metal soldering or welding)
- Eating foods containing it; low levels in all foods (highest in shellfish, liver, and kidney meats)
- Breathing cadmium in cigarette smoke (doubles the average daily intake)
- Drinking contaminated water
- Breathing contaminated air near the burning of fossil fuels or municipal waste

How can cadmium affect my health?

Breathing high levels of cadmium severely damages the lungs and can cause death. Eating food or drinking water with very high levels severely irritates the stomach, leading to vomiting and diarrhea.

Long term exposure to lower levels of cadmium in air, food, or water leads to a build up of cadmium in the kidneys and possible kidney disease. Other potential long term effects are lung damage and fragile bones.

Animals given cadmium in food or water show high blood pressure, iron-poor blood, liver disease, and nerve or brain damage. We don't know if humans get any of these diseases from eating or drinking cadmium.

Skin contact with cadmium is not known to cause health effects in humans or animals.

How likely is cadmium to cause cancer?

The Department of Health and Human Services (DHHS) has determined that cadmium and cadmium compounds may reasonably be anticipated to be carcinogens.

This is based on weak evidence of increased lung cancer in humans from breathing cadmium and on strong evidence from animal studies. We do not know if cadmium causes cancer from skin contact or from eating or drinking contaminated food and water.

Is there a medical test to show whether I've been exposed to cadmium?

Tests are available in some medical laboratories that measure cadmium in blood, urine, hair, or nails.

Blood levels show recent exposure to cadmium, and urine levels show both recent and earlier exposure. Urine tests can indicate kidney damage. The reliability of tests for cadmium levels in hair or nails is unknown.

Tests are available to measure cadmium in your liver and kidney. The tests are expensive, but can help a doctor evaluate your risk of kidney disease.

Has the federal government made recommendations to protect human health?

The Environmental Protection Agency (EPA) allows 5 parts of cadmium per billion parts of drinking water (5 ppb). The EPA also limits how much cadmium can enter lakes, rivers, waste sites, and cropland.

The EPA does not allow cadmium in pesticides.

The Food and Drug Administration (FDA) limits the amount of cadmium in food colors to 15 parts of cadmium per million parts of food color (15 ppm).

The Occupational Safety and Health Administration (OSHA) now limits workplace air to 100 micrograms (µg) cadmium per cubic meter as cadmium fumes and 200 µg cadmium/cubic meter as cadmium dust. OSHA is planning to limit all cadmium compounds to either 1 or 5 µg/cubic meter.

The National Institute for Occupational Safety and Health (NIOSH) currently recommends that workers breathe as little cadmium as possible.

Glossary

Carcinogen:
Substance that can cause cancer.
PPM:
Parts per million.
PPB:
Parts per billion.
Microgram (µg):
One millionth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological profile for cadmium. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Case studies in environmental medicine: Cadmium toxicity. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns. For more information, contact:

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U.S. Department of Health and Human Services
Public Health Service

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Link to ATSDR Science Corner

Link to ATSDR Home Page

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ToxFAQs

Cobalt

September 1995

Agency for Toxic Substances and Disease Registry

This fact sheet answers the most frequently asked health questions about cobalt. For more information, you may call 404-639-6000. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Everyone is exposed to low levels of cobalt in air, water, and food. Exposure to higher levels of cobalt occurs in the workplace. Cobalt has both beneficial and harmful effects on health. At low levels, it is part of Vitamin B12, which is essential for good health; at high levels, it may harm the lungs. This chemical has been found in at least 336 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.

What is cobalt?
(Pronounced ko'balt)

Cobalt is a compound that occurs in nature. It occurs in many different chemical forms. Pure cobalt is a steel-gray, shiny, hard metal. Cobalt is not currently mined in the United States.

All cobalt used in industry is imported or obtained by recycling scrap metal that contains cobalt. It is used in industry to make alloys (mixtures of metals), colored pigments, and as a drier for paint and porcelain enamel used on steel bathroom fixtures, large appliances, and kitchen wares.

Small amounts of cobalt naturally occur in food. In addition, vitamin B12 is a cobalt-containing compound that is essential for good health.

Some important natural sources of cobalt in the environment are soil, dust, and seawater. Cobalt is also released to the environment from burning coal and oil, and from exhaust from cars and trucks.

What happens to cobalt when it enters the environment?

- ☐ Cobalt enters the environment from natural sources and from the burning of coal and oil.
- ☐ Cobalt stays in the air for a few days.
- ☐ Pure cobalt does not dissolve in water, but some of its compounds do.

- Cobalt can stay for years in water and soil.
- It can move from the soil to underground water.
- Cobalt is taken up by plants from the soil.

How might I be exposed to cobalt?

- Everyone is exposed to cobalt at low levels in air, water, and food.
- People who live near hazardous waste sites containing cobalt may be exposed to higher levels of this chemical.
- Food is another source of exposure to cobalt.
- Workers may be exposed to cobalt in industries that process it or make products containing cobalt.

How can cobalt affect my health?

Cobalt has both beneficial and harmful effects on human health. Cobalt is beneficial because it is part of Vitamin B12. Cobalt has also been used as a treatment for anemia, because it causes red blood cells to be produced.

Exposure to high levels of cobalt can harm your health. Effects on the lungs, including asthma, pneumonia, and wheezing, have been found in workers who breathed high levels of cobalt in the air.

In the 1960s, some breweries added cobalt to beer to stabilize the foam. Some people who drank large quantities of the beer experienced nausea, vomiting, and serious effects on the heart. However, effects on the heart were not seen in people with anemia or pregnant women treated with cobalt.

Animal studies have found problems with the development of the fetus in animals exposed to high concentrations of cobalt during pregnancy. However, cobalt is also essential for the growth and development of certain animals.

How likely is cobalt to cause cancer?

The International Agency for Research on Cancer has determined that cobalt is a possible carcinogen to humans.

Studies in animals have shown that cobalt causes cancer when placed directly into the muscle or under the skin. Cobalt did not cause cancer in animals that were exposed to it in the air, in food, or in drinking water. Studies on people are inconclusive regarding cobalt and cancer.

Is there a medical test to show whether I've been exposed to cobalt?

Tests are available to measure cobalt levels in the urine and blood. These tests are only accurate for up to a few days after exposure because cobalt leaves the body fairly quickly.

These tests are not usually performed in most doctors' offices because special equipment is needed to conduct them. These tests cannot determine if adverse health effects will occur from exposure to cobalt.

Has the federal government made recommendations to protect human health?

The Environmental Protection Agency (EPA) requires that discharges or accidental spills into the environment of 1,000 pounds or more of cobalt be reported.

302782

The Occupational Safety and Health Administration (OSHA) has set an exposure limit of 0.1 milligrams per cubic meter (0.1 mg/m³) for cobalt in workplace air for an 8-hour workday, 40-hour workweek.

The American Conference of Governmental and Industrial Hygienists (ACGIH) has recommended an occupational exposure limit of 0.02 mg/m³ for cobalt for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) has recommended an occupational exposure limit of 0.05 mg/m³ for cobalt for a 10-hour workday, 40-hour workweek.

Glossary

Alloy:
A mixture of metals.
Anemia:
A decreased ability of the blood to transport oxygen.
Carcinogen:
A substance that can cause cancer.
Milligram (mg):
One thousandth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for cobalt. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

For more information, contact:

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U.S. Department of Health and Human Services
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302784

Agency for Toxic Substances and Disease Registry

Public Health Statement

1,2-Dichloroethene

ATSDR Public Health Statement, December 1990

This Statement was prepared to give you information about 1,2-dichloroethene and to emphasize the human health effects that may result from exposure to it. The Environmental Protection Agency (EPA) has identified 1177 sites on its National Priorities List (NPL). 1,2-Dichloroethene has been found in at least 275 of these sites. However, we do not know how many of the 1177 NPL sites have been evaluated for 1,2-dichloroethene. As EPA evaluates more sites, the number of sites at which 1,2-dichloroethene is found may change. The information is important for you because 1,2-dichloroethene may cause harmful health effects and because these sites are potential or actual sources of human exposure to 1,2-dichloroethene.

When a chemical is released from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment as a chemical emission. This emission, which is also called a release, does not always lead to exposure. You can be exposed to a chemical only when you come into contact with the chemical. You may be exposed to it in the environment by breathing, eating, or drinking substances containing the chemical or from skin contact with it.

If you are exposed to a hazardous substance such as 1,2-dichloroethene, several factors will determine whether harmful health effects will occur and what the type and severity of those health effects will be. These factors include the dose (how much), the duration (how long), the route or pathway by which you are exposed (breathing, eating, drinking, or skin contact), the other chemicals to which you are exposed, and your individual characteristics such as age, sex, nutritional status, family traits, lifestyle, and state of health.

What is 1,2-dichloroethene?

1,2-Dichloroethene, also called 1,2-dichloroethylene or acetylene dichloride, is a highly flammable, colorless liquid with a sharp, harsh odor. You can begin to smell 1,2-dichloroethene in air at a level of 17 parts 1,2- dichloroethene per million parts air (17 ppm). There are two forms of 1,2-dichloroethene; one form is called cis-1,2-dichloroethene, while the other is called trans-1,2-dichloroethene. Sometimes both forms are present as a mixture. It is used most often in the production of solvents and in chemical mixtures.

Occurrence of 1,2-dichloroethene in the environment is due entirely to human activity. This chemical has been found in air, water, and soil. 1,2-Dichloroethene is released to the environment from chemical

factories which make or use this chemical, from landfills and hazardous waste sites containing this chemical, from chemical spills, and from the burning of vinyl-containing objects.

1,2-Dichloroethene evaporates rapidly. When released to moist soil surfaces or to lakes, rivers and other bodies of water, most of it will evaporate into air. Once in the air, it usually takes about 4 to 8 days for half of any given amount of 1,2-dichloroethene to break down. When 1,2-dichloroethene occurs below soil surfaces in landfills or hazardous waste sites, it may dissolve in water, seep deeper into the soil, and possibly contaminate groundwater. Some 1,2-dichloroethene may escape as a gas. Once in groundwater, it takes about 13 to 48 weeks for half of a given amount to break down. There is a chance that small amounts of the 1,2- dichloroethene found in landfills will eventually break down into vinyl chloride (a more hazardous chemical).

How might I be exposed to 1,2-dichloroethene?

You might be exposed to 1,2-dichloroethene by breathing contaminated air or by drinking contaminated tap water. If you have contaminated tap water, you could also be breathing 1,2-dichloroethene vapors while cooking, bathing, or washing dishes. There are no known products which you can buy which contain 1,2-dichloroethene. People who live near landfill and hazardous waste sites that contain this chemical and people who work at chemical factories where this chemical is made or used, and those who work at landfills or work as firefighters are likely to be exposed to higher levels of this chemical than other people. Job-related exposure results from breathing in 1,2-dichloroethene or from skin contact with the chemical or materials contaminated with it. According to a National Institute for Occupational Safety and Health (NIOSH) survey conducted between 1981 and 1983, an estimated 215 people in the United States may have been exposed to 1,2-dichloroethene while working.

1,2-Dichloroethene has been found in the soil at eight hazardous waste sites in the United States at average levels of 5 to 4,000 parts 1,2-dichloroethene per billion (ppb) parts of soil. Air in urban and suburban areas has been found to contain an average of about 13 to 76 parts trans-1,2-dichloroethene per trillion (ppt) parts of air. Little is known about the levels in air in rural areas.

In a survey of tap water derived from groundwater in the United States, 16 of 466 randomly selected sites contained 1,2-dichloroethene. In this study it was found that contaminated tap water contained as much as 2 ppb. Little is known about the typical level of 1,2-dichloroethene in tap water originating from lake water or river water. It appears that people in urban and suburban areas commonly breathe small amounts of 1,2- dichloroethene in contaminated air. People are more likely to breathe 1,2-dichloroethene from contaminated air than to swallow it in drinking water. Exposure to 1,2-dichloroethene as the result of eating food is unlikely, unless the food is prepared with contaminated tap water. Heating will reduce the amount present in food.

How can 1,2-dichloroethene enter and leave my body?

1,2-Dichloroethene can enter the body through your lungs when you breathe air contaminated with it, through your stomach and intestines when you eat food or drink water contaminated with it, or through your skin upon contact with the chemical.

No studies have been performed that specifically show how 1,2-dichloroethene leaves the body. Available data indicates some of the swallowed 1,2-dichloroethene may leave the body unchanged, while some of it may be broken down to other substances in the body. The rate of elimination of 1,2-dichloroethene from the body is unknown.

How can 1,2-dichloroethene affect my health?

Breathing high levels of trans-1,2-dichloroethene can make you feel nauseous, drowsy, and tired. Breathing very high levels of 1,2-dichloroethene vapor can cause death. Animals that breathed high levels of trans-1,2- dichloroethene for short or long periods of time had damaged livers and lungs. The effects were more severe with increased exposure time. Animals that breathed very high levels of trans-1,2-dichloroethene had damaged hearts. Extremely high doses of cis- or trans-1,2-dichloroethene given by mouth caused death in animals. Lower oral doses of cis-1,2-dichloroethene caused decreased numbers of red blood cells.

The long-term human health effects following exposure to low concentrations of 1,2-dichloroethene are unknown. Neither birth defects nor cancer have been reported in humans or animals exposed to 1,2-dichloroethene. 1,2- Dichloroethene is not known to affect fertility in humans or animals.

What levels of exposure have resulted in harmful health effects?

Tables 1-1, 1-2, 1-3, and 1-4 show the relationship between exposure to 1,2-dichloroethenes and known health effects. As shown in Table 1-1, the exposure levels of 1,2-dichloroethenes in the air that cause adverse health effects in humans are not known. This chemical has a sharp, slightly unpleasant odor. You can begin to smell 1,2- dichloroethene when it is in the air at a level of 17 ppm. Minimal Risk Levels (MRLs) for cis-1,2- dichloroethene are included in Table 1-3. These MRLs were derived from animal data for both short-term and long-term exposure. The MRLs provide a basis for comparison with levels that people might encounter in food. If a person is exposed to cis-1,2-dichloroethene at an amount below the MRL, it is not expected that harmful (noncancer) health effects will occur. Since these levels are based on information currently available, there is always some uncertainty associated with them.

Also, since the method for deriving MRLs does not use any information about cancer, an MRL does not imply anything about the presence, absence, or levels of risk for cancer. MRLs have not been derived for trans-1,2- dichloroethene in food or for cis- and trans-1,2-dichloroethene in water or air. The health effects resulting from skin contact with 1,2-dichloroethene in humans and animals are not presently known.

Is there a medical test to determine if I have been exposed to 1,2-dichloroethene?

Although methods are presently available for measuring the concentration of 1,2-dichloroethene in the blood and tissues, the methods are not routinely used to determine if you have been exposed to 1,2-dichloroethene. The expected effects are not specific to 1,2-dichloroethene and may result from a number of other causes.

What recommendations has the federal government made to protect human health?

The Environmental Protection Agency (EPA) requires notification of the National Response Center when 1000 pounds or more of 1,2-dichloroethene is discharged or spilled into the environment. The Occupational Safety and Health Administration (OSHA) limits 1,2-dichloroethene levels in the air in the

302787

workplace to 200 ppm (790 mg/m3) for an 8-hour workday, 40-hour workweek.

Where can I get more information?

If you have any more questions or concerns not covered here, please contact your state health or environmental department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road, E-29
Atlanta, Georgia 30333

This agency can also give you information on the location of the nearest occupational and environmental health clinics. Such clinics specialize in recognizing, evaluating, and treating illnesses that result from exposure to hazardous substances.

ToxFAQs

Lead

April 1993

Agency for Toxic Substances and Disease Registry

This fact sheet answers the most frequently asked health questions about lead. For more information, you may call 404-639-6000. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to lead happens mostly from breathing workplace air or dust, and eating contaminated foods. Children can be exposed from eating lead-based paint chips, or playing in contaminated soil. Lead can damage the nervous system, kidneys, and the immune systems. Lead has been found in at least 922 of 1,300 National Priorities List sites identified by the Environmental Protection Agency.

What is lead?
(Pronounced led)

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. It has no special taste or smell. Lead can be found in all parts of our environment. Most of it came from human activities like mining, manufacturing, and the burning of fossil fuels.

Lead has many different uses, most importantly in the production of batteries. Lead is also in ammunition, metal products (solder and pipes), roofing, and devices to shield x-rays.

Because of health concerns, lead from gasoline, paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years.

What happens to lead when it enters the environment?

- Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- When released to the air from industry or burning of fossil fuels or waste, it stays in air about 10 days.
- Most of the lead in soil comes from particles falling out of the air.
- City soils also contain lead from landfills and leaded paint.
- Lead sticks to soil particles.
- It does not move from soil to underground water or drinking water unless the water is acidic or

"soft".
- ☐ It stays a long time in both soil and water.

How might I be exposed to lead?

- ☐ Breathing workplace air (lead smelting, refining, and manufacturing industries)
- ☐ Eating lead-based paint chips
- ☐ Drinking water that comes from lead pipes or lead soldered fittings
- ☐ Breathing or ingesting contaminated soil, dust, air, or water near waste sites
- ☐ Breathing tobacco smoke
- ☐ Eating contaminated food grown on soil containing lead or food covered with lead-containing dust
- ☐ Breathing fumes or ingesting lead from hobbies that use lead (leaded-glass, ceramics)

How can lead affect my health?

Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the immune system. The effects are the same whether it is breathed or swallowed.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common after exposure to **high levels** of lead.

In adults, lead may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory. Lead may cause anemia, a disorder of the blood. It can cause abortion and damage the male reproductive system. The connection between these effects and exposure to **low levels** of lead is uncertain.

How likely is lead to cause cancer?

The Department of Health and Human Services (DHHS) has determined that lead acetate and lead phosphate may reasonably be anticipated to be carcinogens based on studies in animals. There is inadequate evidence to clearly determine lead's carcinogenicity in humans.

Is there a medical test to show whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your exposure to lead. Blood tests are commonly used to screen children for potential chronic lead poisoning. The Centers for Disease Control and Prevention (CDC) considers children to have an elevated level of lead if the amount in the blood is at least 10 micrograms per deciliter (10 µg/dL). Lead in teeth and bones can be measured with X-rays, but this test is not as readily available.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends all children be screened for lead poisoning at least once a year. This is especially important for children between 6 months and 6 years old.

The Environmental Protection Agency (EPA) requires lead in air not to exceed 1.5 micrograms per cubic meter (1.5 $\mu g/m^3$) averaged over 3 months. The sale of leaded gasoline will be illegal as of

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December 31, 1995. EPA limits lead in drinking water to 15 micrograms per liter (15 µg/L).

The Consumer Product Safety Commission (CPSC), EPA, and the states control the levels of lead in drinking water coolers. Water coolers that release lead must be recalled or repaired. New coolers must be lead-free. Drinking water in schools must be tested for lead.

The Department of Housing and Urban Development (HUD) requires that federally funded housing and renovations, public housing, and Indian housing be tested for lead-based paint hazards. Hazards must be fixed by covering the paint or removing it.

The Occupational Safety and Health Administration (OSHA) limits the concentration of lead in workroom air to 50 µg/cubic meter for an 8-hour workday. If a worker has a blood lead level of 40 µg/dL, OSHA requires that worker to be removed from the workroom.

Glossary

Carcinogenicity:
Ability to cause cancer.
Anemia:
Low numbers of red blood cells or hemoglobin.
Ingesting:
Taking food or drink into your body.
Microgram (µg):
One millionth of a gram.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological profile for lead. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Case studies in environmental medicine: Lead toxicity. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop E-29
Atlanta, GA 30333.
Phone: 404-639-6000

U.S. Department of Health and Human Services
Public Health Service
Agency for Toxic Substances and Disease Registry

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PB93-110761

TOXICOLOGICAL PROFILE FOR MANGANESE AND COMPOUNDS

Prepared by:

Life Systems, Inc.
Under Subcontract to:

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Under Contract No. 205-88-0608

Prepared for:

Agency for Toxic Substances and Disease Registry
U.S. Public Health Service

July 1992

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1. PUBLIC HEALTH STATEMENT

This Statement was prepared to give you information about manganese and to emphasize the human health effects that may result from exposure to it. The Environmental Protection Agency (EPA) has identified 1,177 sites on its National Priorities List (NPL). Manganese has been found in at least 148 of these sites. However, we do not know how many of the 1,177 NPL sites have been evaluated for manganese. As EPA evaluates more sites, the number of sites at which manganese is found may change. This information is important for you to know because manganese may cause harmful health effects and because these sites are potential or actual sources of human exposure to manganese.

When a chemical is released from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment as a chemical emission. This emission, which is also called a release, does not always lead to exposure. You can be exposed to a chemical only when you come into contact with the chemical. You may be exposed to it in the environment by breathing, eating, or drinking substances containing the chemical or from skin contact with it.

If you are exposed to a hazardous chemical such as manganese, several factors will determine whether harmful health effects will occur and what the type and severity of those health effects will be. These factors include the dose (how much), the duration (how long), the route or pathway by which you are exposed (breathing, eating, drinking, or skin contact), the other chemicals to which you are exposed, and your individual characteristics such as age, sex, nutritional status, family traits, life style, and state of health.

1.1 WHAT IS MANGANESE?

Manganese is a naturally occurring substance found in many types of rock. Pure manganese is a silver-colored metal, somewhat like iron in its physical and chemical properties. Manganese does not occur in the environment as the pure metal. Rather, it occurs combined with other chemicals such as oxygen, sulfur, and chlorine. These forms (called compounds) are solids that do not evaporate. However, small dust particles of the solid material can become suspended in air. Some manganese compounds can dissolve in water, and low levels of these compounds are normally present in lakes, streams, and the ocean. Manganese can change from one compound to another (either by natural processes or by man's activities), but it does not break down or disappear in the environment.

Rocks containing high levels of manganese compounds are mined and used to produce manganese metal. This manganese metal is mixed with iron to make various types of steel. Some manganese compounds are used in the production of batteries, as an ingredient in some ceramics, pesticides, and fertilizers, and in dietary supplements.

More information on the properties and uses of manganese and how it behaves in the environment may be found in Chapters 3, 4, and 5.

1.2 HOW MIGHT I BE EXPOSED TO MANGANESE?

Because manganese is a natural component in the environment, you are always exposed to low levels of it in water, air, soil, and food. In drinking water, levels are usually about 0.004 parts manganese per million parts of water (ppm). In air, levels are usually about 0.02 micrograms manganese per cubic meter of air ($\mu g/m^3$). Levels in soil usually range from 40 to 900 ppm. Manganese is also a normal component of living things, including both plants and animals, so manganese is present in foods. For nearly all people, food is the main source of manganese, and usual daily intakes range from about 2,000 to 9,000 μg/day. The exact amount you take in depends on your diet.

You are most likely to be exposed to higher-than-normal levels of manganese if you work in a factory where manganese metal is produced from manganese ores, or where manganese compounds are used to make steel or other products. In these factories, you would be exposed to manganese mainly by breathing in manganese dust. If you live near such a factory, you could also be exposed to higher-than-average levels of manganese dust in the outside air, although the amounts would be much lower than in the factory. You might be exposed to higher-than-average levels if you live near a coal or oil-burning factory, or close to a major highway, because manganese is released into air when fossil fuels are burned. If manganese compounds from a factory or a waste site get into water, you could be exposed to higher-than-average levels by drinking the water.

More information on how you might be exposed to manganese or its compounds is given in Chapter 5.

1.3 HOW CAN MANGANESE ENTER AND LEAVE MY BODY?

If you live near a hazardous waste site, you could be exposed to manganese in soil or water, or to manganese-containing dust particles in air. If you get manganese-contaminated soil or water on your skin, very little will enter your body, so this is not of concern. If you swallow manganese in water or in soil, most of the manganese is excreted in the feces. However, about 3%-5% is usually taken up and kept in the body. If you breathe air containing manganese dust, many of the dust particles will be trapped in your lungs. Some of the manganese in these particles may then dissolve in the lungs and enter the blood. The exact amount that does this is not known. Particles that do not dissolve will be carried in a sticky layer of mucus out of the lungs to the throat, where they will be swallowed into the stomach.

Because manganese is a regular part of the human body, the body normally controls the amount that is taken up and kept. For example, if large amounts are eaten in the diet, the amount that is taken up in the body becomes smaller. If too much does enter the body, the excess is usually removed in the feces. Therefore, the total amount of manganese in the body usually tends to stay about the same, even when exposure rates are higher or lower than usual. However, if too much manganese is taken in, the body may not be able to adjust for the added amount.

More information on how manganese enters and leaves the body is given in Chapter 2.

1.4 HOW CAN MANGANESE AFFECT MY HEALTH?

Eating a small amount of manganese each day is important in maintaining your health. The amount of manganese in a normal diet (about 2,000-9,000 µg/day) seems to be enough to meet your daily need, and no cases of illness from eating too little manganese have been reported in humans. In animals, eating too little manganese can interfere with normal growth, bone formation, and reproduction.

Too much manganese, however, can cause serious illness. Although there are some differences between different kinds of manganese, most manganese compounds seem to cause the same effects. Manganese miners or steel workers exposed to high levels of manganese dust in air may have mental and emotional disturbances, and their body movements may become slow and clumsy. This combination of symptoms is a disease called manganism. Workers usually do not develop symptoms of manganism unless they have been exposed for many months or years. Manganism occurs because too much manganese injures a part of the brain that helps control body movements. Some of the symptoms of manganism can be reduced by medical treatment, but the brain injury is permanent.

It is not certain whether eating or drinking too much manganese can cause manganism or not. In one report, humans who drank water containing high levels of manganese developed symptoms similar to those seen in manganese miners or steel workers, but it is not certain if the effects were caused by manganese alone. In another report, people who drank water with above average levels of manganese seemed to have a slightly higher frequency of symptoms such as weakness, stiff muscles, and trembling of the hands. However, these symptoms are not specific for manganese, and might have been caused by other factors. Studies in animals have shown that very high levels of manganese in food or water can cause changes in the brain. This information suggests that high levels of manganese in food or water might cause brain injury, but it does not appear that this is of concern to people exposed to the normal amounts of manganese in food, water, or air. The chances of harm from exposure near a waste site can only be evaluated on a site-by-site basis.

Breathing too much manganese dust can also cause irritation of the lungs. Sometimes this makes breathing difficult and it can also increase the chances of getting a lung infection, such as pneumonia. However, this can happen from breathing in many different kinds of dust particles, not just those that contain manganese.

A common effect in men who are exposed to high levels of manganese dust in air is impotence. As a result, men exposed to high levels may not be able to father children. Studies in animals show that too much manganese may also injure the testes. Much less is known about the effects of too much manganese in women. Studies in animals suggest that females may not be as sensitive to manganese as males, but this is not certain.

There is not much information on whether manganese can cause birth defects. One study in humans suggests that high exposures to manganese in the environment might increase the chances of birth defects, but other factors besides manganese might have been responsible. One study in animals shows that exposure of pregnant females to high levels of manganese in air can lead to changes in behavior of the offspring. Since there are so few studies on this, more research is needed to determine the importance of these observations.

No studies have been done to determine if breathing manganese dust causes cancer. Some studies in animals suggest that eating high amounts of manganese might increase the chances of getting cancer. However, only a few animals in these studies got cancer, and it was difficult to tell if the tumors were really caused by the excess manganese. Thus, there is little evidence to suggest that cancer is a major concern for people exposed to manganese in the environment or near waste sites. The EPA has determined that manganese is not classifiable as to human carcinogenicity.

There is no information on any human or animal health effects from skin contact with manganese.

More information on health effects of manganese in humans and animals can be found in Chapter 2.

1.5 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO MANGANESE?

Several tests are available for measuring manganese in blood, urine, hair, or feces. Because manganese is a normal part of the body, some manganese is always found in these materials. Concentrations of manganese in blood, urine, hair, or feces are often found to be higher-than-average in groups of people exposed to above-average levels of manganese. However, because the levels in different people can vary widely, these methods are not very reliable for determining if any one individual has been exposed to higher-than-average levels of manganese. Also, because excess manganese is usually removed from the body within a few days, past exposures to manganese are difficult to measure. For these reasons, it is often not possible to tell whether excess exposure to manganese has occurred, or whether there is reason for health concern.

More information of how manganese can be measured in exposed humans can be found in Chapters 2 and 6.

1.6 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

In order to avoid staining of clothing or fixtures, the EPA recommends that the concentration of manganese in drinking water not be more than 0.05 ppm. The Food and Drug Administration (FDA) has set the same level for bottled water. This concentration is believed to be more than adequate to

protect human health. The EPA has also established rules that set limits on the amount of manganese that factories can dump into water, and requires factories that use or produce manganese to report how much they dump in the environment to the EPA. The Occupational Safety and Health Administration (OSHA) has set a limit of 1,000 $\mu g/m^3$ for the average amount of manganese in workplace air over an 8-hour workday.

More information on governmental rules regarding manganese can be found in Chapter 7.

1.7 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns not covered here, please contact your state health or environmental department or:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road, E-29
Atlanta, Georgia 30333

This agency can also provide you with information on the location of the nearest occupational and environmental health clinic. Such clinics specialize in recognizing, evaluating, and treating illnesses that result from exposure to hazardous substances.

ToxFAQs

Nickel

April 1993

Agency for Toxic Substances and Disease Registry

This fact sheet answers the most frequently asked health questions about nickel. For more information, you may call 404- 639-6000. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to nickel happens mostly from breathing air in the workplace air or at waste sites, or skin contact with alloys. Higher levels of nickel cause lung disease and death. Nickel has been found in at least 648 of 1,300 National Priorities List sites identified by the Environmental Protection Agency.

What is nickel?
(Pronounced nik' el)

Nickel is a naturally-occurring, hard, silvery white metal. It is the 24th most abundant mineral in the earth's crust and can be found in all soils.

Nickel combines with other metals to form mixtures called alloys. The most common nickel alloy is nickel-iron which is used to make stainless steel. Other nickel alloys are used to make coins, jewelry, plumbing and heating equipment, gas-turbine engines, and electrodes.

Nickel also forms compounds with chlorine, sulfur, and oxygen. These compounds have no characteristic odor or taste. Many dissolve easily in water and have a characteristic green color. Nickel compounds are used for nickel plating, to color ceramics, and to make some batteries. They also act as catalysts to increase the rate of chemical reactions.

What happens to nickel when it enters the environment?

- ☐ Nickel from smoke stacks attaches to small dust particles in the air.
- ☐ Nickel dust settles to the ground or is washed from the air by rain or snow.
- ☐ Removal of nickel particles from the air may take more than a month.
- ☐ Most ends up attached to soil or sediment particles.
- ☐ It may seep into groundwater in acidic soils.
- ☐ Nickel does not break down, but can change its form.

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- It doesn't build up in the bodies of fish but may build up in plants and land animals.

How might I be exposed to nickel?

- Breathing workplace air where nickel is used (nickel mining, smelting, and manufacturing)
- Ingesting or skin contact with workplace dust or nickel containing metals or solutions
- From artificial body parts that contain nickel alloys
- Breathing, skin contact, or ingesting contaminated soil, dust, and vegetation near industries that process or use nickel or that burn fossil fuels
- Skin contact with coins and some plated jewelry that contain nickel
- Eating a regular diet but levels are very low.

How can nickel affect my health?

Small amounts of nickel have been shown to be essential to animal health. Nickel may also be essential for human health, however, no cases of nickel deficiency in humans has ever been reported. Although small amounts may be essential, breathing, ingesting, or skin contact with high levels of nickel can harm your health.

Workers who breathed high levels of nickel had higher death rates from lung diseases. Cancer of the lung and nasal sinus are the most serious effects from long term exposures. Effects on the heart, blood, and kidneys, and skin rashes are also found. The levels of nickel in these studies were much higher than most people's exposure.

Ingesting nickel can also be harmful. A child died of heart failure after accidentally eating 20,360 parts of nickel per million parts of a nickel compound (20,360 ppm). Workers drinking nickel contaminated-water from a fountain (250 ppm) had stomach aches, increased number of red blood cells, and kidney damage.

The most common health effects from nickel exposure in the general population are skin allergies. Nickel can stimulate an allergic response in skin including skin rashes or asthma. Sensitive people may have a skin rash return if they later ingest nickel.

It is not known whether eating or breathing nickel will affect reproduction or cause birth defects in humans.

How likely is nickel to cause cancer?

The Department of Health and Human Services (DHHS) has determined that nickel and certain nickel compounds may reasonably be anticipated to be carcinogens. The ability of some nickel compounds to cause nasal and lung cancers when inhaled has been well documented in workers. Animal studies support these findings.

Is there a medical test to show whether I've been exposed to nickel?

Tests are routinely available to measure nickel in the urine, feces, and blood. They must be performed soon after exposure. The amount of nickel in your feces and urine indicates your exposure to nickel. Exposures from water soluble nickel compounds are easier to determine than from water insoluble compounds. These tests don't predict the potential health effects from exposure to nickel.

Has the federal government made recommendations to protect human health?

The U.S. Environmental Protection Agency (EPA) has determined that long-term exposure to 0.02 milligrams of nickel per kilogram of body weight **per day** (0.02 mg/kg/day) in food or drinking water is safe for humans. This value is for nickel compounds **that** dissolve easily in water. EPA requires industry to report a spill of more than 100 pounds of nickel **compounds** that dissolve easily in water.

The Occupational Safety and Health Administration (OSHA) and the American Conference of Governmental Industrial Hygienists (ACGIH) **have both** set the occupational exposure limit for an 8-hour workday, 40-hour workweek at 0.1 **milligrams per** cubic meter (0.1 mg/m^3) for nickel compounds that dissolve easily in water.

Glossary

Carcinogen:
Substance that can cause cancer.
Ingestion:
Taking food or drink into your body.
Nasal sinus:
The air cavities in the nose.
Milligram (mg):
One thousandth of a gram.
PPM:
Parts per million.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological profile for nickel. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational **and** environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting **from** exposure to hazardous substances. You can also contact your community or state health or **environmental** quality department if you have any more questions or concerns.

For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
1600 Clifton Road NE, Mailstop E-29
Atlanta, GA 30333
Phone: 404-639-6000

U.S. Department of Health and Human Services
Public Health Service
Agency for Toxic Substances and Disease Registry

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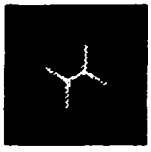
ToxFAQs

Tetrachloroethylene

April 1993



tetrachloroethylene

- GIF Image
- 3D Viewer File

Agency for Toxic Substances and Disease Registry (ATSDR)

This fact sheet answers the most frequently asked health questions about tetrachloroethylene. For more information, you may call 404-639-6000. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to tetrachloroethylene happens mostly from breathing workplace air or contaminated air and drinking contaminated water. Short-term exposure to high levels of this chemical can damage the nervous system. repeated contact with tetrachloroethylene can cause skin irritation. Tetrachloroethylene has been found in at least 714 of 1,300 National Priorities List sites identified by the Environmental Protection Agency.

What is tetrachloroethylene?
(Pronounced tet'rah-klo'ro-eth'i-leen)

Tetrachloroethylene is a manufactured chemical that is widely used for dry cleaning fabrics and for removing grease from metal surfaces. It is also used to make other chemicals and some consumer products.

Tetrachloroethylene is a nonflammable liquid at room temperature that evaporates easily to air producing a sharp, sweet odor. Most people can smell very low levels in air and water. This chemical is also called perchloroethylene, PCE, perc, tetrachloroethene, perclene, and perchlor.

What happens to tetrachloroethylene when it enters the environment?

- It evaporates during use or from waste sites, and is mostly found in air.
- It takes several months in air to break down.

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- Rain or snow carries some of it to soil and water.
- It can be carried from soil to underground drinking water supplies.
- It can stay in underground water for many months without breaking down.
- Bacteria in water may break it down, but some of the breakdown products may also be harmful.
- It does not appear to build up in fish, clams, and oysters.

How might I be exposed to tetrachloroethylene?

- Breathing contaminated workplace air
- Breathing vapors from consumer products like auto brake quieters and cleaners, water repellents, silicon lubricants, and spot removers (check the label)
- Breathing air or drinking water near industries, dry cleaners, or waste sites.
- For infants, drinking breast milk from mothers exposed to the chemical.

How can tetrachloroethylene affect my health?

High levels of tetrachloroethylene in the air can cause dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, and possibly unconsciousness and death. Skin irritation may result from repeated or extended contact with the chemical.

The health effects of breathing air or drinking water that have **low levels** of tetrachloroethylene are not known. Several studies suggest that some women who work in dry cleaning industries have more menstrual problems and spontaneous abortions than women not exposed to tetrachloroethylene. We don't know if tetrachloroethylene was responsible because other causes were not considered. The chemical doesn't seem to cause birth defects in children whose parents are exposed to it

Tetrachloroethylene can be toxic to the fetuses of rats and mice. In one study, minor changes in the brain and behavior were seen in the offspring of rats exposed to very high levels of tetrachloroethylene during pregnancy. This single study, however, is not sufficient to draw any conclusions about the effects of tetrachloroethylene on human development or reproduction.

Animal studies using high levels of tetrachloroethylene show that it can cause liver and kidney damage.

How likely is tetrachloroethylene to cause cancer?

The Department of Health and Human Services has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. This is based on long-term animal studies using high levels of tetrachloroethylene which resulted in liver and kidney cancers. This chemical has not been shown to cause cancer in people.

Is there a medical test to show whether I've been exposed to tetrachloroethylene?

Tests are available to measure tetrachloroethylene in the breath, blood, and urine. It can be detected in the breath for weeks following a heavy exposure. Some of the breakdown products in blood and urine can be identified for only short periods after exposure.

Because other chemicals produce the same breakdown products in the urine and blood, these test can't determine if you have been exposed only to tetrachloroethylene. Although the tests are simple to perform, they aren't routinely available in your doctor's office.

Has the federal government made recommendations to protect human health?

The Environmental Protection Agency (EPA) recommends that children should not have more than 2.0 parts tetrachloroethylene per million parts of water (2 ppm) in 1 day or more than 1.4 ppm per day for long-term exposure. Adults should not have more than 5 ppm in the drinking water for long-term exposure. EPA requires industry to immediately report a spill of more than 100 pounds of tetrachloroethylene to the National Response Center.

The Occupational Safety and Health Administration (OSHA) limits the amount of tetrachloroethylene in workroom air to 100 ppm for an 8-hour workday over a 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) recommends that tetrachloroethylene be handled as a potential carcinogen and states that workplace air levels should be as low as possible.

Glossary

Carcinogen:
Substance that can cause cancer.
Long-term:
Generally means longer than one year.
PPM:
Parts per million.
Short-term:
Generally means less than 90 days.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological profile for tetrachloroethylene. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

For more information, contact:

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U.S. Department of Health and Human Services

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Link to ToxFAQs Home Page

Link to ATSDR Science Corner

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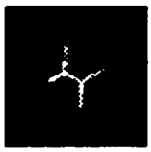
ToxFAQs

Trichloroethylene (TCE)

April 1993



trichloroethylene (TCE)

- GIF Image
- 3D Viewer File

Agency for Toxic Substances and Disease Registry

This fact sheet answers the most frequently asked health questions about trichloroethylene. For more information, you may call 404-639-6000. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to trichloroethylene happens mostly from breathing workplace air, breathing contaminated air near waste sites or from consumer products or from drinking contaminated water. High levels in air can cause dizziness, headaches, and unconsciousness. Trichloroethylene has been found in at least 791 of 1,300 National Priorities List sites identified by the Environmental Protection Agency.

What is trichloroethylene?
(Pronounced tri' - klo - ro - eth'i - leen)

Trichloroethylene is an industrial chemical. It is a nonflammable, colorless liquid at room temperature with a somewhat sweet odor and a sweet, burning taste. Most people can smell it in the air at low levels. Trade names for trichloroethylene are Triclene and Vitran.

Trichloroethylene was once used as an anesthetic for surgery, but it is now used mainly as a solvent to remove grease from metal parts. The automotive and metals industries are the main users. It is also found in some household products like typewriter correction fluid, paint removers, adhesives, and spot removers.

What happens to trichloroethylene when it enters the environment?

- It evaporates to air during grease removal operations.
- It gets into soil and water from industrial and hazardous waste sites.

- From surface water and soil, it quickly evaporates to air.
- It does not stick to soil particles, and it moves quickly through the soil to groundwater.
- It breaks down in air in a few weeks, in surface water in days to weeks, more slowly in deep soil, and not at all in groundwater.
- Fish don't store it, but low levels have been found in their body.

How might I be exposed to trichloroethylene?

- Low exposure to the general public
- Breathing workplace air around metal cleaning operations and solvents
- Ingesting contaminated food or water, or breathing contaminated air around hazardous waste sites
- Breathing indoor air contaminated from consumer products containing trichloroethylene (check label)

How can trichloroethylene affect my health?

Trichloroethylene mostly affects the nervous system. Exposure to **very high levels** for short times has caused unconsciousness and death.

People who breathe **moderate** levels may have headaches, dizziness, or impaired ability to perform. Most people can smell it in the air at much lower levels. People vary in their ability to smell, however, so odor may not always alert you to an unwanted exposure. Skin contact with high levels can cause rashes. Health effects from long-term exposures have mostly been studied in animals. Animals exposed to moderate levels had enlarged livers. Higher exposures caused liver and kidney damage. We do not know if these effects would occur in people.

Children of parents who drank water from a well contaminated with trichloroethylene were born with more heart problems. Other chemicals, however, were also in the well water. Also, other people who drank water contaminated with trichloroethylene had normal babies. Therefore, we do not know if trichloroethylene causes birth defects or affects our ability to reproduce.

How likely is trichloroethylene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that trichloroethylene is not classifiable as to its carcinogenicity to humans.

The IARC determination is based on the lack of strong evidence associating cancer in people with exposure to trichloroethylene and the mixed or flawed results from animal studies. More research is needed to make a clear determination on trichloroethylene's ability to cause cancer.

Is there a medical test to show whether I've been exposed to trichloroethylene?

Tests can measure trichloroethylene in your breath and breakdown products in urine or blood, but these tests are not routinely available at your doctor' s office.

Breath levels can show if you were exposed to large amounts of trichloroethylene. If exposed to low levels, the test must be performed soon after the exposure. Urine and blood tests can also show if you have been exposed to large amounts.

One of the breakdown products can be measured in the urine for about 1 week after trichloroethylene

exposure. Other chemicals have the same breakdown products so the tests are not specific for trichloroethylene.

Has the federal government made recommendations to protect human health?

The U.S. Environmental Protection Agency (EPA) sets a drinking water standard of 5 parts of trichloroethylene per one billion parts of water (5 ppb) effective January 9, 1989. The standard is for community water systems and systems that serve the same 25 or more people for at least 6 months. EPA requires industries to report spills of 1,000 pounds or more of trichloroethylene. This level may be reduced to 100 pounds.

The Occupational Safety and Health Administration (OSHA) limits exposure to an average level of 50 parts of trichloroethylene per one million parts of air (50 ppm) for an 8-hour workday, 40-hour workweek. A level of 200 ppm has been set for a 15-minute average exposure in air any time during the workday.

Glossary

Carcinogenicity:
Ability to cause cancer.
PPB:
Parts per billion.
PPM:
Parts per million.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Toxicological profile for trichloroethylene. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Agency for Toxic Substances and Disease Registry (ATSDR). 1993. Case studies in environmental medicine: Trichloroethylene toxicity. Atlanta: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

For more information, contact:

Agency for Toxic Substances and Disease Registry
Division of Toxicology
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Atlanta, GA 30333
Phone: 404-639-6000

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APPENDIX P

Appendix P

Ecological Risk Assessment Tables

Appendix P-1

Toxicity Data Used in the Ecological Assessment

TOXICITY DATA USED IN ECOLOGICAL ASSESSMENT

Compound	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose	Notes
Volatiles					
Acetone	rat	NOAEL, oral intubation, 90 days, liver/kidney damage	Opresko, 1996	10 mg/kg BW-day	
Benzene	mouse	NOAEL, oral gavage, 6 days of gest , reproduction	Opresko, 1996	26.36 mg/kg BW-day	
2-Butanone	rat	NOAEL, oral in water, 2 generations, reproduction	Opresko, 1996	1771 mg/kg BW-day	
2-Hexanone	mouse	LD50, oral, mortality	Lewis, 1992	2,430 mg/kg BW	
Methylene Chloride	rat	NOAEL, oral in water, 2 years, liver histology	Opresko, 1996	5.85 mg/kg BW-day	
4-Methyl-2-Pentanone	rat	NOAEL, oral gavage, 13 weeks, liver & kidney function	Opresko, 1996	25 mg/kg BW-day	
Tetrachloroethene	mouse	NOAEL, oral gavage, 6 weeks, hepatotoxicity	Opresko, 1996	1.4 mg/kg BW-day	Value is for 1,1,2,2-tetrachloroethene
Semi-Volatiles					
Acenapthene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Anthracene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Benzo(a)anthracene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Benzo(b)fluoranthene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Benzo(k)fluoranthene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Benzo(g,h,i)perylene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Benzo(a)pyrene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	
bis(2-ethylhexyl)phthalate	mouse	NOAEL, diet, 4 weeks, reproduction	Opresko, 1996	18.3 mg/kg BW-day	
Chrysene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Dibenz(a,h)anthracene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Fluroene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Fluoranthene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Indeno(1,2,3-cd)pyrene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
2-Methylnaphthalene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Naphthalene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Phenanthrene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Pyrene	mouse	NOAEL, oral intubation, 10 days of gest., reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for benzo(a)pyrene.
Pesticides/PCBs					
4,4'-DDE	rat	NOAEL, diet, 2 yr, reproduction	Opresko, 1996	0.8 mg/kg BW-day	Value is for DDT and its metabolites.
4,4'-DDD	rat	NOAEL, diet, 2 yr, reproduction	Opresko, 1996	0.8 mg/kg BW-day	Value is for DDT and its metabolites.
	brown pelican	NOAEL, diet, 5 yr, reproduction	Opresko, 1996	0.00028 mg/kg BW-day	Value is for DDT and its metabolites.
Endrin	mouse	NOAEL, diet, 120 days, reproduction	Opresko, 1996	0.092 mg/kg BW-day	
	mallard	NOAEL, diet, >200 days, reproduction	Opresko, 1996	0.3 mg/kg BW-day	
PCBs	mink	NOAEL, diet, 6 months, reproduction	Heaton, 1992	0.004 mg/kg BW-day	Value is for Aroclors 1248, 1254 + 1260
	quail	NOAEL, diet, 17 weeks, reproduction	Opresko, 1996	0.18 mg/kg BW-day	Value is for Aroclor 1254.

TOXICITY DATA USED IN ECOLOGICAL ASSESSMENT

Compound	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose	Notes
Inorganics					
Aluminum	mouse	NOAEL, diet, 3 generations, reproduction	Opresko, 1996	1.93 mg/kg BW-day	Value is for $AlCl_3$
	ringed dove	NOAEL, diet, 4 months, reproduction	Opresko, 1996	111.4 mg/kg BW-day	Value is for $Al_2(SO_4)_3$
Antimony	mouse	NOAEL, oral in water, lifetime, longevity	Opresko, 1996	0.125 mg/kg BW-day	Value is for Antimony Potassium Tartrate
Arsenic	mouse	NOAEL, diet, 3 generations, reproduction	Opresko, 1996	0.126 mg/kg BW-day	Value is for Arsenite (As^{+3})
	mallard	NOAEL, diet, 128 days, mortality	Opresko, 1996	5.135 mg/kg BW-day	Value is for Sodium Arsenite (51.35% As^{+3})
Barium	rat	NOAEL, oral in water, 16 months, growth, hypertension	Opresko, 1996	5.06 mg/kg BW-day	Value is for Barium Chloride
	chicks	NOAEL, diet, 4 weeks, mortality	Opresko, 1996	20.826 mg/kg BW-day	Value is for Barium Hydroxide
Beryllium	rat	NOAEL, oral in water, lifetime, longevity, weight loss	Opresko, 1996	0.66 mg/kg BW-day	
Cadmium	mouse	NOAEL, diet, 2 generations, reproduction	Opresko, 1996	0.1913 mg/kg BW-day	Value is for the soluble salt.
	mallard	NOAEL, diet, 90 days, reproduction	Opresko, 1996	1.45 mg/kg BW-day	Value is for Cadmium Chloride
Chromium	rat	NOAEL, diet, 90 days and 2 yr, reproduction, longevity	Opresko, 1996	2737 mg/kg BW-day	Value is for Cr^{+3} as Cr_2O_3 (68.42% Cr)
	black duck	NOAEL, diet, 10 months, reproduction	Opresko, 1996	1 mg/kg BW-day	Value is for Cr^{+3} as $CrK(SO_4)_2$
Cobalt	rat	LD50, oral, mortality	Clement Assoc, 1985	1,500 mg/kg BW	
Copper	mink	NOAEL, diet, 357 days, reproduction	Opresko, 1996	11.71 mg/kg BW-day	Value is for Copper Sulfate
	chicks	NOAEL, diet, 10 seeks, growth	Opresko, 1996	33.21 mg/kg BW-day	Value is for Copper Oxide
Iron	rat	LD50, oral, mortality	Jorgensen, 1991	900 mg/kg BW	Value is for 3-chloride.
Lead	rat	NOAEL, diet, 3 generations, reproduction	Opresko, 1996	8 mg/kg BW-day	Value is for Lead Acetate
	American kestrel	NOAEL, diet, 7 months, reproduction	Opresko, 1996	3.85 mg/kg BW-day	Value is for metallic lead.
Magnesium	rat	LD50, oral, mortality	Jorgensen, 1991	2800 mg/kg BW	Value is for Magnesium Chloride.
Manganese	rat	NOAEL, diet, 224 days (gest), reproduction	Opresko, 1996	88 mg/kg BW-day	Value is for Manganese Oxide
	Japanese quail	NOAEL, diet, 75 days, growth & behavior	Opresko, 1996	977 mg/kg BW-day	Value is for Manganese Oxide
Mercury	mouse	NOAEL, diet, 20 months, reproduction	Opresko, 1996	13.2 mg/kg BW-day	Value is for Mercuric Sulfide.
	mallard	NOAEL, diet, 3 generations, reproduction	Opresko, 1996	0.0064 mg/kg BW-day	Value is for Methyl Mercury Dicyandiamide.
Nickel	rat	NOAEL, diet, 3 generations, reproduction	Opresko, 1996	40 mg/kg BW-day	Value is for Nickel Sulfate Hexahydrate.
	mallard duckling	NOAEL, diet, 90 days, mortality, growth, behavior	Opresko, 1996	77.4 mg/kg BW-day	Value is for Nickel Sulfate.
Selenium	mouse	NOAEL, oral in water, 3 generations, reproduction	Opresko, 1996	0.075 mg/kg BW-day	Value is for Selenate (SeO_4)
	mallard	NOAEL, diet, 78 days, reproduction	Opresko, 1996	0.5 mg/kg BW-day	Value is for Sodium Selanite
Silver	mouse	LD50, oral, mortality	Lewis, 1992	100 mg/kg BW	Value is for colloidal Silver.
Thallium	mouse	NOAEL, oral in water, 60 days, reproduction	Opresko, 1996	0.0074 mg/kg BW-day	Value is for Thallium Sulfate
Thorium	mouse	LD50, oral, mortality	Lewis, 1992	1,760 mg/kg BW	Value is for Thorium (IV) Nitrate.
Uranium	mouse	NOAEL, oral intub., 60 days + reprod., reproduction	Opresko, 1996	3.07 mg/kg BW-day	Value is for Uranyl Acetate.
	black duck	NOAEL, diet, 6 wks, mortality, body wgt, blood chem, liv & kidney	Opresko, 1996	16 mg/kg BW-day	Value is for depleted metallic Uranium.
Vanadium	rat	NOAEL, oral intubation, 60 days + gest., deliv. and lact., reproduction	Opresko, 1996	0.21 mg/kg BW-day	Value is for Sodium Metavanadate ($NaVO_3$, 41.78% V)
	mallard	NOAEL, diet, 12 weeks, mortality, body weight, blood chemistry	Opresko, 1996	11.38 mg/kg BW-day	Value is for Vanadyl Sulfate.

302815

TOXICITY DATA USED IN ECOLOGICAL ASSESSMENT

Compound	Test Organism	Endpoint/Duration/Effect	Source	Effect Dose	Notes
Zinc	rat	NOAEL, diet, 16 days of gest., reproduction	Opresko, 1996	160 mg/kg BW-day	Value is for Zinc Oxide.
	mallard	NOAEL, diet, 60 days, mortality, body weight & blood chemistry	Opresko, 1996	3 mg/kg BW-day	Value is for Zinc Carbonate.
Cyanide	rat	NOAEL, diet, during gest., reproduction	Opresko, 1996	68.7 mg/kg BW-day	Value is for Potassium Cyanide

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Appendix P-2

Toxicity Profiles for COPC: Ecological Assessment

ACETONE

Fate and Transport

Acetone has a high vapor pressure and therefore would be expected to volatilize readily, but because of its high water solubility, volatilization is probably limited. Once in the atmosphere, it is apparently oxidized. Acetone has a low octanol/water partition coefficient and therefore is probably not readily adsorbed. Biodegradation is probably important in determining the fate of acetone in the environment because of its aliphatic nature (Clement Associates 1985).

Toxicity

The toxicity of acetone to aquatic organisms is low. The LC_{50} value for sunfish was reported to be 14.2 g/l, and the threshold concentraiton for immobilization of *Daphnia magna* was reported to be over 9 g/l (Clement Associates 1985). Acetone is also of low acute toxicity in rats. LD_{50} values range from 1.34 - 9.57 g/kg for various age groups (Fawell and Hunt 1988). An oral LD_{50} for acetone in rats was reported as 8.46 g/kg (Fawell and Hunt 1988).

ALUMINUM

Fate and Transport

Aluminum is often taken up and concentrated in root tissue. According to the Draft Toxicological Profile for Aluminum (ATSDR 1991), it is unclear to what extent aluminum is taken up into root food crops and leafy vegetables, however, it is not bioconcentrated in plants. In addition, aluminum is not expected to biomagnify in terrestrial food chains.

The potential for accumulation of aluminum has been studied in several aquatic species. Bioconcentration of aluminum in fish is a function of the water quality. Brook trout have been shown to accumulate slightly more aluminum as pH levels increase. In smallmouth bass, aluminum accumulation was higher in gill tissues than other tissues. Aluminum concentrations were also highest in the gill tissues and lowest in the muscles of rainbow trout. No information was found on the biomagnification of aluminum in aquatic food chains.

Toxicity

Most studies of the health effects of aluminum to animals involved oral and inhalation exposure. Few studies are available regarding respiratory effects in animals. Two studies that involved exposure of rats, guinea pigs and hamsters to aluminum chlorohydrate, reported reactions similar to that of dust exposure, sometimes accompanied by pneumonia.

According to the Draft Toxicological Profile for Aluminum (ATSDR 1991), the effects of aluminum on the development of laboratory animals are controversial. Some studies show decreases in pup growth and neurological development, while others do not. In mice, aluminum chloride has not been shown to produce adverse effects in pups, when administered during gestation. However, aluminum lactate in food during gestation produced weight decreases and lowered birth weights in pups, but it was difficult to determine whether these effects were permanent. Studies on pups that were exposed to aluminum after they were born also have mixed results. Aluminum is fatal to laboratory animals (rats, mice) only at very high doses.

ANTIMONY

Fate and Transport

Antimony exists in a variety of chemical forms. It is found in any of four valence states (-3, 0, +3 or +5). It is present as the soluble oxide or antimonite (+3) salt in most natural waters. In reducing environments, volatile stibine (SbH_3) may be formed. Stibine is a gas at room temperature, and it is quite soluble in water. However, it is not stable in aerobic waters or air and is oxidized to form Sb_2O_3. The formation of stibine in bed sediments, which usually provide a reducing environment, may offer a mechanism for remobilization of antimony previously removed from solution. The extent to which sorption reduces the aqueous transport of antimony is unknown, but it is clear that sorption to clays and minerals is normally the most important mechanism resulting in the removal of antimony from solution. It is likely that most species of antimony in natural waters are soluble and quite mobile and are eventually transported in solution to the oceans. Bioaccumulation appears to be only a minor fate process for antimony (Clement Associates, 1985).

Toxicity

The toxicity of different antimony compounds varies. The metal is inert, and substances such as antimony potassium tartrate have been used medicinally for centuries; but the volatile stibine is extremely toxic. Antimony is absorbed slowly from the gastrointestinal tract, and many antimony compounds are gastrointestinal irritants. Laboratory tests of rats and mice indicate that antimony in drinking water may significantly reduce the animals' life spans (Clayton et al., 1994). Although oral feeding studies in rodents have not shown an increase in tumors, some short-term studies suggest a possible basis for tumor induction (Clayton et al., 1994).

The available data for antimony indicate that acute and chronic toxicity to freshwater aquatic life occur at concentrations as low as 9,000 and 1,600 µg/l, respectively, and would occur at lower concentrations among species that are more sensitive than those tested. Toxicity to algae occurs at concentrations as low as 610 µg/l (USEPA, 1986). Biological effects have been noted in sediments with mean antimony concentrations as low as about 2 mg/kg (NOAA, 1991).

Antimony is non-essential to plants but can be readily taken up by roots when in soluble forms in soil. It therefore has the potential to act as a significant plant contaminant in industrial areas (Jones et al., 1990). Phytotoxic levels of antimony have been given as 5-10 mg/kg in plant tissue. Antimony toxicity to plants has been described as moderate, although there are no reported environmental cases (Jones et al., 1990). Radiological assessments of the translocation of antimony in plants show that this compound is preferentially located in older leaf tissue, lower stems and particularly roots (Jones et al., 1990).

ARSENIC

Fate and Transport

The chemistry of arsenic in water is complex and the form present in solution is dependent on such environmental conditions as Eh, pH, organic content, suspended solids, and sediment. Arsenic is generally quite mobile in the environment (Clement Associates 1985). In the aquatic environment, volatilization is important when biological activity or highly reducing conditions produce arsine or methylarsenics. Sorption by the sediment is an important fate for the chemical. Arsenic is metabolized to organic arsenicals by a number of organisms.

Toxicity

The relative toxicities of the various forms of arsenic apparently vary from species to species. Various inorganic forms of arsenic appear to have similar levels of toxicity; they all seem to be much more toxic than organic forms. Acute toxicity to adult fresh water animals occurs at levels of arsenic trioxide as low as 812 µg/l and at levels as low as 40 µg/l in early life stages of aquatic organisms (USEPA 1986). Sensitive aquatic species were damaged at water concentrations of 19 to 48 µg/l, 120 mg As/kg diet, or (in the case of freshwater fish) tissue residues greater than 1.3 mg/kg fresh weight (Eisler 1988). Arsenic toxicity does not appear to increase greatly with chronic exposure, and it does not seem that arsenic is bioconcentrated to a great degree (USEPA 1986).

Arsenic compounds cause chromosome damage in animals, and humans exposed to arsenic compounds have been reported to have an elevated incidence of chromosome aberrations. Arsenic compounds have been reported to be teratogenic, fetotoxic, and embryotoxic in several laboratory animal species, including chick embryos, hamsters, rats and mice (USEPA 1984). Episodes of arsenic poisoning are either acute or subacute. Single oral doses of arsenicals fatal to 50 percent of sensitive species tested ranged from 17 to 48 mg/kg body weight in birds and from 2.5 to 33 mg/kg body weight in mammals. Susceptible species of mammals were adaversely affected at chronic doses of 1 to 10 mg AS/kg body weight, or 50 mg As/kg diet (Eisler 1988). Adverse effects to crops and vegetation were recorded at 3 to 28 mg of water soluble As/l (equivalent to about 25 to 85 mg total As/kg soil) and at atmospheric concentrations greater than 3.9 µg As/m^3 (Eisler 1988).

BARIUM

Fate and Transport

Barium is likely to precipitate out of solution as an insoluble salt in aquatic media. Waterborne barium can also adsorb to suspended particulate matter. Sedimentation of suspended solids removes a large portion of the barium from surface water. The uptake of barium by fish and marine organisms is another removal mechanism; barium levels in sea water range from 2 to 63 mg/l with a mean concentration of about 13 mg/l. According to the Draft Toxicological Profile for Barium (ATSDR 1990), this compound was found to bioconcentrate in marine plants by a factor of 1,000 times the level present in water. BCFs of marine animals, plankton, and in brown algae of 100, 120, and 260, respectively, have also been reported.

In soils, barium may be taken up by vegetation or transported through soil with precipitation, however, this transport pathway has not been comprehensively studied. Relative to the amount of barium found in soils, little is bioconcentrated by plants. Barium is not very mobile in soil systems, and the rate of its transportation depends on soil material, such as high capacity and calcium carbonate. Barium is more mobile and is more likely to be leached from soils in the presence of chloride due to the increased solubility of barium chloride. The mobility of this compound in soil is reduced by the precipitation of barium carbonate and sulfate.

Toxicity

Barium has been associated with several adverse effects in experimental animals. The cardiovascular system may be one of the primary targets of barium toxicity. Exposure of animals to barium has also been associated with respiratory, gastrointestinal, musculoskeletal, neurological, developmental and reproductive effects. Most studies with experimental animals were performed with rats and mice. Reduced life span was observed in chronic oral studies with mice, and acute parenteral administration of barium compounds to animals has resulted in paralysis of the respiratory muscles. Similar effects have been shown in animals in cases of acute inhalation and ingestion.

BERYLLIUM

Fate and Transport

Most common beryllium compounds are readily soluble in water. However, in water, soluble beryllium salts are hydrolyzed to form beryllium hydroxide. The solubility of beryllium hydroxide is quite low (2 mg/l) in the pH range of most natural waters. Formation of hydrated complexes may increase the solubility of beryllium somewhat, especially at higher pH where polynuclear hydroxide complexes may form. It is probable, however, that in most natural aquatic environments beryllium is present in particulate rather than dissolved form (Clement Associates, 1985). Based on its geochemical similarity to aluminum, beryllium is expected to be adsorbed onto clay mineral surfaces at low pH and to be complexed into some insoluble compounds at high pH. In most natural environments, beryllium is likely to be present in sorbed or precipitated, rather than dissolved, form (Clement Associates, 1985).

Beryllium may be accumulated to a slight extent by aquatic organisms. A bioconcentration factor of 19 with a half-life of one day in the whole body is reported for the bluegill. Although it has a low solubility in water, it is possible that benthos could accumulate beryllium from sediment and thereby transfer the metal to higher organisms via the food chain. However, there is no evidence for food chain magnification (Clement Associates, 1985). Beryllium is apparently easily taken up by plants when it occurs in soluble forms in soils (Kabata-Pendias, 1984).

Toxicity

Data for several freshwater fish species indicate that the acute toxicity of beryllium decreases by about two orders of magnitude with an increase in hardness from about 20 to 400 mg/l calcium carbonate. For example, acute values for the fathead minnow range from 150 to 20,000 µg/l over this range of harness. There does not appear to be much variation in seneitiviey among the fish species tested at similar levels of hardness. Acute and chronic values for the invertebrate *Daphnia magna* in the same test water (hardness equal to 220 mg/l) were reported to be 2,500 and 5.3 µg/l, respectively, indicating a very large difference between acute and chronic toxicity (Clement Associates, 1985).

Some toxicity due to beryllium has been seen in domestic animals. One of the earliest observed effects of beryllium toxicity was the development of rachitic bone changes after the addition of soluble beryllium salts to the diet of poultry and livestock. Approximately 0.125% beryllium carbonate in the food or water is required to produce a mild case (Clement Associates, 1985).

The toxicity of beryllium to plants has been frequently reported. Toxic beryllium concentrations in mature leaves range most often from 10 to 50 ppm (DW). This range is highly variable for each plant species and growth condition. Relatively low beryllium concentrations in solution, ranging from 2 to 16 ppm is highly toxic to plants. Beryllium is known to inhibit the germination of seeds and the uptake of Ca and Mg by roots, to have diverse effects on P absorption, and to degrade some proteins and enzymes (Kabata-Pendias, 1984).

BENZENE

Fate and Transport

The volatility and solubility of benzene are the properties with the greatest influence on the environmental transport of this compound. Benzene has a fairly high solubility rate in water and is considered to be a high volatility chemical with a vapor pressure of 95mm Hg at 25°C. Benzene sorption onto sediments and suspended solids cannot be established based on the reviewed literature, although there is evidence of biodegradation at low concentrations by aquatic microorganisms. The rate of biodegradation is enhanced when other hydrocarbons are present.

Toxicity

Acute toxicity to freshwater aquatic life occurs at concentrations as low as 5,300 mg/L. According to an Ambient Water Quality Criteria document for benzene (USEPA, 1980), the solubility and volatile nature of benzene indicate possible environmental mobility. Some data indicate that unique acute effects may occur at concentrations as low as 700 mg/L. Two freshwater invertebrate species (Daphnia magna and Daphnia pulex) have acute values of 380,000 ug/L and 300,000 ug/L with 48-hour effect concentrations of 203,000 ug/L to 620,000 ug/L. Six freshwater fish species have been tested with benzene; the 96-hour LC50 values ranged from 5300 ug/L for the rainbow trout to 386,000 ug/L for the mosquito fish. The algal species Chlorella vulgaris has shown a 50% reduction in cell numbers after 48 hours at concentrations of 525,000 mg/L (USEPA, 1980).

BIS (2-ETHYLHEXYL) PHTHALATE

Fate and Transport

Bis (2-ethylhexyl) phthalate is readily adsorbed onto particulates, but it tends to be lipophilic, so bioaccumulation is considered an important fate process for this compound. Accumulation has been shown to occur at a rate of 350 to 3,900 times the concentration in water after seven days (USEPA 1979). Aquatic organisms are more apt to concentrate phthalates than warm blooded animals since cold blooded animals metabolize phthalates more slowly than warm blooded ones. It is biodegraded under most conditions, and can be metabolized by multicellular organisms. However, bis (2-ethylhexyl) phthalate is considered to be one of the least biodegradable phthalate esters (Mathur 1974, cited in USEPA 1979).

Toxicity

Acute median effect values range from 1,000 to 11,100 µg/l for the freshwater cladoceran Daphnia magna. The LC_{50} values for the midge, scud, and bluegill all exceeded the highest concentrations tested, which were 18,000, 32,000 and 770,000 µg/l, respectively. As these values are greater than the water solubility of the chemical, it is unlikely that bis (2-ethylhexyl) phthalate will be acutely toxic to organisms in natural waters. In a chronic toxicity test with Daphnia magna, significant reproductive impairment was found at the lowest concentration tested, 3 µg/l. A chronic toxicity value of 8.4 µg/l was reported for the rainbow trout. Reported bioconcentration factors in fish and invertebrates range from 14 to 2,680 (Clement Associates 1985).

2-BUTANONE

Fate and Transport

This compound, also known as methyl ethyl ketone (MEK), is generally absent from the ambient air. If is is released into the soil it will partially evaporate into the atmosphere from near surface soil. MEK may degrade slowly in soil after a long acclimation period and may, therefore, leach into the groundwater. However, it will not significantly hydrolyze in soil or water under normal environmental conditions. If released into the water, MEK will be lost by evaporation or be slowly biodegraded. MEK will not adsorb to sediment or bioconcentrate in aquatic organisms. It biodegrades slowly in both fresh and salt water.

Toxicity

Only limited information is available on the toxicity of MEK to wildlife. LC50 concentrations for two freshwater fishes were around 5,600 µg/l. MEK was toxic to brine shrimp at LC50 levels of 1,950 mg/l (Clement Associates, 1985). In animals, short-term studies suggest that MEK is of low oral toxicity. The LD50 of MEK in the rat has been reported to be between 2,700 and 5,530 mg/kg (Fawell and Hunt, 1988).

CADMIUM

Fate and Transport

Cadmium is relatively mobile in the aquatic environment compared to other heavy metals . It is removed from aqueous media by complexing with organic materials and subsequently being adsorbed to the sediment. It appears that cadmium moves slowly through soil, but only limited information on soil transport is available (Clement Associates 1985).

Cadmium is strongly accumulated by all organisms, both through food and water. Cadmium accumulates in fresh water and marine organisms at concentrations hundreds to thousands of times higher than it does in the water itself. Bioconcentration of cadmium by aquatic organisms is a well-known phenomenon. Bioconcentration factors are about 1,000 for fresh water and marine plants and about 3,000 for fresh water and marine fish. The cadmium content of fish in general ranges from 1 to 50 µg/g and that of shellfish (e.g., mussels, scallops, and oysters) typically is between 100 to 1,000 µg/g.

Toxicity

Fresh water acute values for cadmium are available for species in 44 genera and range from 1.0 µg/l for rainbow trout to 28,000 µg/l for a mayfly. The antagonistic effect of hardness on acute toxicity has been demonstrated with five aquatic species. Chronic tests have been conducted on cadmium with 12 freshwater fish species and 4 invertebrate species with chronic values ranging from 0.15 µg/l for Daphnia magna to 156 µg/l for the Atlantic salmon (USEPA 1986).

Freshwater aquatic plants are affected by cadmium at concentrations ranging from 2 to 7,400 µg/l. These values are in the same range as the acute toxicity values for fish and invertebrate species, and are considerably above the chronic values. Bioconcentration factors (BCFs) for cadmium in fresh water range from 164 to 4,190 for invertebrates and from 3 to 2,213 for fishes (USEPA 1986).

Mammals and birds are comparatively resistant to the biocidal properties of cadmium. The lowest oral doses producing death in rats and guinea pigs ranged from 150 to 250 mg Cd/kg body weight. Although mallards and chickens tolerated 200 mg/kg of cadmium in diets for protracted periods, kidney cadmium exceeded 130 mg/kg fresh weight under this regimen, a concentration considered life-threatening to some organisms (Eisler 1985).

Symptoms of chronic cadmium toxicity include growth retardation, impaired kidney function, poor reproductive capacity, hypertension, tumor formation, hepatic dysfunction, poor lactation, and lowered hematocrit levels. Teratogenic effects are noticed in offspring when pregnant animals are exposed to chronic toxic doses of cadmium. Carcinogenicity of cadmium in animals has been well established by parenteral administration, although cadmium is not carcinogenic by the oral route (Luckey et al. 1977).

CARBAZOLE

Carbazole has a log octanol/water partition coefficient of 3.29 and is therefore expected to have moderate to low mobility in soil or sediment and moderate to extensive adsorption to suspended solids. A bioaccumulation coefficient of 115 (wet weight) was determined with Daphnia pulex (Verschueren, 1983), indicating that this chemical should not bioaccumulate significantly in aquatic organisms. Acute oral toxicity for the laboratory rat was found to occur at 500 mg/kg (Lewis, 1992).

CHROMIUM

Fate and Transport

Hexavalent chromium is quite soluble, existing in solution as a component of a complex anion. It is not sorbed to any significant degree by clays or hydrous metal oxides. The anionic form varies according to pH and may be a chromate, hydrochromate or dichromate. Because all anionic forms are so soluble, they are quite mobile in the aquatic environment. Chromium (VI) is efficiently removed by activated carbon and thus may have some affinity for organic materials in natural water. Most chromium (III) in the aquatic environment is hydrolyzed and precipitates as chromium hydroxide. Sorption to sediments and bioaccumulation will remove much of the remaining chromium (III) from solution. Chromium (III) is adsorbed only weakly to inorganic materials. Chromium (III) and chromium (VI) are readily interconvertible in nature depending on microenvironmental conditions such as pH, hardness, and the types of other compounds present (Clement Associates 1985).

Chromium (III) tends to be adsorbed strongly onto clay particles and organic particulate matter, but can be mobilized if it is complexed with organic molecules. Hexavalent compounds are not strongly adsorbed by soil components and chromium (VI) is mobile in groundwater. Chromium (VI) is quickly reduced to chromium (III) in poorly drained soils having a high content of organic matter. Chromium (VI) of natural origin is rarely found in soils (Clement Associates 1985).

Toxicity

Acute toxicity values for chromium (VI) are available for freshwater animal species in 27 genera and range from 23.07 µg/l for a cladoceran to 1,870,000 µg/l for a stonefly. All five tested species of daphnids are especially sensitive. The few data that are available indicate that the acute toxicity of chromium (VI) decreases as hardness and pH increase (USEPA 1986).

Acute values for chromium (III) are available for 20 freshwater animal species in 18 genera ranging from 2,221 µg/l for a mayfly to 71,060 µg/l for caddisfly. Hardness has a significant influence on toxicity, with chromium (III) being more toxic in soft water (USEPA 1986).

The chronic value for chromium (VI) for both rainbow trout and brook trout is 264.6 µg/l, which is much lower than the chronic value of 1,987 µg/l for the fathead minnow. In three chronic tests, a temporary reduction in growth occurred at low concentrations. Six chronic tests with five species of daphnids gave chronic values that range from <2.5 to 40 µg/l. Except for the fathead minnow, all the chronic tests were conducted in soft water. Green algae are quite sensitive to chromium (VI). The bioconcentration factor obtained with rainbow trout is less than 3. Growth of chinook salmon was reduced at a measured concentration of 16 µg/l (USEPA 1986).

A life-cycle test for chromium (III) with *Daphnia magna* in soft water gave a chronic value of 66 µg/l. In a comparable test in hard water the lowest test concentration of 44 µg/l inhibited reproduction of *Daphnia magna*, but this effect may have resulted from ingested precipitated chromium. In a life-cycle test with the fathead minnow in hard water the chronic value was 1,025 µg/l. Toxicity data are available for only two freshwater plant species. A concentration of 9,900 µg/l inhibited growth of roots of Eurasian watermilfoil. A freshwater green alga was affected by a concentration of 397 µg/l in soft water. No bioconcentration factor has been measured for chromium (III) with freshwater organisms (USEPA 1986).

Chromium is essential for regulating carbohydrate metabolism in mammals. Chromium deficiency has been described in rats, guinea pigs, and squirrell monkey; signs include reduced growth, decreased life span, elevated serum cholesterol, increased formation of aortic plaques, and signs resembling those of diabetes mellitus. Chromium has proved effective in counteracting the deleterious effects of cadmium in rats and of vanadium in chickens. It is beneficial but not essential to growth in higher plants. Residues in plants seldom exceed a few parts per million, except in plants living on infertile serpentine soils containing high Cr concentrations, or grown on soils smended with sewage sludge. Plants with elevated Cr residues show no toxic

effects, although concentrations in excess of 1 ppm in the aqueous medium may inhibit germination of the seed and growth of roots and shoots (Eisler 1986).

Among warm-blooded organisms, hexavalent chromium was fatal to dogs in 3 months at 100 mg/kg in their food and killed most mammalian experimental animals at injected doses of 1 to 5 mg Cr/kg body weight, but had no measurable effect on chickens at dietary levels of 100 mg/kg or a 32-day period. Trivalent chromium compounds were generally less toxic than hexavalent chromium compounds, but significant differences may occur in uptake of anionic and cationic Cr (III) species, and this difference may affect survival (Eisler 1986). For birds and mammals, dietary levels of 10.0 mg Cr+3/kg adversely affected young black ducks, and 5.1 mg Dr+6/kg in food and water of mice was associated with elevated tissue residues. Available evidence suggests that organs and tissues of fish and wildlife that contain greater than 4.0 mg total Cr/kg dry weight should be viewed as presumptive evidence of Cr contamination (Eisler 1986).

COBALT

Fate and Transport

Very little cobalt appears to occur in soluble form in natural aquatic systems. The most important control on mobility of cobalt in aquatic and terrestrial systems is probably adsorption to the clay minerals and hydrous oxides of iron, manganese and aluminum that are often present in the clay fractions of sediments and soils. The principal factors controlling adsorption and desorption processes are pH, Eh, and the concentrations of cobalt and competing compounds. Small amounts of cobalt may be solubilized by bacteriological activity. Photolysis, volatilization and biotransformation are not important environmental fate processes for cobalt (Clement Associates 1985).

Cobalt is an essential element and can be accumulated by plants and animals, though generally not to excessive concentrations. This compound has been found to be essential for both blue-green algae and microorganisms in nitrogen fixation. It is not clear, however, whether cobalt is essential for higher plants, although there has been some evidence of a favorable effect on plant growth. It has also been recognized as a component of a precursor of vitamin B_{12} for ruminant animals (Kabata-Pendias 1984).

Toxicity

Little information regarding toxic effects of exposure to cobalt or cobalt compounds is available. Acute cobalt toxicity is seen in chickens at 50 mg/kg in the diet (approximately 3 mg/kg of body weight) per day and in sheep at 6 mg/kg of body weight per day. In sheep, daily doses of 3 mg/kg of body weight, which is about 1,000 times the normal daily intake of cobalt, do not produce harmful effects, even after several weeks. The oral LD_{50} value for cobalt is 1,500 mg/kg in the rat. The oral LD_{50} values for a variety of inorganic cobalt compounds range from about 150 mg/kg for cobalt fluoride to 503 mg/kg for cobalt acetate (Clement Associates 1985).

COPPER

Fate and Transport

Copper has two oxidation states, +1 (cuprous) and +2 (cupric). Cuprous copper is unstable in aerated water over the pH range of most natural waters (6 to 8) and oxidizes to the cupric state. Several processes determine the fate of copper in the aquatic environment: formation of complexes, especially with humic substances; sorption to hydrous metal oxides, clays, and organic materials; and bioaccumulation. Copper has a strong affinity for hydrous iron and manganese oxides, clays, carbonate minerals, and organic matter.

Sorption to these materials, both suspended in the water column and in the sediment, results in relative enrichment of the solid phase and reduction in dissolved levels (Clement Associates 1985).

Because many copper compounds and complexes are readily soluble, copper is among the more mobile heavy metals in soil and other surface environments. The major process that limits the environmental mobility of copper is adsorption to organic matter, clays and other materials (Clement Associates 1985).

The bioconcentration factor (BCF) of copper in fish obtained in various field studies is 10-100 indicating a low potential for bioconcentration. The BCF is higher in molluscs, such as oysters, where it may reach 30,000. However, abundant evidence has shown that there is no biomagnification in the food chain. Studies have been performed on bottom-feeding fish such as suckers and bullheads, as well as on herbivorous, omnivorous and carnivorous animals.

Toxicity

Acute toxicity data are available for species in 41 genera of freshwater animals. At a hardness of 50 mg/l, the genera range in sensitivity from 16.74 µg/l for the squawfish, *Ptychocheilus*, to 10,240 µg/l for the stonefly, *Acroneuria*. Data for eight aquatic species indicate that acute toxicity decreases as hardness increases. Additional data for several species indicate that toxicity also decreases with increases in alkalinity and total organic carbon (USEPA 1986).

Chronic values are available for 15 freshwater species and range from 3.873 µg/l for brook trout to 60.36 µg/l for northern pike. Fish and invertebrate species seem to be about equally sensitive to the chronic toxicity of copper. Toxicity tests have been conducted on copper with a wide range of freshwater plants and the sensitivities are similar to those of animals. Copper does not appear to bioconcentrate very much in the edible portion of freshwater aquatic species (USEPA 1986).

Sheep are very susceptible to copper toxicosis, and poisoning may be acute or chronic. The toxic dose is about 200 mg/kg. Copper intake of 1.5 g/day for 30 days is known to be fatal for many breeds of sheep. Swine develop copper poisoning at levels of 250 mg/kg in the diet unless zinc and iron levels are increased. Cattle are much more resistant to copper than sheep or swine (Clement Associates 1985).

CYANIDE

Fate and Transport

The transport and fate of cyanide in the environment is dependent on the chemical compound containing the cyanide. Most free cyanide will be hydrogen cyanide (HCN) in aquatic environments and will probably evaporate, although biodegradation is another possible fate process. Metal cyanides are generally insoluble and for that reason will accumulate in the sediment. Sorption occurs but is not considered an important transport or fate process. Cyanides move rather freely in soils but biodegradation would probably significantly decrease the amount present in the groundwater. Volatilization of HCN and nitriles may occur from soil surfaces (Clement Associates, 1985).

Toxicity

Hydrogen cyanide and its simple salts are highly toxic following acute exposure by humans, experimental animals, and both aquatic and terrestrial wildlife. Data on the acute toxicity of free cyanide (the sum of cyanide present as HCN and CN-, expressed as CN) are available for a wide variety of freshwater species that are involved in diverse community functions. The acute sensitivities ranged from 44.73 µg/l to 2,490 µg/l, but all of the species with acute sensitivities above 400 µg/l were invertebrataes. A long-term survival, and a partial and life-cycle test with fish gave chronic values of 13.57, 7.849, and 16.39 µg/l,

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respectively. Chronic values for two freshwater invertebrate species were 18.33 and 34.06 µg/l. Freshwater plants were affected at cyanide concentrations ranging from 30 µg/l to 26,000 µg/l (USEPA, 1986).

4'4'- DDT, 4,4'- DDD and 4,4'-DDE

Fate and Transport

Volatilization of DDT and DDE is known to account for considerable losses of these compounds from soil surfaces and water (ATSDR 1989). The tendency of DDD to volatilize is approximately three times less than that of DDT or DDE. Studies of the air and water partition coefficient of DDE indicate that it will volatilize from seawater 10 to 20 times faster than from freshwater. Residues are removed from the atmosphere by precipitation, diffusion into large bodies of water, and chemical transformation. When DDT is released to water, it quickly adsorbs to particles, and it is subject to sedimentation, or may bioconcentrate in microorganisms and can become part of the food chain.

Under simulated atmospheric conditions, DDE decomposes to form carbon dioxide and hydrochloric acid. Due to the prolonged half-life of DDE, average levels of DDT are expected to decline slowly while the ratio of DDE to DDT is expected to increase. Estimates of the half-life for DDT biodegraded in soil range from 2 to >15 years.

DDT, DDE and DDD are highly lipid soluble, and have extremely long half-lives. These properties lead to bioaccumulation through higher levels of the food chain. DDT stored in the fat is at least largely inactive since a greater total dose may be stored in an experimental animal than is sufficient as a lethal dose for the same animal given at one time. DDT and its metabolites may be transported from one medium to another by the processes of solubilization, adsorption, bioaccumulation, or volatilization. Studies of DDT transformations in soils indicate prolonged persistence, and during these extended periods of time, these compounds undergo extensive adsorption to soil particles. DDT, DDD and DDE are only slightly soluble in water, and they do not tend to leach to groundwater.

Toxicity

No information was found on the health effects in animals following inhalation exposure to DDT, DDD and DDE. Genotoxicity studies of DDT and DDE In Vitro, resulted in gene mutation and mitotic gene conversion in certain fungal and plant cells. These studies resulted in chromosomal aberrations in mammalian cells of the chinese hamster and kangaroo rat, gene mutation in the chinese hamster, rat and mouse, and DNA damage in the rat, mouse and hamster.

Animal health effects from eating DDT, DDD or DDE have ranged from developmental effects in rabbits and death in rats, to immunological effects in rabbits and liver and renal effects in rats. DDT, DDD, DDE and the other persistent organochlorine pesticides are primarily responsible for the great decrease in the reproductive capabilities and consequently in the populations of fish-eating birds, such as the bald eagle, brown pelican and osprey. DDT has also been shown to decrease the populations of numerous other species of waterbirds, raptors and passerines significantly (Clement Associates 1985). Reported health effects from drinking these compounds are not known.

DIBENZOFURAN

The ethers, such as dibenzofuran, have a wide range of industrial applications, though they are particularly uselful as solvents and fragrances. Very little toxicological information is available for this group of chemicals. The only ether of this group for which there is a significant amount of toxicological information is dioxane. Although this compound does cause injury to the liver and kidney at high doses, the most important toxicological finding is its carcinogenic activity in rats. For ethers, it would appear that as the

aliphatic chain length increases and the volatility decreases, their toxic potential tends to decrease. The principal target organs for toxicity of dioxane are the liver and kidney (Fawell and Hunt, 1988).

ENDRIN

Fate and Transport

Endrin is tightly bound to and relatively immobile in soil. If endrin is released to soil, it will be expected to persist for extremely long periods of time (up to 14 years or more) (Howard 1991). However, compared with other more persistent chlorinated pesticides, endrin is biodegraded more rapidly and by a larger spectrum of soil bacteria. Leachability of endrin is correspondingly small with a mobility factor of 0.52 (ATSDR 1990).

Endrin in water will not hydrolize or biodegrade. It will be subject to photoisomerization to ketoendrin based upon experiments on solid endrin (Howard 1991). As in soil, endrin will extensively sorb to sediment and significantly bioconcentrate in aquatic organisms.

Despite endrin's low vapor pressure, volatilization after agricultural application to soil is initially rapid. After initial volatilization of 20 to 30 percent, further volatilization can no longer be detected. Endrin is degraded by ultraviolet light so that one chlorine atom is lost. Unlike some other chlorinated pesticides, endrin volatilization is not enhanced after a rainfall (ATSDR 1990).

Extensive bioconcentration of endrin has been reported in fish ranging from 1,335 -10,000. Moderate bioconcentration factors (in the hundreds) were reported for four species of algae.

Toxicity

Endrin is very toxic to aquatic organisms. Freshwater fish were generally more sensitive than invertebrates, with species mean acute values ranging from 0.15 to 2.1 µg/l. LC_{50} values for saltwater organisms ranged from 0.037 to 14.2 µg/l. Final acute values for freshwater and saltwater species were 0.18 µg/l and 0.037 µg/l, respectively. The freshwater final chronic value is 0.045 µg/l and the saltwater final chronic value is 0.0093 µg/l.

Endrin is acutely toxic to terrestrial wildlife and domestic animals and has been used as a rodenticide and an avicide. It can also cause central nervous system effects and reproductive disorders following chronic exposure. Sublethal effects observed in animals exposed to endrin include abnormal behavior, increased postnatal mortality, and increased fetal death (Clement Associates 1985). The effect of endrin on growth rate and numbers of soil bacteria in two studies resulted in no appreciable effects at concentrations of 1.5 kg/ha (sandy loam) and 0.45-2.25 kg/ha (rice soils) (Jørgensen et al 1991).

2-HEXANONE

Fate and Transport

Once released to the atmosphere, reaction with photochemically produced hydroxyl radicals should be the most rapid method of degradation, with an estimated half-life on the order of two days. Other atmospheric chemical reactions, such as direct photochemical degradation, the reaction with nitrate radicals, and the reaction with ozone, are expected to occur at a much slower rate. The relatveily high water solubility of 2-hexanone suggests that rain washout may be an important fate process. If released to soil, 2-hexanone is expected to display high mobility, and is capable of undergoing rapid biodegradation. If released to water,

w-hexanone would not be expected to undergo hydrolysis, adsorb to sediment and suspended material, or bioaccumulate in aquatic organisms. Volatilization from both water and soil to the atmosphere is expected to be an important fate process.

Toxicity

A rat acute oral LD50 of 2.59 g/kg for 2-hexanone has been reported. The oral LD50 in mice has been reported as 100 mg/kg, and the intraperitoneal LD50 for rats and guinea pigs has been reported as 1142 and 1140 ml/kg, respectively (Fawell and Hunt, 1988). Neurotoxic effects may develop in the periphery following exposure to 2-hexanone or its metabolite 2,5-hexandione over a period of weeks in experimental animals and man. Symptoms include clumsiness and lack of muscular coordination. Cats receiving twice-daily subsutaneous injections of 150 mg/kg undiluted commercial grade 2-hexanone (99.66% purity) 5 days/week for up to 8.5 months developed damage to the peripheral and central nervous system (Fawell and Hunt, 1988).

IRON

Fate and Transport

Iron is an essential element required by both plants and animals. The ferrous, or bivalent (Fe^{++}), and the ferric, or trivalent (Fe^{+++}) irons are the primary forms of concern in the aquatic environment, although other forms may be in organic and inorganic wastewater streams. Prime pollution sources are industrial wastes, mine drainage waters, and iron-bearing groundwaters. In the presence of dissolved oxygen, iron in water is precipitated as a hydroxide, $Fe(OH)_3$ or occasionally as ferric oxide (Fe_2O_3). Both of these precipitates form as gels or flocs that may be detrimental, when suspended in water, to fishes and other aquatic life. They can settle to form flocculent materials that cover stream bottoms thereby destroying bottom-dwelling invertebrates, plants or incubating fish eggs.

Toxicity

A 96-hour LC_{50} value of 0.32 mg/l (320 µg/l) was obtained for mayflies, stoneflies, and caddisflies (USEPA 1976). Iron was found to be toxic to carp at concentrations of 0.9 mg/l (900 µg/l) when the pH of the water was 5.5, and both pike and trout died at iron concentrations of 1 to 2 mg/l (1,000 to 2,000 µg/l) (USEPA 1976). The USEPA (1986) has established a criterion of 1,000 µg/l for fresh water, based upon laboratory tests. Data obtained under laboratory conditions suggest a greater toxicity for iron than that obtained in natural ecosystems, due to variations in alkalinity, pH, hardness, temperature and the presence of ligands which change the valence state and solubility, and therefore the toxicity of the metal.

LEAD

Fate and Transport

Natural compounds of lead are not usually mobile in normal surface or groundwater because the lead leached from ores is adsorbed by ferric hydroxide or combines with carbonate or sulfate ions to form insoluble compounds. The transport of lead in the aquatic environment is influenced by the speciation of the ion. Lead exists mainly as the divalent cation in most unpolluted waters and becomes adsorbed into particulate phases. Volatilization of lead compounds probably is not important in most aquatic environments (Clement Associates 1985).

Sorption processes appear to exert a dominant effect on the distribution of lead in the environment. Adsorption to inorganic solids, organic materials, and hydrous iron and manganese oxides usually controls the

mobility of lead and results in a strong partitioning of lead to the bed sediments in aquatic systems. The sorption mechanism most important in a particular system varies with geological setting, pH, Eh, availability of ligands, dissolved and particulate ion concentrations, salinity, and chemical composition (Clement Associates 1985).

Lead does not seem to be biomagnified in food chains, yet it may accumulate in plants such as fungi, as well as earthworms, millipedes, terrestrial birds and mammals, freshwater invertebrates and fish. In aquatic environments, lead concentrations are usually highest in benthic organisms and algae, and lowest in upper-trophic-level predators like carnivorous fish. High BCFs were determined in studies using oysters, freshwater algae and marine algae. Bioconcentration factors are available for four freshwater invertebrate and two fish species and range from 42 to 1,700. Available bioconcentration factors for saltwater species range from 17.5 to 2,570.

Toxicity

The acute and chronic toxicity of lead to several species of freshwater animals has been shown to decrease as the hardness of water increases. At a hardness of 50 mg/l the acute sensitivities of 10 species range from 142.5 µ/l for an amphipod to 235,900 µg/l for a midge. Freshwater algae are affected by concentrations of lead above 500 µg/l. Data on the chronic effects of lead freshwater animals are available for two fish and two invertebrate species. The lowest and highest available chronic values (12.26 and 128.1 µg/l) are both for a cladoceran, but in soft and hard water, respectively (USEPA 1986).

Among sensitive species of birds, survival was reduced at doses of 50 to 75 mg Pb^{2+}/kg body weight or 28 mg organolead/kg body weight, reproduction was impaired at dietary levels of 50 mg Pb^{2+}/kg, and signs of poisoning were evident at doses as low as 2.8 mg organolead/kg body weight. In general, forms of lead other than shot (or ingestible lead object), or routes of administration other than ingestion, are unlikely to cause clinical signs of lead poisoning in birds. Data for toxic and sublethal effects of lead on mammalian wildlife are missing. For sensitive species of domestic and laboratory animals, survival was reduced at acute oral lead doses of 4 mg/kg body weight (rat), at chronic oral doses of 5 mg/kg body weight (dog), and at dietary levels of 1.7 mg/kg body weight (horse). Sublethal effects were documented in monkeys exposed to doses as low as 0.1 mg Pb/kg body weight daily or fed diets containing 0.5 mg Pb/kg. In general, organolead compounds were more toxic than inorganic lead compounds, food chain biomagnification of lead was negligible, and younger organisms were most susceptible (Eisler 1988).

MAGNESIUM

Fate and Transport

Magnesium is the eighth most abundant element on earth. It is very reactive chemically and does not occur uncombined in nature. Most magnesium salts are very soluble at pH levels normally found in natural waters, and the magnesium ion is readily transported in surface water, soil and groundwater. The extent of magnesium transport in soil is dependent, in part, on the cation exchange capacity of the soil.

Toxicity

There is no evidence to suggest that magnesium has carcinogenic, mutagenic, teratogenic or reproductive effects in experimental animals. This compound is an essential element for humans, animals and plants. Different magnesium compounds vary in the severity of their toxic effects to experimental animals. Such effects include central nervous system and purgative effects similar to those seen in humans. Available data are not adequate to characterize the toxicity of magnesium to wildlife or domestic animals. Observed effects are generally related to deficiency symptoms (Clement Associates, 1985).

MANGANESE

Manganese occurs most commonly in the +2 and +4 oxidation states in aquatic systems. Its solubility depends to a great extent on pH, dissolved oxygen, and presence of complexing agents. In freshwater, manganese can occur as the soluble ion, in complex organic ions, or in colloidal suspensions. Manganese often occurs at higher concentrations near the bottom of stratified lakes because it can be released from sediments, as the manganous ion, under reducing conditions (Clement Associates 1985).

In the soil, the concentration and chemical form in which manganese occur can be affected by pH, cation exchange capacity, drainage, organic matter content and other factors. The solubility of manganese is increased at low pH and under reducing conditions. The presence of high concentrations of chlorides, nitrates or sulfates may also increase solubility. Under these conditions, manganese is more easily taken up by plants or transported in aqueous solution. Lack of sufficient cation exchange sites, which are provided by organic matter or clay, can also result in greater leaching of manganese to surface and groundwater (Clement Associates 1985).

Atmospheric transport of manganese fumes or dusts can occur. These materials can be returned to the earth by wet or dry deposition.

All manganese compounds are very important soil constituents because this element is essential in plant nutrition and controls the behavior of several other micronutrients. Manganese generally is not considered to be a contaminant metal in soils. However, past studies reported the increase of manganese from 242 to 555 mg/kg (dry weight) in sludge, amended soil in five years. Toxicity to some field crops might be expected on acid soils with a pH around 5.5 or lower and with a high manganese level. However, the critical manganese content and unfavorable soil pH range depend upon several other environmental factors. Manganese toxicity is also known to occur at higher pH levels in poorly drained soils. If acid soils are very low in total manganese, plants are not subjected to manganese toxicity (Kabata-Pendias 1984).

The most common symptom of manganese toxicity in plants is iron chlorosis. Leaf puckering, necrotic brown spots and an uneven distribution of chlorophyll in older leaves are also symptoms of toxicity. In severely injured plants, browning of roots occur. Plants resistant to manganese excess have an adaptability to accumulate manganese in root tissues or to precipitate manganese oxide, which is deposited mainly within the epidermis. An increased iron uptake by these plants has also been observed (Kabata-Pendias 1984).

In freshwater, ions of manganese are rarely found at concentrations above 1 mg/l. The tolerance values reported range from 1.5 mg/l to over 1,000 mg/l. As a result, manganese is not considered to be a problem in fresh waters. Permanganates have been reported to kill fish in 8 to 18 hours at concentrations of 2.2 to 4.1 mg/l, but permanganates are not persistent because they rapidly oxidize organic materials and are thereby reduced and rendered nontoxic (USEPA 1986).

MERCURY

Fate and Transport

The global biogeochemical cycling of mercury is characterized by degassing of the element from soils and surface waters, followed by atmospheric transport deposition of mercury back to land and surface waters, and sorption to soil or sediment. The sorption process has been found to be related to the organic matter content of the soil or sediment; pH does not affect the process. Inorganic mercury sorbed to particulate material is not readily desorbed; thus, freshwater and marine sediments are important repositories, and leaching is a relatively insignificant transport process in soils. Particulate-bound mercury can be converted to insoluble HgS, and precipitated into more volatile or soluble forms that re-enter the atmosphere, or are taken up by biota and bioaccumulated in terrestrial and aquatic food chains (ATSDR 1989).

Inorganic mercury can be methylated by microorganisms indigenous to soils, fresh water, and salt water. Two transformation processes of mercury in surface waters are biotransformation and bioaccumulation. Methylmercury in surface waters is rapidly accumulated by aquatic organisms. For example, concentrations

in carnivorous fish at the tops of freshwater and saltwater food chains such as pike, tuna and swordfish are biomagnified on the order of 10,000-100,000 times those concentrations found in ambient waters.

Mercury compounds in soils may undergo the same chemical and biological transformations described for surface waters. Mercuric mercury usually forms complexes with chloride and hydroxide ions in soils, the specific complexes formed being dependent on the pH, salt content, and composition of the soil solution.

Toxicity

Numerous animal studies have determined the health effects from breathing mercury. Effects from breathing metallic mercury range from lung, kidney, heart, stomach, liver damage, and possible damage to brain tissue in rabbits, to lung and liver disease in rabbits, decrease in number of fertile female rats over time, and shakiness, temporary learning disability in rats. Animal health effects from drinking inorganic mercury range from death in both young rats and developing young in pregnant hamsters, to weight loss possible lowering of immune system, and behavior changes in mice. Effects from eating this compound have resulted in kidney disease in rats.

From eating and drinking organic mercury, long-term health effects to animals include kidney disease in rats, brain damage and weakness in kittens, and liver damage to developing young in pregnant rats. Studies have shown that short-term effects from drinking organic mercury include behavior problems in offspring of exposed mothers in rats, male infertility, and brain cell death in rabbits. Acute values for invertebrate species range from 2.2 ug/L for *Daphnia pulex* to 2,000 ug/L for some insects. Acute values for fishes range from 30 ug/L for guppies to 1,000 ug/L for the *Mozambique tilapia*.

Freshwater plants show a wide range of sensitivities to mercury, but the most sensitive plants appear to be less sensitive than the most sensitive freshwater animals. The acute toxicity of mercuric chloride on saltwater animals studied include annelids, mollusks, crustaceans, echinoderms, and fishes. Acute values range from 3.5 ug/L for a mysid shrimp to 1,678 ug/L for winter flounder.

METHYLENE CHLORIDE

Volatilization to the atmosphere appears to be the major mechanism for removal of methylene chloride from aquatic systems and its primary environmental transport process (USEPA 1979). Photooxidation in the troposphere appears to be the dominant environmental fate of methylene chloride. Once in the troposphere, the compound is attacked by hydroxyl radicals, resulting in the formation of carbon dioxide, and to a lesser extent, carbon monoxide and phosgene. Phosgene is readily hydrolyzed to HCl and CO_2. About one percent of tropospheric methylene chloride would be expected to reach the stratosphere where it would probably undergo photodissociation resulting from interaction with high energy ultraviolet radiation. Aerial transport of methylene chloride is partly responsible for its relatively wide environmental distribution. Atmospheric methylene chloride may be returned to the earth in precipitation (Clement Associates, 1985).

Photolysis, oxidation, and hydrolysis do not appear to be significant environmental fate processes for methylene chloride, and there is not evidence to suggest that either adsorption or bioaccumulation are important fate processes for this chemical. Although methylene chloride is potentially biodegradable, especially by acclimatized microorganisms, biodegradation probably only occurs at a very slow rate (Clement Associate, 1985).

Methylene chloride is currently under review by the National Toxicology Program (NTP 1984, USEPA 1985). Preliminary results indicate that it produced an increased incidence of lung and liver tumors in mice and mammary tumors in female and male rats. In a chronic inhalation study, male rats exhibited an increased incidence of sarcomas in the ventral neck region (Burek et al. 1984). However, the authors suggested that the relevance and toxicological significance of this finding were uncertain in light of available toxicity data. Methylene chloride is reported to be mutagenic in bacterial test systems. It also has produced positive results in the Fischer rat embryo cell transformation test. However, it has been suggested that the

observed cell-transforming capability may have been due to impurities in the test material. There is no conclusive evidence that methylene chloride can produce teratogenic effects (Clement Associates, 1985).

In experimental animals, methylene chloride is reported to cause kidney and liver damage, convulsions, and distal paresis. An oral LD_{50} value of 2,136 mg/kg, and an inhalation LC_{50} value of 88,000 mg/m^3/30 min are reported for the rat (Clement Associates, 1985).

Very little information concerning the toxicity of methylene chloride to domestic animals and wildlife exists (USEPA 1980). Acute values for the freshwater species Daphnia magna, the fathead minnow, and the bluegill are 224,000, 193,000, and 224,000 ug/liter, respectively. Acute values for the saltwater species, mysid shrimp and sheepshead minnow, are 256,000 and 331,000 ug/liter, respectively. No data concerning chronic toxicity are available. The 96-hour EC50 values for both freshwater and saltwater algae are greater than the highest test concentration, 662,000 ug/liter (Clement Associates, October 1985).

4-METHYL-2-PENTANONE

Fate and Transport

Very limited information on the transport and fate of 4-methyl-2-pentanone (also known as methyl isobutyl ketone, or MIBK) was found in the literature reviewed. However, ketones in general are probably not very persistent. MIBKwould be expected to volatilize fairly readily. However, because it is somewhat soluble in water, volatilization from wet environments is probably limited. Once in the atmosphere it is apparently oxidized. MIBK has a low octanol/water partition coefficient and therefore is probably not readily adsorbed. Biodegradation is probably the predominant fate of MIBK in the environment. (Clement Associates, 1985)

Toxicity

No studies on the carcinogenicity, mutagenicity, reproductive toxicity or teratogenicity of MIBK were found in the literature reviewed. Kidney damage was observed in rats exposed to 400 mg/m^3 of MIBK for 2 weeks but the damage appeared to be reversible. The oral LD_{50} for MIBK in the rat was 2,080 mg/kg. (Clement Associates, 1985)

The only study on the toxicity of MIBK to wildlife reported that the TL_{50} for brine shrimp was 1,230 mg/liter. MIBK is probably also not very toxic to other aquatic species or to terrestrial animals. (Clement Associates, 1985).

NICKEL

Fate and Transport

Nickel is a highly mobile metal in aquatic systems because many nickel compounds are highly soluble in water. However, the insoluble sulfide is formed under reducing conditions and in the presence of sulfur. In natural, unpolluted waters, sorption and coprecipitation processes involving hydrous iron and manganese oxides are probably at least moderately effective in limiting the mobility of nickel. In more organic-rich, polluted waters, it appears that little sorption of nickel is likely. The lack of other controls on nickel mobility probably makes incorporation into bed sediments an important fate of nickel in surface waters (Clement Associates 1985).

In general, nickel is not accumulated in significant amounts by aquatic organisms. Bioconcentration factors are usually on the order of 100 to 1,000. Uptake of nickel from the soil by plants can also occur.

302833

Bioconcentration factors in freshwater range from 0.8 for fish muscle to 193 for a cladoceran. In saltwater, bioconcentration factors range from 261.8 with an oyster to 675 with a brown alga.

Toxicity

Acute values with twenty-one freshwater species in 18 genera range from 1,101 µg/l for a cladoceran to 43,240 µg/l for a fish. Fishes and invertebrates are both spread throughout the range of sensitivity. Acute values with four species are significantly correlated with hardness. Data are available concerning the chronic toxicity of nickel to two invertebrates and two fishes in freshwater. Data available for two species indicate that chronic toxicity decreases as hardness increases. The measured chronic values ranged from 14.77 µg/l with *Daphnia magna* in soft water to 526.7 µg/l with the fathead minnow in hard water (USEPA 1986).

Nickel appears to be quite toxic to freshwater algae, with concentrations as low as 50 µg/l producing significant inhibition. Bioconcentration factors for nickel range from 0.8 for fish muscle to 193 for a cladoceran (USEPA 1986).

TOTAL PAHs

Fate and Transport

Polynuclear Aromatic Hydrocarbons (PAHs) released to the atmosphere are subject to short- and long-term transport. Atmospheric residence time and transport distance depend on the size of the particles to which PAHs are sorbed.

In sediments, PAHs can biodegrade or accumulate in aquatic organisms, specifically bottom-dwelling vertebrates. PAHs in soil can biodegrade or accumulate in terrestrial plants, through roots or foliage. Specific transport and partitioning are determined by: water solubility; vapor pressure; concentration; and molecular weight of the PAH. PAHs may accumulate in terrestrial animals through the food chain or by ingestion of soil. PAHs can also enter groundwater and be transported within an aquifer. In surface water, these compounds can volatilize, photodegrade, oxidize, biodegrade, bind to particles, or accumulate in aquatic organisms. Because of their low solubility, PAHs in aquatic systems are usually found sorbed to particles that either have settled to the bottom or are suspended in the water column. PAHs tend to be removed from the water column by volatilization to the atmosphere, binding to sediments or by being accumulated or sorbed onto aquatic biota. Bioconcentration factors (BCFs) of PAHs in fish and crustaceans have frequently been reported to be in the range of 100-2000 (ATSDR 1989), and exposure to PAHs has been linked to the development of tumors in fish. The ability of fish to metabolize PAHs may explain why benzo(a) pyrene is frequently not detected or found at only low levels in fish from environments heavily contaminated with PAHs. According to the Draft Toxicological Profile for PAHs (ATSDR 1989), one study ranked the amount of benzo(a)pyrene metabolism by aquatic organisms as follows: fish > shrimp > crustaceans > clams. Half lives for elimination of PAHs in fish ranged from 1.5 days to 9 days.

Toxicity

No studies were located regarding either deaths in animals following dermal exposure or neurological effects to PAHs in animals, although the skin is susceptible to PAH induced toxicity in animals. The developmental toxicity data in animals for PAHs are limited. Available animal studies exclusively discuss the reproductive effects of benzo(a)pyrene, adverse effects such as decreased fertility and total sterility in mice (F1 progeny of CD-1). Effects of hepatic injury have also been observed in animals. In one study, a simple injection of pyrene resulted in minimal swelling of the liver. Longer administration of PAHs has been reported to result in adverse hepatic effects in animals. Adverse hematological effects have also been observed in animals following exposure to PAHs. PAHs tend to exert their adverse effects on rapidly proliferating tissues, such as the bone marrow forming elements and the lymphatic system.

302834

A growing literature exists on uptake, retention, and translocation of PAHs by aquatic plants and animals. Authorities generally agree that: most species of aquatic organisms studied to date rapidly accumulate PAHs from low concentrations in the ambient medium; uptake of PAHs is highly species specific, being higher in algae, molluscs, and other species which are incapable of metabolizing PAHs; bioconcentration factors tend to increase as the molecular weight of the PAH increases, with increasing octanol/water partition coefficient values, with time until approaching an apparent equilibrium level (sometimes within 24 hours), and with increases in dissolved organic matter in the medium, lipid content of the organism, and a variety of endogenous and exogenous factors (Eisler 1987).

PCBs

Fate and Transport

PCBs are relatively inert, and therefore persistent, compounds with low vapor pressures, low water solubility, and high log octanol/water partition coefficients. Despite their low vapor pressures, they have a high activity coefficient in water, which causes a higher rate of volatilization than might normally be expected. Volatilization and persistence account for the ubiquitous nature of PCBs in the environment. Adsorption to the organic material in soil or sediments is probably the major fate of at least the more heavily chlorinated PCBs. Once bound, the PCBs may persist for years with slow desorption providing continuous, low-level exposure to the surrounding locality (Clement Associates 1985).

Because of their low water solubility and tendency to accumulate in fatty tissue (lipophilicity), PCBs have a strong tendency to bioaccumulate in aquatic organisms. Reported bioconcentration factors range from 2,700 to 108,000 for freshwater invertebrates (i.e., the PCB levels are from 2,700 to 108,000 times higher in the invertebrates than in the river water) and from 3,000 to 274,000 for freshwater fish. Eisler (1986, cited in TAMS et al. 1991) reports a BCF value of 47,000 for *Daphnia magna*. Recent studies by Jones et al. (1989 cited in TAMS et al 1991) indicated that caged fathead minnows studied in the Upper Hudson River selectively accumulated tetra- and penta-chlorinated biphenyls, suggesting a congener-specific bioaccumulation preference.

Toxicity

Measurements of acute toxicity of PCBs to freshwater organisms have resulted in acute LC_{50}s (lethal concentrations to 50 percent mortality of test organisms) ranging from 10 to 400 µg/l (parts per billion) for three invertebrate species and from 2 to 7.7 µg/l for four fish species (USEPA 1980). Fish fry were more sensitive than adults.

Exposure to Aroclor 1242 at 30 µg/l resulted in no significant effects to the amphipod *Hyalela azteca*, whereas exposures to 100 µg/l resulted in complete mortality (Borgmann et al 1990, cited in TAMS et al 1991). *Daphnia magna*, a common aquatic organism used in establishing toxicity benchmarks, is very sensitive to PCB exposure. Lethal exposures for this species range from 1.2 µg/l for Aroclor 1248 to 2.5 µg/l for Aroclor 1254 (Eisler 1986, cited in TAMS et al. 1991). Eisler (1986) also reports that chironomids (midges) are sensitive to Aroclor 1254 at concentrations of 0.5 to 1.2 µg/l.

Six chronic tests with three species of freshwater invertebrates gave effective concentration to 50 percent (EC_{50}) values of 0.8 to 4.9 µg/l. Chronic tests with freshwater fish gave EC_{50} values of 0.2 to 9.0 µg/l for fathead minnows and 1.0 µg/l for brook trout. Little data exists on aquatic plants, but effects on certain species of phytoplankton have been reported at concentrations as low as 0.1 µg/l (USEPA 1980).

The EPA Ambient Water Quality Criteria for PCBs for the protection of aquatic life are 0.014 µg/l, as a 24-hour average, for freshwater organisms. Available data suggest that acute toxicity would occur only at concentrations above 2 µg/l for freshwater organisms.

302835

Although very few studies address the issues of PCB toxicity associated with tissue residues, a PCB concentration of 0.4 mg/kg (ppm) in whole-body fish tissues has been observed to cause reproductive impairment in rainbow trout (Eisler 1986 cited in TAMS et al 1991). Trout are particularly sensitive to PCBs and other species may be more tolerant to PCB exposures (TAMS et al. 1991).

In a study conducted by the U.S. Army Corps of Engineers (1988), adult fathead minnows (*Pimephales promelas*) were exposed to sediments containing 0.82, 14.0 and 27.0 µg/g (ppm) (low, medium and high, respectively) dry weight PCB (expressed as Aroclor 1254 equivalents). This study concluded that PCB-contaminated sediments had a significant deleterious effect of the species' fecundity and frequency of reproduction. Reproduction was significantly impaired in fish exposed to the medium and high PCB-contaminated sediment treatments compared to fish in the controls and low PCB-contaminated sediment. Mean PCB tissue concentrations in the fish ranged from 13.7 to 47.2 µg/g (ppm) wet weight, expressed as Aroclor 1254 equivalents (USACOE 1988).

Among small mammals, the mink (*Mustela vison*) is one of the most susceptible species tested; dietary levels as low as 100 µg PCBs/kg fresh weight caused death and reproductive toxicity. A tolerable daily limit for mink has been estimated at less than 1.5 µg total PCBs/kg body weight. Tolerable daily PCB levels for rhesus monkey (*Macaca mulatta*), dog (*Canis sp.*) and rat (*Rattus spp.*) were 1.0, 2.5 and 5.0 µg/kg body weight, respectively. For birds, total PCB levels (in µg/kg fresh weight) in excess of 3,000 in diet, 16,000 in egg, or 54,000 in brain were frequently associated with PCB poisoning (Eisler 1986).

RADIUM

Fate and Transport

Radium is a naturally-occurring radioactive metal that can exist as several isotopes, and is formed when uranium and thorium decay in the environment. Radium is transported in the atmosphere in the association with particulate matter, but data on its residence time or deposition rate was not located. However, data for other elements adsorbed to particulate matter indicate that the residance time for fine particles is about 1 to 10 days. Therefore, radium may be subject to long-range transport in the atmosphere.

Radium exists in water primarily as a divalent ion (Ra^{2+}), and has chemical properties similar to barium, calcium, and strontium. The concentration of radium in water is usually controlled by adsorption-desorption reactions at solid-liquid interfaces which are influenced by pH or by the dissolution and coprecipitation of minerals that contain radium. Radium has a tendancy to coprecipitate with barite, and sparingly soluble barium sulfate, as $(BaRa)SO_4$. It is therefore likely that radium in water does not migrate significantly from the area where it is released or generated.

Radium in water may be adsorbed by sedimants, soils, and aquifer components. Its adsorptive behavior is similar to that of other divalent cationic metals in that it decreases with an increase in pH and is subject to competitive interactions with other ions in solution for adsorption sites. It has been shown that once adsorbed, radium may be partially resistant to removal, which would reduce its mobility in the environment.

Radium in the soil may be readily absorbed by plants, depending on the specific plant and soil type. The partitioning of radium-226 to plants from soils has been estimated by measuring the ratio of radium activity in the plant mass to that in the host soil. Soil-plant transfer coefficients or concentration factors have ranged from 1.1×10^{-3} to 6.5. Forage grown in soils containing radium are particularly hazardous to grazing animals. The radium taken up by the animal may be stored in the animals milk and subsequently transferred to the animals young.

302836

Aquatic organisms such as fish, snails, clams, and algae can bioaccumulate radium from water. Bioconcentration factors (BCFs) for fish living in streams or lakes receiving uranium-processing waste effluent have ranged from 1 to 60 for flesh portions, and from 40 to 1,800 in bone samples. It has been proposed that bottom-feeding organisms ingest suspended solids containing adsorbed radium, then are in turn consumed by larger predatory fish.

Toxicity

Most studies of the health effects of radium to animals involved oral and parenteral exposure. In a study where rats were administered radium for 20 days, it was found that 3 out of 5 rats developed osteogenic sarcomas. Each animal was given a different estimated total dose ranging from 10 to 70 *u*Ci. The lowest dose to induce a malignancy was 22 *u*Ci. The information obtained through parenteral exposure to animals invoved very high administered doses. The main effects observed were animal death and systemic effects. The two prevelant systemic effects were bone marrow depression and chronic liver disease.

SELENIUM

Fate and Transport

In aerobic waters and at a high pH, selenium is present in the selenite (+4) or selenate (+6) oxidation state. These chemical species are very soluble, and it is probable that most of the selenium released into the aquatic environment is transported in these forms. Under reducing conditions and at low pH, elemental selenium or metal selenides can be formed. Similar chemical speciation patterns affect the transport of selenium in soil. In poorly aerated acidic soils, insoluble forms predominate. In well-aerated alkaline soils, soluble forms of selenium subject to leaching and compounds readily taken up by plants tend to be formed (Clement Associates, 1985).

Selenium is strongly adsorbed to hydrous metal oxides, while clays and organic materials have a lesser affinity. Sorption by bed sediments or suspended solids, and precipitation with hydrous iron oxides are probably the major control on mobility of selenium in aerobic waters. However, most selenium in aquatic systems is probably transported as the dissolved species. Experimental studies indicate that selenium is quite mobile in clays especially under alkaline conditions (Clement Associates, 1985).

In soils, pH and Eh are determining factors in the transport and partitioning of selenium. Elemental selenium, heavy metal selenides and selenium sulfides are essentially insoluble and predominate in acidic soils and soils with high amounts of organic matter. Selenium in this form is immobile and will remian in soil. In alkaline well oxidized soil, selenates are the major selenium species. Due to their high solubility and low tendency to sorb onto soil particles, the selenates are very mobile and are readily taken up by biological systems (i.e. plants) or leached through the soil. Sodium selenate appears to be responsible for most of the naturally occuring instances of plants accumulating high levels of selenium (ATSDR, 1990).

Selenium is bioaccumulated by aquatic and terrestrial organisims. Although dietary intake is thought to be the most important source of selenium in many organisims, little biomagnification appears to take place. Conversion of selenium to inert and insoluble forms may occur in terrestrial and aquatic organisims. However, selenium can be methylated by a variety of organisims, including benthic microflora. In a reducing environment, hydrogen selenide may be formed. Both the methylated forms and hydrogen selenide are volatile and can be released to the atmosphere. Consequently, remobilization of selenium from aquatic and terrestrial

302837

systems through biotransformation to volatile forms and subsequent atmospheric transport can result in significant recycling (Clement Associates, 1985).

Toxicity

Although selenium in plants has been investigated in many studies, its physiological role is still unknown. In one study, a decrease in the yield of several crops was effected by the application of about 2 ppm onto the soil. The great interest in plant concentrations is due to the importance of this element in nutrition, particularly for domestic animals, since selenium can act both as a micronutrient and a toxin (Kabata-Pendias, 1984).

Some food and forage crops growing on certain seleniferous soils can accumulate selenium to concentrations as high as 1,000 ppm. Chronic selenium toxicity can occur in grazing animals that consume plants containing 3 to 25 ppm over a long period of time. Symptoms of chronic poisoning (alkali disease) include lack of vitality, loss of hair, sterility, hoof deformity, lameness, anemia and fatty necrosis of the liver. Acute toxic effects including impairment of vision, weakness of limbs and respiratory failure may occur in livestock consuming 100 to 1,000 ppm of selenium. There are reports that consumption of plants containing 400 to 800 ppm has been lethal to sheep, hogs and calves (Clement Associates, 1985).

Selenium in the aquatic environment is bioaccumulated and bioconcentrated by aquatic organisms. In freshwater, selenium has bioconcentration factors of 150-1,580 and bioaccumulation factors of 1,746-3,975 (ATSDR, 1990). For total recoverable inorganic selenite, the criterion to protect freshwater aquatic life is 35 ug/L as a 24-hour average, and the concentration should not exceed 260 ug/l at any time. The available data for inorganic selenate indicate that acute toxicity to freshwater aquatic life occurs at concentrations as low as 760 ug/l and would occur at lower concentrations among species that are more sensitive than those tested (USEPA, 1986).

SILVER

Fate and Transport

Silver can exist in several chemical forms in aqueous systems. Metallic silver, which has very low solubility, is stable over much of the Eh-pH range for water. Concentrations of hydrated silver cations, usually present as the univalent species, may be controlled by reaction with chloride, bromide, and iodide ions to give insoluble silver halides. Precipitation of AgCl may exert a major control on solubility of silver where chloride concentrations are relatively high. Under the reducing conditions often found in bed sediments, formation of insoluble silver sulfides and metallic silver may also control levels of soluble silver species. Silver is strongly sorbed by manganese dioxide, ferric hydroxide, and clay minerals. Sorption is probably the dominant process leading to removal of dissolved silver from the water column. In general, concentrations of silver are higher in the bed sediments than in overlying waters (Clement Associates 1985).

The mobility of silver in soils is affected by drainage (silver tends to be removed from well-drained soils); oxidation-reduction potential and pH conditions (which determine the reactivity of iron and manganese complexes which tend to immobilize silver); and the presence of organic matter (which complexes with silver and reduces its mobility) (ATSDR 1990).

Bioaccumulation of silver by aquatic plants, invertebrates, and vertebrates occurs readily and appears to depend primarily on sorption/desorption from sediments. However, the amount of silver partitioned to the biota appears to be minor in comparison with the amount partitioned to the sediments. Little food-chain magnification seems to occur. Photolysis, volatilization, atmospheric transport, and biotransformation do not appear to be important fate or transport processes for silver (Clement Associates 1985).

302838

Toxicity

For freshwater aquatic life, the concentration (in µg/l) of total recoverable silver should not exceed the numerical value given by $e^{(1.72[\ln(\text{hardness})]-6.52)}$ at any time. For example, at hardnesses of 50, 100, and 200 mg/l as $CaCO_3$, the concentration of total recoverable silver should not exceed 1.2, 4.1 and 13 µg/l, respectively, at any time. The available data indicate that chronic toxicity to freshwater aquatic life may occur at concentrations as low as 0.12 µg/l (USEPA 1986). Liver and kidney damage, central nervous system effects, and pulmonary edema and congestion have been reported in experimental animals exposed to various silver compounds. The No Observed Adverse Effect Level (NOAEL) for acute exposure in rats was shown to be 181.2 mg Ag/kg/day (ATSDR 1990).

Silver combines with proteins to form stable insoluble complexes that finally decompose into black silver sulfide; silver salts tend to decompose in the tissues. Colloidal silver is toxic following parenteral administration; it causes tumors in the liver and spleen. Silver salts cause corrosion of intestinal and gastric mucosa. Acute dietary silver toxicity causes severe gastroenteritis, diarrhea, hypotension, spasms, paralysis, and respiratory failure. Chronic silver toxicity symptoms are fatty degeneration of the liver and kidney, and liver necrosis (Luckey, et al. 1977).

Silver concentrations in plants are reported to range from 0.03 to 0.5 mg/kg (dry weight), and the intermediate range of Silver in plant foodstuffs has been established as 0.07 to 2.0 mg/kg (dry weight). The amount of silver absorbed by several plants seems to be related to the amount of the metal in soils. Thus, silver can be concentrated to toxic levels in plants growing in silver-mineralized areas (Kabata-Pendias 1984).

TETRACHLOROETHENE

Fate and Transport

Volatilization is the major process for removal of Tetrachloroethene from aquatic systems; when it is present in surface waters and on soil surfaces this compound will predominantly volatize into the atmosphere. There was no information found to indicate that microorganisms exist which can readily biodegrade tetrachloroethene, although this compound can be metabolized by higher organisms. In subsurface regions where volatilization cannot occur, tetrachloroethene is slowly degraded and may be relatively persistent (U.S. Public Health Service, 1987). Tetrachloroethene is moderately to highly mobile in soil and susceptible to significant leaching. Sediments rich in organic detritus have much higher adsorptive capacity than coarse gravels or sandy soils.

Toxicity

Tetracloroethylene has been tested for acute toxicity in twelve species under laboratory conditions, including the adult fathead minnow (Pimephales promelas), bluegill (Lepomis macrochirus) and the Rainbow trout (Salmo gairdneri) which was the most sensitive. According to the 1986 Water Quality Criteria document (USEPA,1986), acute and chronic toxicity to freshwater aquatic life was found to occur at concentrations as low as 5,280 ug/L and 840 ug/L respectively. There was limited data available on the effects to aquatic plants, although USEPA observed no adverse effects of this compound at exposure concentrations as high as 816 ug/L. In animals, the uptake of tetrachloroethene through the skin is thought to be slow (Fawell et al., 1988).

THALLIUM

Thallium is a rare and dispersed element in the lithosphere. There is little information on the chemical form taken by thallium in soils. It is generally believed that thallium is present as Tl^+, and is transferred to

302839

solution in this form. It becomes enriched in sediments, especially in strongly reducing environments where organic matter is accumulating under anaerobic conditions (Jones et al., 1990).

In reducing environments, thallium may be precipitated as the metal or as thallium sulfide. However, much of the thallium present in aquatic systems is likely to remain in solution and be transported to the oceans. Active removal of some dissolved thallium by sorption to clay minerals and hydrous metal oxides present in bed sediments is probably an important environmental fate process. Thallium is readily taken up by aquatic organisms, and bioaccumulation may also be an important fate process. Results of limited studies with algae suggest that thallium may also be available for food chain magnification. There is no evidence to suggest that photolysis or volatilization are important environmental processes (Clement Associates, 1985).

Recent studies on thallium uptake by plants indicate that: it is a mobile element with ready movement from root to shoot and; thallium uptake is profoundly affected by the presence of K. Increased thallium levels in plant tissues are highly toxic to both plants and animals (Kabata-Pendias, 1984). Thallium effects on plant metabolism include reductions in photosynthesis and transpiration (Jones et al., 1990).

The available data for thallium indicate that acute and chronic toxicity to freshwater aquatic life occurs at concentrations as low as 1,400 and 40 µg/l, respectively, and would occur at lower concentrations among species that are more sensitive than those tested. Toxicity to one species of fish occurs at concentrations as low as 20 µg/l after 2,600 hours of exposure (USEPA, 1986).

There is no evidence that thallium is carcinogenic in humans or experimental animals, and it does not appear to have significant mutagenic activity. Exposure to thallium salts during critical developmental stages is reported to produce effects in chickens and rats. No other significant teratogenic effects are reported. In experimental animals, thallium compounds produce effects similar to those seen in humans. Rats appear to be particularly sensitive to the cataractogenic activity of thallium. Regardless of the specific thallium compound tested, rate of intake, or route of administration, LD_{50} values for a variety of species range from about 3 to 92 mg/kg (Clement Associates, 1985).

THORIUM

Fate and Transport

Thorium is a relatively reactive, metallic radioactive element which occurs naturally in the environment as the isotope thorium-232. Data regarding the fate and transport of thorium in the air are limited. Wet and dry deposition are presumed to be mechanisms for removal of atmospheric thorium. The rate of deposition depends on meteorlogical conditions, the particle size and density, and the chemical form of thorium particles.Thorium particels with small aerodynamic diameters will travel long distances from their sources of emmission.

In water, thorium will be present in suspended matters and sediment and the concentration of soluble thorium will be low. Sediment resuspension and mixing may control the transport of particlesorbed thorium in water. The concentration of dissolved thorium in some waters may increase due to formation of soluble complexes with carbonate, humic materials, or other ligands in the water. Thorium has been found to show significant bioconcentration in lower trophic animals in water, but the bioconcentration factors decrease as the trophic level of aquatic animals increases.

The fate and mobility of thorium in soil will be governed by the same principles as in water. In most cases, thorium will remain strongly sorbed to soil and its mobility will be very slow. The plant/soil transfer ratio is less than 0.01, indicating that it will not bioconcentrate in plants from soil. The root system of plants adsorb thorium from the soil but the transport of the thorium from the root to the aboveground parts of the plant is not extensive.

Toxicity

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Studies dealing with the health effects of thorium to animals generally involve inhalation, ingestion, and dermal exposure. Evidence exists that most, if not all, effects of thorium may be due to its radiological, and not chemical, effects. The major effects of thorium via the inhalation pathway to laboratory animals were lung and hematological effects, although these effects differed between animal species and administered dose.

Several studies have shown that neonatal animals tend to absorb 20-40 times more thorium through the gastrointestinal tract than adult animals, indicating that the adverse health effects may be far more detremental in young animals than in adults. Laboratory studies have also shown that ingestion of thorium by mice and rats can be lethal.

Few studies have been conducted regarding the rate and extent of absorption of thorium following dermal exposure. Absorption of thorium through the skin of animals can be inferred, however, because testicular and ocular effects were seen in laboratory animals following application of thorium to these dermal areas. It is noteworthy to mention that the main issue regarding thorium is its potential radiological effect. Since thorium is an alpha-emitting bone-seeker, the small amount of thorium that enters the body migrates to the bone surfaces. The carcinogenic potential of thorium is most likely a result of its radiological properties.

URANIUM

Fate and Transport

Uranium, like other metals, can speciate as a result of environmental reactions. Particulate uranium is removed from the atmosphere to surface water, plant surfaces, and soil via wet and dry deposition. Part of the uranium deposited on soil and plant surfaces is resuspended into the atmosphere. Deposition on surface water and its transport to sediments is probably the ultimate fate of atmospheric uranium. The important factors in determining the atmospheric transport are particle size, distribution, and density. There is no measured data on the residence time of particulate uranium in the atmosphere, but the UNSCEAR (1988) report assumes that it behaves like atmospheric dust.

The significant reactions of uranium in soil are complexation with anions and ligands and reduction of U^{+6} to U^{+4}. These reactions are critical in controlling the mobility of uranium in water and soil. Other factors which control the mobility of uranium in water and soil are oxidation-reduction potential (E_h), pH, and the sorbing characteristics of the sediments and soils. Conditions that increase the rate of formation of soluble complexes and decrease the rate of sorption of labile uranium in soil and sediment are expected to enhance the mobility of uranium.

In natural waters, sediments are the sink for uranium. The levels of uranium in aquatic organisms decline with each successive trophic level because of very low assimilation efficiencies in higher trophic animals and because bioconcentration factors are not significant in most fish. In plants, uptake of uranium is probably restricted to the root system and it may only be transported from soil to the outer root membrane and not to the interior of the root. Fruits and vegetables grown in contaminated areas may contain higher levels of uranium due to precipitation of airborne dusts on fruits and vegetable surfaces.

Toxicity

Studies on the health effects of uranium to animals involve inhalation, ingestion, and dermal exposure. Animals were observed to have adverse health effects in both short-term ($\leq$ 14 days) and long-term (> 14 days) exposure. Uranium exposures to animals by oral, inhalation, or dermal routes have resulted in mild to severe kidney damage, depending on the exposure level. In some studies where exposures were high and/or prolonged, pulmonary fibrosis, lymph node necrosis, pulmonary neoplasms, anemia, liver damage, testicular injury, birth defects, and death were observed. The examination of these three routes of exposure has

302841

determined that the toxicity of the uranium compound is dependent on the solubility of the compound in water; soluble uranium compounds are generally more toxic than insoluble uranium compounds.

The kidney is by far the most sensitive to uranium exposure. Animal studies have shown that inhalation, ingestion, and dermal exposure to uranium results in kidney damage. The histologic and physiologic features of nephrotoxicity in animals are known. In animals, two particular areas of the kidney are affected: the glomerulus and the proximal tubules. Other sections of the nephron may also be sensitive to uranium. Glomerular defects include a decrease in filtration rate, as assessed by creatinine or insulin clearance or by proteinuria. Ultrastructural analysis shows damage to the glomerular endothelial cells, such as loss of foot processes, and reduction in density of endothelial fenestrae. In the terminal segments of the proximal tubules, there is loss of the brush border, cellular vacuolization, and necrosis. Tubular reabsorption of solutes is disrupted. Manifestations of the tubular injury include urinary casts, excessive urinary excretion of protein, glucose, amino acids, or enzymes, such as catalase or alkaline phosphatase.

In a study involving oral exposure in mice it was found that uranium treatment during the period of organogenesis resulted in developmental effects. Exposure-related fetotoxicity (reduced fetal body weight and length, an increase in the incidence of stunted fetuses, an increase in external and skeletal malformations and developmental variations) was found in the fetuses of the exposed mice. Maternal effects were also observed and included reduced weight gain and food consumption, and increased liver weight.

VANADIUM

Fate and Transport

The size distribution of vanadium-bearing particles in the atmosphere is altered during long-range transportation. Large particles like man-made ore-processing dust settle near their source, whereas smaller particles like those emitted from oil-fueled power plants have a longer residence time. In the course of biogeochemical movement between soil and water these particulates are adsorbed to hydroxides or associated with organic compounds and are deposited on the sea bed. The transport of vanadium in both water and soil is influenced by: pH; redox potential; and the presence of particulates. Some marine organisms, particularly the ascidians (sea squirts), bioconcentrate vanadium very efficiently, attaining concentrations approximately 10,000 times greater than the ambient sea water. According to the Draft Toxicological Profile for Vanadium (ATSDR 1990), upon the death of the organism, the body burden adds to the accumulation of vanadium in silt.

In general, marine plants and invertebrates contain higher levels of vanadium than terrestrial plants and animals. Furthermore, in the terrestrial environment, bioconcentration is more commonly observed amongst the lower plant phyla than in the higher, seed-producing phyla. The uptake of vanadium in the above-ground parts of many plants is low, although root concentrations have some correlation with levels in the soil. Certain legumes, such as Astralagus preussi, have been shown to be vanadium accumulators. Also Amanita muscaria, a poisonous mushroom, has been demonstrated to contain levels up to 112 ppm. Vanadium is fairly mobile in neutral or alkaline soils, but its mobility decreases in acidic soils.

Toxicity

Animal health effects have been studied mostly on the rat, mouse and rabbit. The absorption of vanadium through the gastrointestinal tract of animals is low. Minor renal effects have been shown in rats, after oral exposure, and in rabbits after inhalation exposure. Minimal or no studies were located regarding neurological, immunological, or genotoxic effects in animals. Other studies have shown that long-term vanadium exposure has results in diminished weight gains and gross pathological changes in animals. Acute studies with rats showed the highest vanadium concentration to be located in the skeleton. High concentrations of vanadium over short periods of time caused rabbits to experience conjunctivitis and some fatty tissue

302842

degeneration of the liver. Studies in animals support the findings that vanadium primarily effects the respiratory system.

ZINC

Fate and Transport

Zinc can occur in both suspended and dissolved forms. Dissolved zinc may occur as the free (hydrated) zinc ion or as dissolved complexes and compounds with varying degrees of stability and toxicity. Suspended zinc may be dissolved following minor changes in water chemistry or may be sorbed to suspended matter. The predominant fate of zinc in aerobic aquatic systems is sorption of the divalent cation by hydrous iron and manganese oxides, clay minerals and organic material. Concentrations of zinc in suspended and bed sediments always exceed concentrations in ambient water. Zinc tends to be more readily sorbed at higher pH than lower pH and tends to be desorbed from sediments as salinity increases (Clement Associates 1985).

Microcosm studies generally indicate that zinc is not biomagnified. Although biota seem to be a minor sink compared to sediments, this compound is actively bioaccumulated in aquatic systems. Zinc has been found to accumulate in freshwater animal tissues from 51 to 1,130 times the concentration present in the water. A 1981 study reported zinc BCF values of 1000 for both aquatic plants and fish. Steady-state bioconcentration factors for twelve saltwater species range from 3,692 to 23,820.

Toxicity

Acute toxicity values are available for 43 species of freshwater animals and data for eight species indicate that acute toxicity decreases as hardness increases. Additional data indicate that toxicity increases as temperature increases. Chronic values for two invertebrates ranges from 46.73 µg/l for *Daphnia magna* to >5,243 µg/l for the caddisfly, *Clistoronia magnificia*. Chronic values for seven fish species ranged from 36.41 µg/l for the flagfish, *Jordanella floridae*, to 854.7 µg/l for the brook trout, *Salvelinus fontinalis* (USEPA 1986).

The sensitivity range of freshwater plants to zinc is greater than that for animals. Growth of the alga, *Selenastrum capricornutum*, was inhibited by 30 µg/l. On the other hand, with several other species of green algae, 4-day EC_{50}s exceeded 200,000 µg/l. Zinc was found to bioaccumulate in freshwater animal tissues from 51 to 1,130 times the concentration present in the water (USEPA 1986).

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302847

APPENDIX 7B-2

TOXICITY DATA USED IN ECOLOGICAL ASSESSMENT

APPENDIX 7B-3

EXPOSURE CALCULATIONS FOR ECOLOGICAL ASSESSMENT

Appendix P-3

Exposure Calculations for the Ecological Risk Assessment

Mallard Exposure Calculations
Li Tungsten Site

Chemical	Concentration in Sediment (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Sediment (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)
Acetone	2.40E-01	NC	2.40E-01	1.29E+01	1.71E-04	NC
4,4'-DDE	5.60E-02	1.60E-03	2.80E-01	3.58E-03	3.98E-05	6.02E-05
4,4'-DDD	1.16E-01	9.10E-03	5.80E-01	7.42E-03	8.24E-05	3.42E-04
Total PCBs	8.75E-01	1.00E-03	5.25E+00	5.25E+00	6.22E-04	3.76E-05
Uranium-238	1.39E-01	1.45E-02	1.39E-01	1.18E-03	9.88E-05	5.45E-04
Radium-226	6.60E-09	4.50E-09	6.60E-09	9.90E-11	4.69E-12	1.69E-10
Radium-228	1.85E-11	8.89E-12	1.85E-11	2.78E-13	1.31E-14	3.34E-13
Thorium-230	1.41E-06	3.12E-08	1.41E-06	1.20E-09	1.00E-09	1.17E-09
Thorium-232	5.18E-02	3.73E-03	5.18E-02	4.40E-05	3.68E-05	1.40E-04
Aluminum	2.06E+04	7.70E+01	2.06E+04	8.24E+01	1.46E+01	2.90E+00
Antimony	8.78E+01	2.26E+00	8.78E+01	1.76E+01	6.24E-02	8.50E-02
Arsenic	2.08E+03	8.09E+00	2.08E+03	8.32E+01	1.48E+00	3.04E-01
Barium	2.71E+02	NC	2.71E+02	4.07E+01	1.93E-01	NC
Beryllium	1.64E+01	5.50E-03	1.64E+01	1.64E-01	1.17E-02	2.07E-04
Cadmium	1.03E+01	8.46E-01	3.81E+01	5.67E+00	7.32E-03	3.18E-02
Chromium	3.94E+02	2.15E-01	3.94E+01	2.96E+00	2.80E-01	8.09E-03
Cobalt	6.90E+03	4.23E+01	6.90E+03	1.38E+02	4.90E+00	1.59E+00
Copper	7.32E+03	1.71E+01	1.46E+04	2.93E+03	5.20E+00	6.43E-01
Iron	7.08E+04	7.22E+02	7.08E+04	2.83E+02	5.03E+01	2.72E+01
Lead	7.09E+03	1.18E+00	6.74E+03	3.19E+02	5.04E+00	4.44E-02
Magnesium	1.41E+04	NC	1.41E+04	1.41E+04	1.00E+01	NC
Manganese	5.35E+03	5.39E+00	5.35E+03	1.34E+03	3.80E+00	2.03E-01
Mercury	2.10E+00	3.60E-03	2.10E+00	1.89E+00	1.49E-03	1.35E-04
Nickel	2.64E+03	2.79E+01	5.28E+03	1.58E+02	1.88E+00	1.05E+00
Selenium	5.15E+02	2.00E-01	4.94E+03	1.29E+01	3.66E-01	7.52E-03
Silver	6.33E+01	2.56E-01	6.33E+01	2.53E+01	4.50E-02	9.63E-03
Vanadium	6.95E+02	2.10E-01	6.95E+02	3.82E+00	4.94E-01	7.90E-03
Zinc	2.65E+03	9.12E+01	1.51E+04	3.98E+03	1.88E+00	3.43E+00
Cyanide	1.00E+00	NC	1.00E+00	1.00E+00	7.11E-04	NC
	Cs = maximum detected conc.	Cw = maximum detected conc. NC = Not a COPC for this medium	Cp = Cs x EUF	Cv = Cs x PUF	EEsed = Cs x FS x IR x FR / BW FS = 2% IR = 0.07 kg/day FR = 0.66 BW = 1.3 kg	EEwater = Cw x FRw x NIRw FRw = 0.66 NIRw = 0.057 g/g-day

302851

Mallard Exposure Calculations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Mallard TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Acetone	5.70E-02	7.64E-01	8.21E-01	NA	NA
4,4'-DDE	6.65E-02	2.13E-04	6.68E-02	2.80E-04	2.39E+02
4,4'-DDD	1.38E-01	4.41E-04	1.39E-01	2.80E-04	4.95E+02
Total PCBs	1.25E+00	3.12E-01	1.56E+00	1.80E-01	8.67E+00
Uranium-238	3.30E-02	7.02E-05	3.37E-02	1.60E+01	2.11E-03
Radium-226	1.57E-09	5.88E-12	1.75E-09	NA	NA
Radium-228	4.40E-12	1.65E-14	4.76E-12	NA	NA
Thorium-230	3.35E-07	7.12E-11	3.37E-07	NA	NA
Thorium-232	1.23E-02	2.62E-06	1.25E-02	NA	NA
Aluminum	4.89E+03	4.89E+00	4.92E+03	1.11E+02	4.41E+01
Antimony	2.09E+01	1.04E+00	2.21E+01	NA	NA
Arsenic	4.94E+02	4.94E+00	5.01E+02	5.14E+00	9.75E+01
Barium	6.44E+01	2.41E+00	6.70E+01	2.09E+01	3.21E+00
Beryllium	3.90E+00	9.74E-03	3.92E+00	NA	NA
Cadmium	9.05E+00	3.37E-01	9.43E+00	1.45E+00	6.50E+00
Chromium	9.36E+00	1.76E-01	9.83E+00	1.00E+00	9.83E+00
Cobalt	1.64E+03	8.20E+00	1.65E+03	NA	NA
Copper	3.48E+03	1.74E+02	3.66E+03	3.32E+01	1.10E+02
Iron	1.68E+04	1.68E+01	1.69E+04	NA	NA
Lead	1.60E+03	1.90E+01	1.62E+03	3.85E+00	4.22E+02
Magnesium	3.35E+03	8.38E+02	4.20E+03	NA	NA
Manganese	1.27E+03	7.94E+01	1.35E+03	9.77E+02	1.39E+00
Mercury	4.99E-01	1.12E-01	6.13E-01	6.40E-03	9.58E+01
Nickel	1.25E+03	9.41E+00	1.27E+03	7.74E+01	1.64E+01
Selenium	1.17E+03	7.65E-01	1.18E+03	5.00E-01	2.35E+03
Silver	1.50E+01	1.50E+00	1.66E+01	NA	NA
Vanadium	1.65E+02	2.27E-01	1.66E+02	1.14E+01	1.46E+01
Zinc	3.59E+03	2.36E+02	3.83E+03	3.00E+00	1.28E+03
Cyanide	2.38E-01	5.94E-02	2.98E-01	NA	NA
	EEprey = Cp x FRp x NIp FRp = 0.66 NIRp = 0.27 g/g-day	EEveg = Cv x FRv x NIRv FRv = 0.66 NIRv = 0.09	EEtotal = EEsed + EEwater + EEprey + EEveg NA = Not Available		HQ = EEtotal / NOAELr

302852

Raccoon Exposure Calculations
Li Tungsten Site

Chemical	Concentration in Sediment (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Sediment (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)
Acetone	2.40E-01	NC	2.40E-01	1.29E+01	1.13E-03	NC
4,4'-DDE	5.60E-02	1.60E-03	2.80E-01	3.58E-03	2.63E-04	1.33E-04
4,4'-DDD	1.16E-01	9.10E-03	5.80E-01	7.42E-03	5.45E-04	7.55E-04
Total PCBs	8.75E-01	1.00E-03	5.25E+00	5.25E+00	4.11E-03	8.30E-05
Uranium-238	1.39E-01	1.45E-02	1.39E-01	1.18E-03	6.53E-04	1.20E-03
Radium-226	6.60E-09	4.50E-09	6.60E-09	9.90E-11	3.10E-11	3.74E-10
Radium-228	1.85E-11	8.89E-12	1.85E-11	2.78E-13	8.70E-14	7.38E-13
Thorium-230	1.41E-06	3.12E-08	1.41E-06	1.20E-09	6.63E-09	2.59E-09
Thorium-232	5.18E-02	3.73E-03	5.18E-02	4.40E-05	2.43E-04	3.10E-04
Aluminum	2.06E+04	7.70E+01	2.06E+04	8.24E+01	9.68E+01	6.39E+00
Antimony	8.78E+01	2.26E+00	8.78E+01	1.76E+01	4.13E-01	1.88E-01
Arsenic	2.08E+03	8.09E+00	2.08E+03	8.32E+01	9.78E+00	6.71E-01
Barium	2.71E+02	NC	2.71E+02	4.07E+01	1.27E+00	NC
Beryllium	1.64E+01	5.50E-03	1.64E+01	1.64E-01	7.71E-02	4.57E-04
Cadmium	1.03E+01	8.46E-01	3.81E+01	5.67E+00	4.84E-02	7.02E-02
Chromium	3.94E+02	2.15E-01	3.94E+01	2.96E+00	1.85E+00	1.78E-02
Cobalt	6.90E+03	4.23E+01	6.90E+03	1.38E+02	3.24E+01	3.51E+00
Copper	7.32E+03	1.71E+01	1.46E+04	2.93E+03	3.44E+01	1.42E+00
Iron	7.08E+04	7.22E+02	7.08E+04	2.83E+02	3.33E+02	5.99E+01
Lead	7.09E+03	1.18E+00	6.74E+03	3.19E+02	3.33E+01	9.79E-02
Magnesium	1.41E+04	NC	1.41E+04	1.41E+04	6.63E+01	NC
Manganese	5.35E+03	5.39E+00	5.35E+03	1.34E+03	2.51E+01	4.47E-01
Mercury	2.10E+00	3.60E-03	2.10E+00	1.89E+00	9.87E-03	2.99E-04
Nickel	2.64E+03	2.79E+01	5.28E+03	1.58E+02	1.24E+01	2.32E+00
Selenium	5.15E+02	2.00E-01	4.94E+03	1.29E+01	2.42E+00	1.66E-02
Silver	6.33E+01	2.56E-01	6.33E+01	2.53E+01	2.98E-01	2.12E-02
Vanadium	6.95E+02	2.10E-01	6.95E+02	3.82E+00	3.27E+00	1.74E-02
Zinc	2.65E+03	9.12E+01	1.51E+04	3.98E+03	1.25E+01	7.57E+00
Cyanide	1.00E+00	NC	1.00E+00	1.00E+00	4.70E-03	NC
	Cs = maximum detected conc.	Cw = maximum detected conc. NC = Not a COPC for this medium	Cp = Cs x EUF	Cv = Cs x PUF	EEsed = Cs x FS x IR x FR / BW FS = 9.4% IR = 0.29 kg/day FR = 1 BW = 5.8 kg	EEwater = Cw x FRw x NIRw FRw = 1 NIRw = 0.083 g/g-day

302853

Raccoon Exposure Calculations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Raccoon TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Acetone	3.84E-02	2.06E+00	2.10E+00	4.29E+00	4.89E-01
4,4'-DDE	4.48E-02	5.73E-04	4.58E-02	3.40E-01	1.35E-01
4,4'-DDD	9.28E-02	1.19E-03	9.53E-02	3.40E-01	2.80E-01
Total PCBs	8.40E-01	8.40E-01	1.68E+00	2.60E-03	6.48E+02
Uranium-238	2.22E-02	1.89E-04	2.43E-02	7.90E-01	3.07E-02
Radium-226	1.06E-09	1.58E-11	1.48E-09	NA	NA
Radium-228	2.96E-12	4.44E-14	3.83E-12	NA	NA
Thorium-230	2.26E-07	1.92E-10	2.35E-07	9.01E+00	2.61E-08
Thorium-232	8.29E-03	7.04E-06	8.85E-03	9.01E+00	9.82E-04
Aluminum	3.30E+03	1.32E+01	3.41E+03	4.90E-01	6.96E+03
Antimony	1.40E+01	2.81E+00	1.75E+01	3.00E-02	5.82E+02
Arsenic	3.33E+02	1.33E+01	3.57E+02	3.00E-02	1.19E+04
Barium	4.34E+01	6.50E+00	5.11E+01	2.17E+00	2.36E+01
Beryllium	2.62E+00	2.62E-02	2.73E+00	2.80E-01	9.74E+00
Cadmium	6.10E+00	9.06E-01	7.12E+00	5.00E-02	1.42E+02
Chromium	6.30E+00	4.73E-01	8.65E+00	1.18E+03	7.36E-03
Cobalt	1.10E+03	2.21E+01	1.16E+03	1.29E+01	9.02E+01
Copper	2.34E+03	4.68E+02	2.85E+03	7.54E+00	3.78E+02
Iron	1.13E+04	4.53E+01	1.18E+04	7.73E+00	1.52E+03
Lead	1.08E+03	5.10E+01	1.16E+03	3.44E+00	3.38E+02
Magnesium	2.26E+03	2.26E+03	4.58E+03	2.40E+01	1.91E+02
Manganese	8.56E+02	2.14E+02	1.10E+03	3.78E+01	2.90E+01
Mercury	3.36E-01	3.02E-01	6.49E-01	3.38E+00	1.92E-01
Nickel	8.45E+02	2.53E+01	8.85E+02	1.72E+01	5.14E+01
Selenium	7.91E+02	2.06E+00	7.96E+02	2.00E-02	3.98E+04
Silver	1.01E+01	4.05E+00	1.45E+01	5.10E-01	2.84E+01
Vanadium	1.11E+02	6.12E-01	1.15E+02	9.00E-02	1.28E+03
Zinc	2.42E+03	6.36E+02	3.07E+03	6.87E+01	4.47E+01
Cyanide	1.60E-01	1.60E-01	3.25E-01	2.95E+01	1.10E-02
	EEprey = Cp x FRp x NIRp FRp = 1 NIRp = 0.16 g/g-day	EEveg = Cv x FRv x NIRv FRv = 1 NIRv = 0.16 g/g-day	EEtotal = EEsed + EEwater + EEprey + EEveg		HQ = EEtotal / NOAEL

302854

American Robin Exposure Calculations
Li Tungsten Site

Chemical	Concentration in Soil (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)
Acetone	1.90E-01	NC	1.90E-01	1.02E+01	1.79E-03	NC
Benzene	4.00E-03	NC	4.00E-03	9.20E-03	3.78E-05	NC
2-Butanone	5.20E-02	NC	5.20E-02	1.37E+00	4.91E-04	NC
2-Hexanone	4.50E-02	NC	4.50E-02	2.79E-01	4.25E-04	NC
Methylene Chloride	2.20E-02	NC	2.20E-02	1.61E-01	2.08E-04	NC
4-Methyl-2-pentanone	2.90E-02	NC	2.90E-02	2.35E-01	2.74E-04	NC
Tetrachlorethene	3.90E-02	NC	3.90E-02	4.29E-02	3.68E-04	NC
Acenaphthene	6.40E-01	NC	1.54E-01	1.34E-01	6.04E-03	NC
Anthracene	7.00E-01	NC	1.75E-01	6.30E-02	6.61E-03	NC
Benzo(a)anthracene	3.10E+00	NC	1.18E+00	6.20E-02	2.93E-02	NC
Benzo(b)fluoranthene	1.00E+01	NC	9.60E+00	1.20E-01	9.44E-02	NC
Benzo(k)fluoranthene	1.50E+00	NC	1.40E+00	1.80E-02	1.42E-02	NC
Benzo(g,h,i)perylene	4.70E+00	NC	1.72E+00	9.40E-03	4.44E-02	NC
Benzo(a)pyrene	3.90E+00	NC	3.35E+00	4.68E-02	3.68E-02	NC
bis(2-ethylhexyl)phthalate	1.60E+01	4.00E-03	1.60E+01	3.20E-02	1.51E-01	3.70E-04
Carbazole	1.00E+00	NC	1.00E+00	4.80E-01	9.44E-03	NC
Chrysene	4.00E+00	NC	1.48E+00	4.80E-02	3.78E-02	NC
Dibenz(a,h)anthracene	1.30E+00	NC	4.94E-01	1.04E-02	1.23E-02	NC
Dibenzofuran	8.30E-01	NC	8.30E-01	1.33E-01	7.83E-03	NC
Fluoranthene	1.00E+01	NC	3.20E+00	4.00E-01	9.44E-02	NC
Fluorene	5.70E-01	NC	5.70E-01	7.98E-02	5.38E-03	NC
Indeno(1,2,3-cd)pyrene	3.80E+00	NC	2.85E+00	4.56E-02	3.59E-02	NC
2-Methylnaphthalene	6.10E-01	NC	6.10E-01	1.16E-01	5.76E-03	NC
Naphthalene	1.90E-01	NC	1.90E-01	8.36E-02	1.79E-03	NC
Phenanthrene	3.80E+00	NC	1.10E+00	3.42E-01	3.59E-02	NC
Pyrene	7.30E+00	NC	5.40E+00	2.92E-01	6.89E-02	NC
Endrin	7.00E-02	NC	6.30E-01	1.40E-03	6.61E-04	NC
Total PCBs	1.59E+01	1.00E-03	9.53E+01	1.75E-01	1.50E-01	9.24E-05
Uranium-238	1.42E+00	1.45E-02	1.42E+00	1.21E-02	1.34E-02	1.34E-03
Radium-226	2.50E-07	4.50E-09	2.50E-07	3.75E-09	2.36E-09	4.16E-10
Radium-228	1.96E-09	8.89E-12	1.96E-09	2.94E-11	1.85E-11	8.21E-13
Thorium-230	1.51E-05	3.12E-08	1.51E-05	1.28E-08	1.43E-07	2.88E-09
Thorium-232	2.00E+00	3.73E-03	2.00E+00	1.70E-03	1.89E-02	3.45E-04

302855

American Robin Exposure Calculations
Li Tungsten Site

Chemical	Concentration in Soil (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)
Aluminum	5.66E+04	7.70E+01	5.66E+04	2.26E+02	5.34E+02	7.11E+00
Antimony	5.61E+03	2.26E+00	5.61E+03	1.12E+03	5.29E+01	2.09E-01
Arsenic	6.30E+03	8.09E+00	6.30E+03	2.52E+02	5.95E+01	7.48E-01
Barium	6.40E+03	NC	6.40E+03	9.60E+02	6.04E+01	NC
Beryllium	1.10E+01	5.50E-03	1.10E+01	1.10E-01	1.04E-01	5.08E-04
Cadmium	2.39E+01	8.46E-01	8.84E+01	1.31E+01	2.26E-01	7.82E-02
Chromium	1.62E+03	2.15E-01	1.62E+02	1.22E+01	1.53E+01	1.99E-02
Cobalt	4.66E+03	4.23E+01	4.66E+03	9.32E+01	4.40E+01	3.91E+00
Copper	4.61E+03	1.71E+01	9.22E+03	1.84E+03	4.35E+01	1.58E+00
Iron	3.13E+04	7.22E+02	3.13E+04	1.25E+02	2.95E+02	6.67E+01
Lead	1.96E+04	1.18E+00	1.86E+04	8.82E+02	1.85E+02	1.09E-01
Magnesium	9.40E+04	NC	9.40E+04	9.40E+04	8.87E+02	NC
Manganese	9.00E+04	5.39E+00	9.00E+04	2.25E+04	8.49E+02	4.98E-01
Mercury	8.40E+00	3.60E-03	8.40E+00	7.56E+00	7.93E-02	3.33E-04
Nickel	2.89E+04	2.79E+01	5.78E+04	1.73E+03	2.73E+02	2.58E+00
Selenium	2.62E+02	2.00E-01	2.52E+03	6.55E+00	2.47E+00	1.85E-02
Silver	1.14E+02	2.56E-01	1.14E+02	4.56E+01	1.08E+00	2.37E-02
Thallium	2.27E+01	NC	2.27E+01	9.08E-02	2.14E-01	NC
Vanadium	1.65E+02	2.10E-01	1.65E+02	9.08E-01	1.56E+00	1.94E-02
Zinc	2.90E+03	9.12E+01	1.65E+04	4.35E+03	2.74E+01	8.43E+00
Cyanide	2.30E+00	0.00E+00	2.30E+00	2.30E+00	2.17E-02	0.00E+00
	Cs = maximum detected conc.	Cw = maximum detected conc. NC = Not a COPC for this medium	Cp = Cs x EUF	Cv = Cs x PUF	EEsoil = Cs x FS x IR x FR / FS = 10.4% IR = 0.011 kg/day FR = 0.66 BW = 0.08 kg	EEwater = Cw x FRw x NIR FRw = 0.66 NIRw = 0.14 g/g-day

302856

American Robin Exposure Calculations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Robin TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Acetone	5.64E-02	5.11E+00	5.17E+00	NA	NA
Benzene	1.19E-03	4.61E-03	5.84E-03	NA	NA
2-Butanone	1.54E-02	6.89E-01	7.05E-01	NA	NA
2-Hexanone	1.34E-02	1.40E-01	1.54E-01	NA	NA
Methylene Chloride	6.53E-03	8.06E-02	8.73E-02	NA	NA
4-Methyl-2-pentanone	8.61E-03	1.18E-01	1.27E-01	NA	NA
Tetrachlorethene	1.16E-02	2.15E-02	3.35E-02	NA	NA
Acenaphthene	4.56E-02	6.74E-02	1.19E-01	NA	NA
Anthracene	5.20E-02	3.16E-02	9.02E-02	NA	NA
Benzo(a)anthracene	3.50E-01	3.11E-02	4.10E-01	NA	NA
Benzo(b)fluoranthene	2.85E+00	6.02E-02	3.01E+00	NA	NA
Benzo(k)fluoranthene	4.14E-01	9.03E-03	4.38E-01	NA	NA
Benzo(g,h,i)perylene	5.10E-01	4.72E-03	5.59E-01	NA	NA
Benzo(a)pyrene	9.96E-01	2.35E-02	1.06E+00	NA	NA
bis(2-ethylhexyl)phthalate	4.75E+00	1.61E-02	4.92E+00	NA	NA
Carbazole	2.97E-01	2.41E-01	5.47E-01	NA	NA
Chrysene	4.40E-01	2.41E-02	5.01E-01	NA	NA
Dibenz(a,h)anthracene	1.47E-01	5.22E-03	1.64E-01	NA	NA
Dibenzofuran	2.47E-01	6.66E-02	3.21E-01	NA	NA
Fluoranthene	9.50E-01	2.01E-01	1.25E+00	NA	NA
Fluorene	1.69E-01	4.00E-02	2.15E-01	NA	NA
Indeno(1,2,3-cd)pyrene	8.46E-01	2.29E-02	9.05E-01	NA	NA
2-Methylnaphthalene	1.81E-01	5.81E-02	2.45E-01	NA	NA
Naphthalene	5.64E-02	4.19E-02	1.00E-01	NA	NA
Phenanthrene	3.27E-01	1.72E-01	5.35E-01	NA	NA
Pyrene	1.60E+00	1.46E-01	1.82E+00	NA	NA
Endrin	1.87E-01	7.02E-04	1.88E-01	3.00E-01	6.28E-01
Total PCBs	2.83E+01	8.77E-02	2.86E+01	1.80E-01	1.59E+02
Uranium-238	4.22E-01	6.05E-03	4.43E-01	1.60E+01	2.77E-02
Radium-226	7.43E-08	1.88E-09	7.89E-08	NA	NA
Radium-228	5.82E-10	1.47E-11	6.16E-10	NA	NA
Thorium-230	4.48E-06	6.44E-09	4.64E-06	NA	NA
Thorium-232	5.94E-01	8.53E-04	6.14E-01	NA	NA

302857

American Robin Exposure Calculations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Robin TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Aluminum	1.68E+04	1.14E+02	1.75E+04	1.11E+02	1.57E+02
Antimony	1.67E+03	5.63E+02	2.28E+03	NA	NA
Arsenic	1.87E+03	1.26E+02	2.06E+03	5.14E+00	4.00E+02
Barium	1.90E+03	4.82E+02	2.44E+03	2.09E+01	1.17E+02
Beryllium	3.27E+00	5.52E-02	3.43E+00	NA	NA
Cadmium	2.63E+01	6.59E+00	3.32E+01	1.45E+00	2.29E+01
Chromium	4.81E+01	6.09E+00	6.95E+01	1.00E+00	6.95E+01
Cobalt	1.38E+03	4.67E+01	1.48E+03	NA	NA
Copper	2.74E+03	9.25E+02	3.71E+03	3.32E+01	1.12E+02
Iron	9.30E+03	6.28E+01	9.72E+03	NA	NA
Lead	5.53E+03	4.42E+02	6.16E+03	3.85E+00	1.60E+03
Magnesium	2.79E+04	4.72E+04	7.60E+04	NA	NA
Manganese	2.67E+04	1.13E+04	3.89E+04	9.77E+02	3.98E+01
Mercury	2.49E+00	3.79E+00	6.37E+00	6.40E-03	9.95E+02
Nickel	1.72E+04	8.70E+02	1.83E+04	7.74E+01	2.37E+02
Selenium	7.47E+02	3.29E+00	7.53E+02	5.00E-01	1.51E+03
Silver	3.39E+01	2.29E+01	5.78E+01	NA	NA
Thallium	6.74E+00	4.55E-02	7.00E+00	NA	NA
Vanadium	4.90E+01	4.55E-01	5.10E+01	1.14E+01	4.48E+00
Zinc	4.91E+03	2.18E+03	7.13E+03	3.00E+00	2.38E+03
Cyanide	6.83E-01	1.15E+00	1.86E+00	NA	NA
	EEprey = Cp x FRp x NIp FRp = 0.66 NIRp = 0.45 g/g-day	EEveg = Cv x FRv x NIRv FRv = 0.66 NIRv = 0.76	EEtotal = EEsoil + EEwater + EEprey + EEveg	NA = Not Available	HQ = EEtotal / NOAEL

302858

Deer Mouse Exposure Calculations
Li Tungsten Site

Chemical	Concentration in Soil (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)
Acetone	1.90E-01	NC	1.90E-01	1.02E+01	5.70E-04	NC
Benzene	4.00E-03	NC	4.00E-03	9.20E-03	1.20E-05	NC
2-Butanone	5.20E-02	NC	5.20E-02	1.37E+00	1.56E-04	NC
2-Hexanone	4.50E-02	NC	4.50E-02	2.79E-01	1.35E-04	NC
Methylene Chloride	2.20E-02	NC	2.20E-02	1.61E-01	6.60E-05	NC
4-Methyl-2-pentanone	2.90E-02	NC	2.90E-02	2.35E-01	8.70E-05	NC
Tetrachlorethene	3.90E-02	NC	3.90E-02	4.29E-02	1.17E-04	NC
Acenaphthene	6.40E-01	NC	1.54E-01	1.34E-01	1.92E-03	NC
Anthracene	7.00E-01	NC	1.75E-01	6.30E-02	2.10E-03	NC
Benzo(a)anthracene	3.10E+00	NC	1.18E+00	6.20E-02	9.30E-03	NC
Benzo(b)fluoranthene	1.00E+01	NC	9.60E+00	1.20E-01	3.00E-02	NC
Benzo(k)fluoranthene	1.50E+00	NC	1.40E+00	1.80E-02	4.50E-03	NC
Benzo(g,h,i)perylene	4.70E+00	NC	1.72E+00	9.40E-03	1.41E-02	NC
Benzo(a)pyrene	3.90E+00	NC	3.35E+00	4.68E-02	1.17E-02	NC
bis(2-ethylhexyl)phthalate	1.60E+01	4.00E-03	1.60E+01	3.20E-02	4.80E-02	7.60E-04
Carbazole	1.00E+00	NC	1.00E+00	4.80E-01	3.00E-03	NC
Chrysene	4.00E+00	NC	1.48E+00	4.80E-02	1.20E-02	NC
Dibenz(a,h)anthracene	1.30E+00	NC	4.94E-01	1.04E-02	3.90E-03	NC
Dibenzofuran	8.30E-01	NC	8.30E-01	1.33E-01	2.49E-03	NC
Fluoranthene	1.00E+01	NC	3.20E+00	4.00E-01	3.00E-02	NC
Fluorene	5.70E-01	NC	5.70E-01	7.98E-02	1.71E-03	NC
Indeno(1,2,3-cd)pyrene	3.80E+00	NC	2.85E+00	4.56E-02	1.14E-02	NC
2-Methylnaphthalene	6.10E-01	NC	6.10E-01	1.16E-01	1.83E-03	NC
Naphthalene	1.90E-01	NC	1.90E-01	8.36E-02	5.70E-04	NC
Phenanthrene	3.80E+00	NC	1.10E+00	3.42E-01	1.14E-02	NC
Pyrene	7.30E+00	NC	5.40E+00	2.92E-01	2.19E-02	NC
Endrin	7.00E-02	NC	6.30E-01	1.40E-03	2.10E-04	NC
Total PCBs	1.59E+01	1.00E-03	9.53E+01	1.75E-01	4.77E-02	1.90E-04
Uranium-238	1.42E+00	1.45E-02	1.42E+00	1.21E-02	4.26E-03	2.76E-03
Radium-226	2.50E-07	4.50E-09	2.50E-07	3.75E-09	7.50E-10	8.55E-10
Radium-228	1.96E-09	8.89E-12	1.96E-09	2.94E-11	5.88E-12	1.69E-12
Thorium-230	1.51E-05	3.12E-08	1.51E-05	1.28E-08	4.53E-08	5.93E-09
Thorium-232	2.00E+00	3.73E-03	2.00E+00	1.70E-03	6.00E-03	7.09E-04

302859

Deer Mouse Exposure Calculations
Li Tungsten Site

Chemical	Concentration in Soil (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)
Aluminum	5.66E+04	7.70E+01	5.66E+04	2.26E+02	1.70E+02	1.46E+01
Antimony	5.61E+03	2.26E+00	5.61E+03	1.12E+03	1.68E+01	4.29E-01
Arsenic	6.30E+03	8.09E+00	6.30E+03	2.52E+02	1.89E+01	1.54E+00
Barium	6.40E+03	NC	6.40E+03	9.60E+02	1.92E+01	NC
Beryllium	1.10E+01	5.50E-03	1.10E+01	1.10E-01	3.30E-02	1.05E-03
Cadmium	2.39E+01	8.46E-01	8.84E+01	1.31E+01	7.17E-02	1.61E-01
Chromium	1.62E+03	2.15E-01	1.62E+02	1.22E+01	4.86E+00	4.09E-02
Cobalt	4.66E+03	4.23E+01	4.66E+03	9.32E+01	1.40E+01	8.04E+00
Copper	4.61E+03	1.71E+01	9.22E+03	1.84E+03	1.38E+01	3.25E+00
Iron	3.13E+04	7.22E+02	3.13E+04	1.25E+02	9.39E+01	1.37E+02
Lead	1.96E+04	1.18E+00	1.86E+04	8.82E+02	5.88E+01	2.24E-01
Magnesium	9.40E+04	NC	9.40E+04	9.40E+04	2.82E+02	NC
Manganese	9.00E+04	5.39E+00	9.00E+04	2.25E+04	2.70E+02	1.02E+00
Mercury	8.40E+00	3.60E-03	8.40E+00	7.56E+00	2.52E-02	6.84E-04
Nickel	2.89E+04	2.79E+01	5.78E+04	1.73E+03	8.67E+01	5.30E+00
Selenium	2.62E+02	2.00E-01	2.52E+03	6.55E+00	7.86E-01	3.80E-02
Silver	1.14E+02	2.56E-01	1.14E+02	4.56E+01	3.42E-01	4.86E-02
Thallium	2.27E+01	NC	2.27E+01	9.08E-02	6.81E-02	NC
Vanadium	1.65E+02	2.10E-01	1.65E+02	9.08E-01	4.95E-01	3.99E-02
Zinc	2.90E+03	9.12E+01	1.65E+04	4.35E+03	8.70E+00	1.73E+01
Cyanide	2.30E+00	0.00E+00	2.30E+00	2.30E+00	6.90E-03	0.00E+00
	Cs = maximum detected conc.	Cw = maximum detected conc. NC = Not a COPC for this medium	Cp = Cs x EUF	Cv = Cs x PUF	EEsoil = Cs x FS x IR x FR / BW FS = 2% IR = 0.003 kg/day FR = 1 BW = 0.02 kg	EEwater = Cw x FRw x NIRw FRw = 1 NIRw = 0.19 g/g-day

302860

Deer Mouse Exposure Calculations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Mouse TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Acetone	2.85E-02	1.22E+00	1.25E+00	1.78E+01	7.03E-02
Benzene	6.00E-04	1.10E-03	1.72E-03	2.79E+01	6.15E-05
2-Butanone	7.80E-03	1.65E-01	1.73E-01	3.15E+03	5.48E-05
2-Hexanone	6.75E-03	3.35E-02	4.04E-02	2.57E+03	1.57E-05
Methylene Chloride	3.30E-03	1.93E-02	2.26E-02	1.04E+01	2.18E-03
4-Methyl-2-pentanone	4.35E-03	2.82E-02	3.26E-02	4.45E+01	7.33E-04
Tetrachlorethene	5.85E-03	5.15E-03	1.11E-02	1.48E+00	7.51E-03
Acenaphthene	2.30E-02	1.61E-02	4.11E-02	1.06E+00	3.88E-02
Anthracene	2.63E-02	7.56E-03	3.59E-02	1.06E+00	3.39E-02
Benzo(a)anthracene	1.77E-01	7.44E-03	1.93E-01	1.06E+00	1.82E-01
Benzo(b)fluoranthene	1.44E+00	1.44E-02	1.48E+00	1.06E+00	1.40E+00
Benzo(k)fluoranthene	2.09E-01	2.16E-03	2.16E-01	1.06E+00	2.04E-01
Benzo(g,h,i)perylene	2.57E-01	1.13E-03	2.73E-01	1.06E+00	2.57E-01
Benzo(a)pyrene	5.03E-01	5.62E-03	5.20E-01	1.06E+00	4.91E-01
bis(2-ethylhexyl)phthalate	2.40E+00	3.84E-03	2.45E+00	1.93E+01	1.27E-01
Carbazole	1.50E-01	5.76E-02	2.11E-01	NA	NA
Chrysene	2.22E-01	5.76E-03	2.40E-01	1.06E+00	2.26E-01
Dibenz(a,h)anthracene	7.41E-02	1.25E-03	7.92E-02	1.06E+00	7.48E-02
Dibenzofuran	1.25E-01	1.59E-02	1.43E-01	NA	NA
Fluoranthene	4.80E-01	4.80E-02	5.58E-01	1.06E+00	5.26E-01
Fluorene	8.55E-02	9.58E-03	9.68E-02	1.06E+00	9.13E-02
Indeno(1,2,3-cd)pyrene	4.28E-01	5.47E-03	4.44E-01	1.06E+00	4.19E-01
2-Methylnaphthalene	9.15E-02	1.39E-02	1.07E-01	1.06E+00	1.01E-01
Naphthalene	2.85E-02	1.00E-02	3.91E-02	1.06E+00	3.69E-02
Phenanthrene	1.65E-01	4.10E-02	2.18E-01	1.06E+00	2.05E-01
Pyrene	8.10E-01	3.50E-02	8.67E-01	1.06E+00	8.18E-01
Endrin	9.45E-02	1.68E-04	9.49E-02	1.00E-01	9.49E-01
Total PCBs	1.43E+01	2.10E-02	1.44E+01	1.00E-02	1.44E+03
Uranium-238	2.13E-01	1.45E-03	2.21E-01	3.25E+00	6.81E-02
Radium-226	3.75E-08	4.50E-10	3.96E-08	NA	NA
Radium-228	2.94E-10	3.53E-12	3.05E-10	NA	NA
Thorium-230	2.27E-06	1.54E-09	2.32E-06	3.72E+01	6.23E-08
Thorium-232	3.00E-01	2.04E-04	3.07E-01	3.72E+01	8.25E-03

302861

Deer Mouse Exposure Calculations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Mouse TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Aluminum	8.49E+03	2.72E+01	8.70E+03	2.04E+00	4.27E+03
Antimony	8.42E+02	1.35E+02	9.93E+02	1.30E-01	7.64E+03
Arsenic	9.45E+02	3.02E+01	9.96E+02	1.30E-01	7.66E+03
Barium	9.60E+02	1.15E+02	1.09E+03	9.00E+00	1.22E+02
Beryllium	1.65E+00	1.32E-02	1.70E+00	1.17E+00	1.45E+00
Cadmium	1.33E+01	1.58E+00	1.51E+01	2.00E-01	7.54E+01
Chromium	2.43E+01	1.46E+00	3.07E+01	4.87E+03	6.30E-03
Cobalt	6.99E+02	1.12E+01	7.32E+02	5.33E+01	1.37E+01
Copper	1.38E+03	2.21E+02	1.62E+03	3.11E+01	5.21E+01
Iron	4.70E+03	1.50E+01	4.94E+03	3.20E+01	1.54E+02
Lead	2.79E+03	1.06E+02	2.96E+03	1.42E+01	2.08E+02
Magnesium	1.41E+04	1.13E+04	2.57E+04	1.00E+02	2.57E+02
Manganese	1.35E+04	2.70E+03	1.65E+04	1.56E+02	1.06E+02
Mercury	1.26E+00	9.07E-01	2.19E+00	1.40E+01	1.57E-01
Nickel	8.67E+03	2.08E+02	8.97E+03	7.11E+01	1.26E+02
Selenium	3.77E+02	7.86E-01	3.79E+02	8.00E-02	4.74E+03
Silver	1.71E+01	5.47E+00	2.30E+01	2.11E+00	1.09E+01
Thallium	3.41E+00	1.09E-02	3.48E+00	1.30E-02	2.68E+02
Vanadium	2.48E+01	1.09E-01	2.54E+01	3.70E-01	6.86E+01
Zinc	2.48E+03	5.22E+02	3.03E+03	2.85E+02	1.06E+01
Cyanide	3.45E-01	2.76E-01	6.28E-01	1.22E+02	5.15E-03
	EEprey = Cp x FRp x NIp FRp = 1 NIRp = 0.15 g/g-day	EEveg = Cv x FRv x NIRv FRv = 1 NIRv = 0.12	EEtotal = EEsoil + EEwater + EEprey + EEveg	NA = Not Available	HQ = EEtotal / NOAELr

302862

Red Fox Exposure Calculations
Li Tungsten Site

Chemical	Concentration in Soil (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)
Acetone	1.90E-01	NC	1.90E-01	1.02E+01	2.84E-04	NC
Benzene	4.00E-03	NC	4.00E-03	9.20E-03	5.97E-06	NC
2-Butanone	5.20E-02	NC	5.20E-02	1.37E+00	7.77E-05	NC
2-Hexanone	4.50E-02	NC	4.50E-02	2.79E-01	6.72E-05	NC
Methylene Chloride	2.20E-02	NC	2.20E-02	1.61E-01	3.29E-05	NC
4-Methyl-2-pentanone	2.90E-02	NC	2.90E-02	2.35E-01	4.33E-05	NC
Tetrachlorethene	3.90E-02	NC	3.90E-02	4.29E-02	5.82E-05	NC
Acenaphthene	6.40E-01	NC	1.54E-01	1.34E-01	9.56E-04	NC
Anthracene	7.00E-01	NC	1.75E-01	6.30E-02	1.05E-03	NC
Benzo(a)anthracene	3.10E+00	NC	1.18E+00	6.20E-02	4.63E-03	NC
Benzo(b)fluoranthene	1.00E+01	NC	9.60E+00	1.20E-01	1.49E-02	NC
Benzo(k)fluoranthene	1.50E+00	NC	1.40E+00	1.80E-02	2.24E-03	NC
Benzo(g,h,i)perylene	4.70E+00	NC	1.72E+00	9.40E-03	7.02E-03	NC
Benzo(a)pyrene	3.90E+00	NC	3.35E+00	4.68E-02	5.82E-03	NC
bis(2-ethylhexyl)phthalate	1.60E+01	4.00E-03	1.60E+01	3.20E-02	2.39E-02	3.40E-04
Carbazole	1.00E+00	NC	1.00E+00	4.80E-01	1.49E-03	NC
Chrysene	4.00E+00	NC	1.48E+00	4.80E-02	5.97E-03	NC
Dibenz(a,h)anthracene	1.30E+00	NC	4.94E-01	1.04E-02	1.94E-03	NC
Dibenzofuran	8.30E-01	NC	8.30E-01	1.33E-01	1.24E-03	NC
Fluoranthene	1.00E+01	NC	3.20E+00	4.00E-01	1.49E-02	NC
Fluorene	5.70E-01	NC	5.70E-01	7.98E-02	8.51E-04	NC
Indeno(1,2,3-cd)pyrene	3.80E+00	NC	2.85E+00	4.56E-02	5.67E-03	NC
2-Methylnaphthalene	6.10E-01	NC	6.10E-01	1.16E-01	9.11E-04	NC
Naphthalene	1.90E-01	NC	1.90E-01	8.36E-02	2.84E-04	NC
Phenanthrene	3.80E+00	NC	1.10E+00	3.42E-01	5.67E-03	NC
Pyrene	7.30E+00	NC	5.40E+00	2.92E-01	1.09E-02	NC
Endrin	7.00E-02	NC	6.30E-01	1.40E-03	1.05E-04	NC
Total PCBs	1.59E+01	1.00E-03	9.53E+01	1.75E-01	2.37E-02	8.50E-05
Uranium-238	1.42E+00	1.45E-02	1.42E+00	1.21E-02	2.12E-03	1.23E-03
Radium-226	2.50E-07	4.50E-09	2.50E-07	3.75E-09	3.73E-10	3.83E-10
Radium-228	1.96E-09	8.89E-12	1.96E-09	2.94E-11	2.93E-12	7.56E-13
Thorium-230	1.51E-05	3.12E-08	1.51E-05	1.28E-08	2.25E-08	2.65E-09
Thorium-232	2.00E+00	3.73E-03	2.00E+00	1.70E-03	2.99E-03	3.17E-04

302863

Red Fox Exposure Calculations
Li Tungsten Site

Chemical	Concentration in Soil (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)
Aluminum	5.66E+04	7.70E+01	5.66E+04	2.26E+02	8.45E+01	6.55E+00
Antimony	5.61E+03	2.26E+00	5.61E+03	1.12E+03	8.38E+00	1.92E-01
Arsenic	6.30E+03	8.09E+00	6.30E+03	2.52E+02	9.41E+00	6.88E-01
Barium	6.40E+03	NC	6.40E+03	9.60E+02	9.56E+00	NC
Beryllium	1.10E+01	5.50E-03	1.10E+01	1.10E-01	1.64E-02	4.68E-04
Cadmium	2.39E+01	8.46E-01	8.84E+01	1.31E+01	3.57E-02	7.19E-02
Chromium	1.62E+03	2.15E-01	1.62E+02	1.22E+01	2.42E+00	1.83E-02
Cobalt	4.66E+03	4.23E+01	4.66E+03	9.32E+01	6.96E+00	3.60E+00
Copper	4.61E+03	1.71E+01	9.22E+03	1.84E+03	6.88E+00	1.45E+00
Iron	3.13E+04	7.22E+02	3.13E+04	1.25E+02	4.67E+01	6.14E+01
Lead	1.96E+04	1.18E+00	1.86E+04	8.82E+02	2.93E+01	1.00E-01
Magnesium	9.40E+04	NC	9.40E+04	9.40E+04	1.40E+02	NC
Manganese	9.00E+04	5.39E+00	9.00E+04	2.25E+04	1.34E+02	4.58E-01
Mercury	8.40E+00	3.60E-03	8.40E+00	7.56E+00	1.25E-02	3.06E-04
Nickel	2.89E+04	2.79E+01	5.78E+04	1.73E+03	4.32E+01	2.37E+00
Selenium	2.62E+02	2.00E-01	2.52E+03	6.55E+00	3.91E-01	1.70E-02
Silver	1.14E+02	2.56E-01	1.14E+02	4.56E+01	1.70E-01	2.18E-02
Thallium	2.27E+01	NC	2.27E+01	9.08E-02	3.39E-02	NC
Vanadium	1.65E+02	2.10E-01	1.65E+02	9.08E-01	2.46E-01	1.79E-02
Zinc	2.90E+03	9.12E+01	1.65E+04	4.35E+03	4.33E+00	7.75E+00
Cyanide	2.30E+00	0.00E+00	2.30E+00	2.30E+00	3.43E-03	0.00E+00
	Cs = maximum detected conc.	Cw = maximum detected conc. NC = Not a COPC for this medium	Cp = Cs x EUF	Cv = Cs x PUF	EEsoil = Cs x FS x IR x FR / BW FS = 2.8% IR = 0.24 kg/day FR = 1 BW = 4.5 kg	EEwater = Cw x FRw x NIRw FRw = 1 NIRw = 0.085 g/g-day

302864

Red Fox Exposure Calculations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Red Fox TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Acetone	1.41E-02	5.70E-02	7.15E-02	4.58E+00	1.56E-02
Benzene	2.98E-04	5.15E-05	3.55E-04	7.34E+00	4.84E-05
2-Butanone	3.87E-03	7.69E-03	1.16E-02	8.11E+02	1.43E-05
2-Hexanone	3.35E-03	1.56E-03	4.98E-03	6.76E+02	7.36E-06
Methylene Chloride	1.64E-03	8.99E-04	2.57E-03	2.68E+00	9.59E-04
4-Methyl-2-pentanone	2.16E-03	1.32E-03	3.52E-03	1.15E+01	3.07E-04
Tetrachlorethene	2.90E-03	2.40E-04	3.20E-03	3.90E-01	8.21E-03
Acenaphthene	1.14E-02	7.53E-04	1.31E-02	2.80E-01	4.69E-02
Anthracene	1.30E-02	3.53E-04	1.44E-02	2.80E-01	5.15E-02
Benzo(a)anthracene	8.76E-02	3.47E-04	9.26E-02	2.80E-01	3.31E-01
Benzo(b)fluoranthene	7.14E-01	6.72E-04	7.30E-01	2.80E-01	2.61E+00
Benzo(k)fluoranthene	1.04E-01	1.01E-04	1.06E-01	2.80E-01	3.79E-01
Benzo(g,h,i)perylene	1.28E-01	5.26E-05	1.35E-01	2.80E-01	4.81E-01
Benzo(a)pyrene	2.50E-01	2.62E-04	2.56E-01	2.80E-01	9.13E-01
bis(2-ethylhexyl)phthalate	1.19E+00	1.79E-04	1.21E+00	5.09E+00	2.39E-01
Carbazole	7.44E-02	2.69E-03	7.86E-02	NA	NA
Chrysene	1.10E-01	2.69E-04	1.16E-01	2.80E-01	4.16E-01
Dibenz(a,h)anthracene	3.68E-02	5.82E-05	3.88E-02	2.80E-01	1.38E-01
Dibenzofuran	6.18E-02	7.44E-04	6.37E-02	NA	NA
Fluoranthene	2.38E-01	2.24E-03	2.55E-01	2.80E-01	9.12E-01
Fluorene	4.24E-02	4.47E-04	4.37E-02	2.80E-01	1.56E-01
Indeno(1,2,3-cd)pyrene	2.12E-01	2.55E-04	2.18E-01	2.80E-01	7.78E-01
2-Methylnaphthalene	4.54E-02	6.49E-04	4.69E-02	2.80E-01	1.68E-01
Naphthalene	1.41E-02	4.68E-04	1.49E-02	2.80E-01	5.32E-02
Phenanthrene	8.20E-02	1.92E-03	8.96E-02	2.80E-01	3.20E-01
Pyrene	4.02E-01	1.64E-03	4.14E-01	2.80E-01	1.48E+00
Endrin	4.69E-02	7.84E-06	4.70E-02	3.00E-02	1.57E+00
Total PCBs	7.09E+00	9.79E-04	7.12E+00	1.50E-03	4.75E+03
Uranium-238	1.06E-01	6.76E-05	1.09E-01	8.50E-01	1.28E-01
Radium-226	1.86E-08	2.10E-11	1.94E-08	NA	NA
Radium-228	1.46E-10	1.65E-13	1.50E-10	NA	NA
Thorium-230	1.12E-06	7.19E-11	1.15E-06	9.80E+00	1.17E-07
Thorium-232	1.49E-01	9.52E-06	1.52E-01	9.80E+00	1.55E-02

302865

Red Fox Exposure Calculations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Red Fox TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Aluminum	4.21E+03	1.27E+00	4.30E+03	5.40E-01	7.97E+03
Antimony	4.17E+02	6.28E+00	4.32E+02	3.00E-02	1.44E+04
Arsenic	4.69E+02	1.41E+00	4.80E+02	4.00E-02	1.20E+04
Barium	4.76E+02	5.38E+00	4.91E+02	2.32E+00	2.12E+02
Beryllium	8.18E-01	6.16E-04	8.36E-01	3.00E-01	2.79E+00
Cadmium	6.58E+00	7.36E-02	6.76E+00	5.00E-02	1.35E+02
Chromium	1.21E+01	6.80E-02	1.46E+01	1.25E+03	1.16E-02
Cobalt	3.47E+02	5.22E-01	3.58E+02	1.37E+01	2.61E+01
Copper	6.86E+02	1.03E+01	7.05E+02	4.51E+00	1.56E+02
Iron	2.33E+03	7.01E-01	2.44E+03	8.24E+00	2.96E+02
Lead	1.39E+03	4.94E+00	1.42E+03	3.66E+00	3.88E+02
Magnesium	6.99E+03	5.26E+02	7.66E+03	2.56E+01	2.99E+02
Manganese	6.70E+03	1.26E+02	6.96E+03	4.03E+01	1.73E+02
Mercury	6.25E-01	4.23E-02	6.80E-01	3.67E+00	1.85E-01
Nickel	4.30E+03	9.71E+00	4.36E+03	1.83E+01	2.38E+02
Selenium	1.87E+02	3.67E-02	1.88E+02	2.00E-02	9.38E+03
Silver	8.48E+00	2.55E-01	8.93E+00	5.60E-01	1.59E+01
Thallium	1.69E+00	5.08E-04	1.72E+00	3.40E-03	5.07E+02
Vanadium	1.23E+01	5.08E-03	1.25E+01	1.00E-01	1.25E+02
Zinc	1.23E+03	2.44E+01	1.27E+03	7.33E+01	1.73E+01
Cyanide	1.71E-01	1.29E-02	1.87E-01	3.15E+01	5.95E-03
	EEprey = Cp x FRp x NIp FRp = 1 NIRp = 0.0744 g/g-day	EEveg = Cv x FRv x NIRv FRv = 1 NIRv = 0.0056	EEtotal = EEsoil + EEwater + EEprey + EEveg	NA = Not Available	HQ = EEtotal / NOAELr

302866

Aquatic Plant, Invertebrate and Fish
Radiation Exposure Calculations: Internal Dose
Li Tungsten Site

Radionuclide	(C_{wr}) (Ci/m^3)	BCF_P (m^3/kg)	C_{Pr} (Ci/kg)	MeV_{Pr}	D_{Pr} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	4.80E-09	9.00E-01	4.32E-09	4.30E+00	9.51E-04	1.00E+00	9.51E-04
Uranium-234	4.80E-09	9.00E-01	4.32E-09	4.90E+00	1.08E-03	1.00E+00	1.08E-03
Thorium-230	6.40E-10	3.00E+00	1.92E-09	4.30E+00	4.23E-04	1.00E+00	4.23E-04
Radium-226	4.50E-09	3.00E+01	1.35E-07	4.30E+00	2.97E-02	1.00E+00	2.97E-02
Lead-210	4.50E-09	2.00E+00	9.00E-09	4.30E+00	1.98E-03	1.00E+00	1.98E-03
Thorium-232	4.10E-10	3.00E+00	1.23E-09	4.00E+00	2.52E-04	1.00E+00	2.52E-04
Radium-228	2.40E-09	3.00E+01	7.20E-08	5.50E+00	2.03E-02	1.00E+00	2.03E-02
Thorium-228	2.40E-09	3.00E+00	7.20E-09	5.40E+00	1.99E-03	1.00E+00	1.99E-03
				Totals:	5.67E-02	1.00E+00	5.67E-02

Notes:

C_{wr} = Maximum concentration in water.
BCF_P = water-to-plant concentration factor
C_{Pr} = Concentration of radionuclide r in plant = C_{wr} x BCF_P
MeV_{Pr} = Average effective energy of decay of radionuclide r in the plant
D_{Pr} = Radiation dose to plants
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302867

Aquatic Plant, Invertebrate and Fish
Radiation Exposure Calculations: Internal Dose
Li Tungsten Site

Radionuclide	(C_{wr}) (Ci/m^3)	BCF_I (m^3/kg)	C_{Ir} (Ci/kg)	MeV_{Ir}	D_{Ir} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	4.80E-09	1.00E-02	4.80E-11	4.30E+00	1.06E-05	1.00E+00	1.06E-05
Uranium-234	4.80E-09	1.00E-02	4.80E-11	4.90E+00	1.20E-05	1.00E+00	1.20E-05
Thorium-230	6.40E-10	1.00E-01	6.40E-11	4.30E+00	1.41E-05	1.00E+00	1.41E-05
Radium-226	4.50E-09	1.00E+00	4.50E-09	4.30E+00	9.91E-04	1.00E+00	9.91E-04
Lead-210	4.50E-09	5.00E-01	2.25E-09	4.30E+00	4.95E-04	1.00E+00	4.95E-04
Thorium-232	4.10E-10	1.00E-01	4.10E-11	4.00E+00	8.40E-06	1.00E+00	8.40E-06
Radium-228	2.40E-09	1.00E+00	2.40E-09	5.50E+00	6.76E-04	1.00E+00	6.76E-04
Thorium-228	2.40E-09	1.00E-01	2.40E-10	5.40E+00	6.64E-05	1.00E+00	6.64E-05
				Totals:	2.27E-03	1.00E+00	2.27E-03

Notes:

C_{wr} = Maximum concentration in water.
BCF_I = water-to-invertebrate concentration factor
C_{Ir} = Concentration of radionuclide r in invertebrate = C_{wr} x BCF_I
MeV_{Ir} = Average effective energy of decay of radionuclide r in the invertebrate
D_{Ir} = Radiation dose to invertebrate
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302868

Aquatic Plant, Invertebrate and Fish
Radiation Exposure Calculations: Internal Dose
Li Tungsten Site

Radionuclide	(C_{wr}) (Ci/m^3)	BCF_F (m^3/kg)	C_{Fr} (Ci/kg)	MeV_{Fr}	D_{Fr} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	4.80E-09	5.00E-02	2.40E-10	4.30E+00	5.28E-05	1.00E+00	5.28E-05
Uranium-234	4.80E-09	5.00E-02	2.40E-10	4.90E+00	6.02E-05	1.00E+00	6.02E-05
Thorium-230	6.40E-10	1.00E-01	6.40E-11	4.30E+00	1.41E-05	1.00E+00	1.41E-05
Radium-226	4.50E-09	5.00E-02	2.25E-10	4.30E+00	4.95E-05	1.00E+00	4.95E-05
Lead-210	4.50E-09	2.00E+00	9.00E-09	4.30E+00	1.98E-03	1.00E+00	1.98E-03
Thorium-232	4.10E-10	1.00E-01	4.10E-11	4.00E+00	8.40E-06	1.00E+00	8.40E-06
Radium-228	2.40E-09	5.00E-02	1.20E-10	5.50E+00	3.38E-05	1.00E+00	3.38E-05
Thorium-228	2.40E-09	1.00E-01	2.40E-10	5.40E+00	6.64E-05	1.00E+00	6.64E-05
				Totals:	2.27E-03	1.00E+00	2.27E-03

Notes:

C_{wr} = Maximum concentration in water.
BCF_F = water-to-fish concentration factor
C_{Fr} = Concentration of radionuclide r in fish = C_{wr} x BCF_F
MeV_{Fr} = Average effective energy of decay of radionuclide r in the fish
D_{Fr} = Radiation dose to fish
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302869

Aquatic Plant, Invertebrate and Fish
Radiation Exposure Calculations: External Dose
Li Tungsten Site

Radionuclide	Aquatic Plant				
	(C_{wr}) (Ci/m^3)	DF_{imm} (rad d^{-1} per Ci $m3^{-1}$)	F_{expW} (unitless)	F_{expS} (unitless)	R_{imm} (rad/d)
Uranium-238	4.80E-09	3.50E-03	1.00E+00	0.00E+00	1.68E-11
Uranium-234	4.80E-09	3.50E-03	1.00E+00	0.00E+00	1.68E-11
Thorium-230	6.40E-10	3.50E-03	1.00E+00	0.00E+00	2.24E-12
Radium-226	4.50E-09	3.50E-03	1.00E+00	0.00E+00	1.58E-11
Lead-210	4.50E-09	3.50E-03	1.00E+00	0.00E+00	1.58E-11
Thorium-232	4.10E-10	NA	1.00E+00	0.00E+00	NA
Radium-228	2.40E-09	NA	1.00E+00	0.00E+00	NA
Thorium-228	2.40E-09	NA	1.00E+00	0.00E+00	NA
Totals:					6.73E-11

Notes:

C_{wr} = Maximum concentration in water.
DF_{imm} = water immersion dose factor
F_{expW} = exposure fraction from water
F_{expS} = exposure fraction from sediment
R_{imm} = water immersion dose rate
F_{sed} = sediment deposition transfer factor
F_{ruf} = geometry-roughness factor (assumed to = 0.2)
DF_{gnd} = ground irradiation dose factor
T_s = time sediment is exposed to contaminated water
R_{sed} = direct irradiation dose rate from sediment
Decay Const. = ln(2)/Tb + ln(2)/Tr
R_{total} = total external dose rate, from water and sediment
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302870

Aquatic Plant, Invertebrate and Fish
Radiation Exposure Calculations: External Dose
Li Tungsten Site

Radionuclide	Aquatic Plant (continued)								
	F_{sed} ($Ci\ m^{-2}\ d^{-1}\ Ci^{-1}\ m^3$)	F_{ruf} (unitless)	DF_{gnd} ($rad\ d^{-1}\ Ci^{-1}\ m^2$)	T_s (days)	Decay Const. (d^{-1})	R_{sed} (rad/d)	R_{total} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	7.00E-02	2.00E-01	1.77E-01	3.65E+02	6.93E-03	0.00E+00	1.68E-11	1.00E+00	1.68E-11
Uranium-234	7.00E-02	2.00E-01	2.21E-01	3.65E+02	6.93E-03	0.00E+00	1.68E-11	1.00E+00	1.68E-11
Thorium-230	7.00E-02	2.00E-01	1.77E-01	3.65E+02	1.22E-05	0.00E+00	2.24E-12	1.00E+00	2.24E-12
Radium-226	7.00E-02	2.00E-01	1.77E-01	3.65E+02	8.67E-05	0.00E+00	1.58E-11	1.00E+00	1.58E-11
Lead-210	7.00E-02	2.00E-01	1.77E-01	3.65E+02	5.50E-03	0.00E+00	1.58E-11	1.00E+00	1.58E-11
Thorium-232	7.00E-02	2.00E-01	NA	3.65E+02	1.22E-05	NA	NA	1.00E+00	NA
Radium-228	7.00E-02	2.00E-01	NA	3.65E+02	4.13E-04	NA	NA	1.00E+00	NA
Thorium-228	7.00E-02	2.00E-01	NA	3.65E+02	1.01E-03	NA	NA	1.00E+00	NA
Totals:						0.00E+00	6.73E-11	1.00E+00	6.73E-11

Notes:

C_{wr} = Maximum concentration in water.
DF_{imm} = water immersion dose factor
F_{expW} = exposure fraction from water
F_{expS} = exposure fraction from sediment
R_{imm} = water immersion dose rate
F_{sed} = sediment deposition transfer factor
F_{ruf} = geometry-roughness factor (assumed to = 0.2)
DF_{gnd} = ground irradiation dose factor
T_s = time sediment is exposed to contaminated water
R_{sed} = direct irradiation dose rate from sediment
Decay Const. = ln(2)/Tb + ln(2)/Tr
R_{total} = total external dose rate, from water and sediment
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302871

Aquatic Plant, Invertebrate and Fish
Radiation Exposure Calculations: External Dose
Li Tungsten Site

Radionuclide	Aquatic Invertebrate				
	(C_{wr}) (Ci/m^3)	DF_{imm} (rad d^{-1} per Ci $m3^{-1}$)	F_{expW} (unitless)	F_{expS} (unitless)	R_{imm} (rad/d)
Uranium-238	4.80E-09	3.50E-03	5.00E-01	5.00E-01	8.40E-12
Uranium-234	4.80E-09	3.50E-03	5.00E-01	5.00E-01	8.40E-12
Thorium-230	6.40E-10	3.50E-03	5.00E-01	5.00E-01	1.12E-12
Radium-226	4.50E-09	3.50E-03	5.00E-01	5.00E-01	7.88E-12
Lead-210	4.50E-09	3.50E-03	5.00E-01	5.00E-01	7.88E-12
Thorium-232	4.10E-10	NA	5.00E-01	5.00E-01	NA
Radium-228	2.40E-09	NA	5.00E-01	5.00E-01	NA
Thorium-228	2.40E-09	NA	5.00E-01	5.00E-01	NA
Totals:					3.37E-11

Notes:

C_{wr} = Maximum concentration in water.
DF_{imm} = water immersion dose factor
Fe_{xpW} = exposure fraction from water
F_{expS} = exposure fraction from sediment
R_{imm} = water immersion dose rate
F_{sed} = sediment deposition transfer factor
F_{ruf} = geometry-roughness factor (assumed to = 0.2)
DF_{gnd} = ground irradiation dose factor
T_s = time sediment is exposed to contaminated water
R_{sed} = direct irradiation dose rate from sediment
Decay Const. = ln(2)/Tb + ln(2)/Tr
R_{total} = total external dose rate, from water and sediment
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302872

Aquatic Plant, Invertebrate and Fish
Radiation Exposure Calculations: External Dose
Li Tungsten Site

Radionuclide	Aquatic Invertebrate (continued)								
	F_{sed} (Ci m^{-2} d^{-1} Ci^{-1} m^3)	F_{ruf} (unitless)	DF_{gnd} (rad d^{-1} Ci^{-1} m^2)	T_s (days)	Decay Const. (d^{-1})	R_{sed} (rad/d)	R_{total} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	7.00E-02	2.00E-01	1.77E-01	3.65E+02	6.93E-03	7.90E-10	7.98E-10	1.00E+00	8.40E-12
Uranium-234	7.00E-02	2.00E-01	2.21E-01	3.65E+02	6.93E-03	9.86E-10	9.95E-10	1.00E+00	8.40E-12
Thorium-230	7.00E-02	2.00E-01	1.77E-01	3.65E+02	1.22E-05	2.89E-10	2.90E-10	1.00E+00	1.12E-12
Radium-226	7.00E-02	2.00E-01	1.77E-01	3.65E+02	8.67E-05	2.00E-09	2.01E-09	1.00E+00	7.88E-12
Lead-210	7.00E-02	2.00E-01	1.77E-01	3.65E+02	5.50E-03	8.78E-10	8.86E-10	1.00E+00	7.88E-12
Thorium-232	7.00E-02	2.00E-01	NA	3.65E+02	1.22E-05	NA	NA	1.00E+00	NA
Radium-228	7.00E-02	2.00E-01	NA	3.65E+02	4.13E-04	NA	NA	1.00E+00	NA
Thorium-228	7.00E-02	2.00E-01	NA	3.65E+02	1.01E-03	NA	NA	1.00E+00	NA
Totals:						4.95E-09	4.98E-09	1.00E+00	3.37E-11

Notes:

C_{wr} = Maximum concentration in water.
DF_{imm} = water immersion dose factor
F_{expW} = exposure fraction from water
F_{expS} = exposure fraction from sediment
R_{imm} = water immersion dose rate
F_{sed} = sediment deposition transfer factor
F_{ruf} = geometry-roughness factor (assumed to = 0.2)
DF_{gnd} = ground irradiation dose factor
T_s = time sediment is exposed to contaminated water
R_{sed} = direct irradiation dose rate from sediment
Decay Const. = ln(2)/Tb + ln(2)/Tr
R_{total} = total external dose rate, from water and sediment
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302873

Aquatic Plant, Invertebrate and Fish
Radiation Exposure Calculations: External Dose
Li Tungsten Site

Radionuclide	Fish				
	(C_{wr}) (Ci/m^3)	DF_{imm} (rad d^{-1} per Ci $m3^{-1}$)	F_{expW} (unitless)	F_{expS} (unitless)	R_{imm} (rad/d)
Uranium-238	4.80E-09	3.50E-03	7.50E-01	2.50E-01	1.26E-11
Uranium-234	4.80E-09	3.50E-03	7.50E-01	2.50E-01	1.26E-11
Thorium-230	6.40E-10	3.50E-03	7.50E-01	2.50E-01	1.68E-12
Radium-226	4.50E-09	3.50E-03	7.50E-01	2.50E-01	1.18E-11
Lead-210	4.50E-09	3.50E-03	7.50E-01	2.50E-01	1.18E-11
Thorium-232	4.10E-10	NA	7.50E-01	2.50E-01	NA
Radium-228	2.40E-09	NA	7.50E-01	2.50E-01	NA
Thorium-228	2.40E-09	NA	7.50E-01	2.50E-01	NA
Totals:					5.05E-11

Notes:

C_{wr} = Maximum concentration in water.
DF_{imm} = water immersion dose factor
F_{expW} = exposure fraction from water
F_{expS} = exposure fraction from sediment
R_{imm} = water immersion dose rate
F_{sed} = sediment deposition transfer factor
F_{ruf} = geometry-roughness factor (assumed to = 0.2)
DF_{gnd} = ground irradiation dose factor
T_s = time sediment is exposed to contaminated water
R_{sed} = direct irradiation dose rate from sediment
Decay Const. = ln(2)/Tb + ln(2)/Tr
R_{total} = total external dose rate, from water and sediment
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302874

Aquatic Plant, Invertebrate and Fish
Radiation Exposure Calculations: External Dose
Li Tungsten Site

Radionuclide	Fish (continued)								
	F_{sed} ($Ci\ m^{-2}\ d^{-1}\ Ci^{-1}\ m^3$)	F_{ruf} (unitless)	DF_{gnd} $ad\ d^{-1}\ Ci^{-1}\ m$	T_s (days)	Decay Const. (d^{-1})	R_{sed} (rad/d)	R_{total} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	7.00E-02	2.00E-01	1.77E-01	3.65E+02	6.93E-03	3.95E-10	4.07E-10	1.00E+00	1.26E-11
Uranium-234	7.00E-02	2.00E-01	2.21E-01	3.65E+02	6.93E-03	4.93E-10	5.06E-10	1.00E+00	1.26E-11
Thorium-230	7.00E-02	2.00E-01	1.77E-01	3.65E+02	1.22E-05	1.44E-10	1.46E-10	1.00E+00	1.68E-12
Radium-226	7.00E-02	2.00E-01	1.77E-01	3.65E+02	8.67E-05	1.00E-09	1.01E-09	1.00E+00	1.18E-11
Lead-210	7.00E-02	2.00E-01	1.77E-01	3.65E+02	5.50E-03	4.39E-10	4.51E-10	1.00E+00	1.18E-11
Thorium-232	7.00E-02	2.00E-01	NA	3.65E+02	1.22E-05	NA	NA	1.00E+00	NA
Radium-228	7.00E-02	2.00E-01	NA	3.65E+02	4.13E-04	NA	NA	1.00E+00	NA
Thorium-228	7.00E-02	2.00E-01	NA	3.65E+02	1.01E-03	NA	NA	1.00E+00	NA
Totals:						2.47E-09	2.52E-09	1.00E+00	5.05E-11

Notes:

C_{wr} = Maximum concentration in water.
DF_{imm} = water immersion dose factor
F_{expW} = exposure fraction from water
F_{expS} = exposure fraction from sediment
R_{imm} = water immersion dose rate
F_{sed} = sediment deposition transfer factor
F_{ruf} = geometry-roughness factor (assumed to = 0.2)
DF_{gnd} = ground irradiation dose factor
T_s = time sediment is exposed to contaminated water
R_{sed} = direct irradiation dose rate from sediment
Decay Const. = ln(2)/Tb + ln(2)/Tr
R_{total} = total external dose rate, from water and sediment
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302875

Semi-aquatic Plant, Herbivore and Omnivore
Radiation Exposure Calculations
Li Tungsten Site

Radionuclide	(C_{sr}) (pCi/g)	B_{vr} (unitless)	C_{Pr} (pCi/g)	MeV_{Pr}	D_{Pr} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	4.60E+01	8.50E-03	3.91E-01	4.30E+00	8.59E-05	1.00E-01	8.59E-04
Uranium-234	4.60E+01	8.50E-03	3.91E-01	4.90E+00	9.79E-05	1.00E-01	9.79E-04
Thorium-230	2.90E+01	8.50E-04	2.47E-02	4.30E+00	5.42E-06	1.00E-01	5.42E-05
Radium-226	6.60E+00	1.50E-02	9.90E-02	4.30E+00	2.18E-05	1.00E-01	2.18E-04
Lead-210	6.60E+00	4.50E-02	2.97E-01	4.30E+00	6.53E-05	1.00E-01	6.53E-04
Thorium-232	5.70E+00	8.50E-04	4.85E-03	4.00E+00	9.90E-07	1.00E-01	9.90E-06
Radium-228	5.00E+00	1.50E-02	7.50E-02	5.50E+00	2.11E-05	1.00E-01	2.11E-04
Thorium-228	5.40E+00	8.50E-04	4.59E-03	5.40E+00	1.27E-06	1.00E-01	1.27E-05
				Totals:	3.00E-04	1.00E-01	3.00E-03

Notes:

Csr = Maximum concentration in sediment.
Bvr = Soil-to-plant concentration factor (Baes et al., 1984).
CPr = Concentration of radionuclide r in plant = Csr x Bvr
MeVPr = Average effective energy of decay of radionuclide r in the plant
DPr = Radiation dose to plants
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302876

Semi-aquatic Plant, Herbivore and Omnivore
Radiation Exposure Calculations
Li Tungsten Site

Radionuclide	IR_H (g/day)	FI_H (unitless)	B_{Hr} (day/kg)	C_{Hr} (pCi/g)	MeV_{Hr}	D_{Hr} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	4.00E+00	1.00E+00	2.00E-04	1.25E-07	4.30E+00	2.75E-11	1.00E-01	2.75E-10
Uranium-234	4.00E+00	1.00E+00	2.00E-04	1.25E-07	4.90E+00	3.13E-11	1.00E-01	3.13E-10
Thorium-230	4.00E+00	1.00E+00	6.00E-06	2.37E-10	4.30E+00	5.20E-14	1.00E-01	5.20E-13
Radium-226	4.00E+00	1.00E+00	2.50E-04	3.96E-08	4.30E+00	8.70E-12	1.00E-01	8.70E-11
Lead-210	4.00E+00	1.00E+00	3.00E-04	1.43E-07	4.30E+00	3.13E-11	1.00E-01	3.13E-10
Thorium-232	4.00E+00	1.00E+00	6.00E-06	4.65E-11	4.00E+00	9.51E-15	1.00E-01	9.51E-14
Radium-228	4.00E+00	1.00E+00	2.50E-04	3.00E-08	5.50E+00	8.43E-12	1.00E-01	8.43E-11
Thorium-228	4.00E+00	1.00E+00	6.00E-06	4.41E-11	5.40E+00	1.22E-14	1.00E-01	1.22E-13
					Totals:	1.07E-10	1.00E-01	1.07E-09

Notes:

IR_H = Ingestion rate of plants by herbivore
FI_H = Fraction ingested by a herbivore from a contaminataed source = 1.0
B_{Hr} = Plant-to-muscle transfer factor (Baes et al., 1984)
C_{Hr} = Contaminant concentration in herbivore
MeV_{Hr} = Average effective energy of decay of radionuclide r in the herbivore.
D_{Hr} = Radiation dose to herbivore

Herbivore = meadow vole

302877

Semi-aquatic Plant, Herbivore and Omnivore
Radiation Exposure Calculations
Li Tungsten Site

Radionuclide	IR_{Op} (g/day)	IR_{Oh} (g/day)	FI_O (unitless)	B_{Hr} (unitless)	B_{mmr} (day/kg)	C_{Or} (pCi/g)	MeV_{Or}	D_{Or} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	1.45E+02	1.45E+02	1.00E+00	2.00E-04	1.00E+00	2.27E-05	4.30E+00	4.98E-09	1.00E-01	4.98E-08
Uranium-234	1.45E+02	1.45E+02	1.00E+00	2.00E-04	1.00E+00	2.27E-05	4.90E+00	5.68E-09	1.00E-01	5.68E-08
Thorium-230	1.45E+02	1.45E+02	1.00E+00	6.00E-06	1.00E+00	4.29E-08	4.30E+00	9.42E-12	1.00E-01	9.42E-11
Radium-226	1.45E+02	1.45E+02	1.00E+00	2.50E-04	1.00E+00	7.18E-06	4.30E+00	1.58E-09	1.00E-01	1.58E-08
Lead-210	1.45E+02	1.45E+02	1.00E+00	3.00E-04	1.00E+00	2.58E-05	4.30E+00	5.68E-09	1.00E-01	5.68E-08
Thorium-232	1.45E+02	1.45E+02	1.00E+00	6.00E-06	1.00E+00	8.43E-09	4.00E+00	1.72E-12	1.00E-01	1.72E-11
Radium-228	1.45E+02	1.45E+02	1.00E+00	2.50E-04	1.00E+00	5.44E-06	5.50E+00	1.53E-09	1.00E-01	1.53E-08
Thorium-228	1.45E+02	1.45E+02	1.00E+00	6.00E-06	1.00E+00	7.99E-09	5.40E+00	2.20E-12	1.00E-01	2.20E-11
							Totals:	1.95E-08	1.00E-01	1.95E-07

Notes:

IR_{Op} and IR_{Oh} = Ingestion rate of plants and herbivores, respectively, by omnivores
FI_O = Fraction ingested by an omnivore from a contaminated source = 1.0
B_{mmr} = Muscle-to-muscle transfer factor (assumed to be 1.0)
C_{Or} = Radionuclide concentration in omnivore
MeV_{Or} = Average effective energy of decay of radionuclide r in the omnivore
D_{Or} = Radiation dose in the omnivore.

Omnivore = raccoon

302878

Terrestrial Plant, Herbivore and Carnivore
Radiation Exposure Calculations
Li Tungsten Site

Radionuclide	(C_{sr}) (pCi/g)	B_{vr} (unitless)	C_{Pr} (pCi/g)	MeV_{Pr}	D_{Pr} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	4.70E+02	8.50E-03	4.00E+00	4.30E+00	8.78E-04	1.00E-01	8.78E-03
Uranium-234	3.43E+02	8.50E-03	2.92E+00	4.90E+00	7.30E-04	1.00E-01	7.30E-03
Thorium-230	3.10E+02	8.50E-04	2.64E-01	4.30E+00	5.79E-05	1.00E-01	5.79E-04
Radium-226	2.50E+02	1.50E-02	3.75E+00	4.30E+00	8.24E-04	1.00E-01	8.24E-03
Lead-210	3.43E+02	4.50E-02	1.54E+01	4.30E+00	3.39E-03	1.00E-01	3.39E-02
Thorium-232	2.20E+02	8.50E-04	1.87E-01	4.00E+00	3.82E-05	1.00E-01	3.82E-04
Radium-228	5.30E+02	1.50E-02	7.95E+00	5.50E+00	2.23E-03	1.00E-01	2.23E-02
Thorium-228	3.75E+02	8.50E-04	3.19E-01	5.40E+00	8.80E-05	1.00E-01	8.80E-04
				Totals:	8.24E-03	1.00E-01	8.24E-02

Notes:

C_{sr} = Maximum concentration in soil
B_{vr} = Soil-to-plant concentration factor (Baes et al., 1984).
C_{Pr} = Concentration of radionuclide r in plant = Csr x Bvr
MeV_{Pr} = Average effective energy of decay of radionuclide r in the plant
D_{Pr} = Radiation dose to plants
TRV = Toxicity Reference Value
HQ = Hazard Quotient = D/TRV

302879

Terrestrial Plant, Herbivore and Carnivore
Radiation Exposure Calculations
Li Tungsten Site

Radionuclide	IR_H (g/day)	FI_H (unitless)	B_{Hr} (day/kg)	C_{Hr} (pCi/g)	MeV_{Hr}	D_{Hr} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	3.00E+00	1.00E+00	2.00E-04	9.59E-07	4.30E+00	2.11E-10	1.00E-01	2.11E-09
Uranium-234	3.00E+00	1.00E+00	2.00E-04	7.00E-07	4.90E+00	1.75E-10	1.00E-01	1.75E-09
Thorium-230	3.00E+00	1.00E+00	6.00E-06	1.90E-09	4.30E+00	4.17E-13	1.00E-01	4.17E-12
Radium-226	3.00E+00	1.00E+00	2.50E-04	1.13E-06	4.30E+00	2.47E-10	1.00E-01	2.47E-09
Lead-210	3.00E+00	1.00E+00	3.00E-04	5.56E-06	4.30E+00	1.22E-09	1.00E-01	1.22E-08
Thorium-232	3.00E+00	1.00E+00	6.00E-06	1.35E-09	4.00E+00	2.75E-13	1.00E-01	2.75E-12
Radium-228	3.00E+00	1.00E+00	2.50E-04	2.39E-06	5.50E+00	6.70E-10	1.00E-01	6.70E-09
Thorium-228	3.00E+00	1.00E+00	6.00E-06	2.30E-09	5.40E+00	6.33E-13	1.00E-01	6.33E-12
					Totals:	2.53E-09	1.00E-01	2.53E-08

Notes:

IR_H = Ingestion rate of plants by herbivore
FI_H = Fraction ingested by a herbivore from a contaminataed source = 1.0
B_{Hr} = Plant-to-muscle transfer factor (Baes et al., 1984)
C_{Hr} = Contaminant concentration in herbivore
MeV_{Hr} = Average effective energy of decay of radionuclide r in the herbivore.
D_{Hr} = Radiation dose to herbivore

Herbivore = deer mouse

302880

Terrestrial Plant, Herbivore and Carnivore
Radiation Exposure Calculations
Li Tungsten Site

Radionuclide	IR_C (g/day)	FI_C (unitless)	B_{mmr} (day/kg)	C_{Cr} (pCi/g)	MeV_{Cr}	D_{Cr} (rad/d)	TRV (rad/d)	HQ (unitless)
Uranium-238	2.40E+02	1.00E+00	1.00E+00	2.30E-04	4.30E+00	4.85E-14	1.00E-01	4.85E-13
Uranium-234	2.40E+02	1.00E+00	1.00E+00	1.68E-04	4.90E+00	2.94E-14	1.00E-01	2.94E-13
Thorium-230	2.40E+02	1.00E+00	1.00E+00	4.55E-07	4.30E+00	1.90E-19	1.00E-01	1.90E-18
Radium-226	2.40E+02	1.00E+00	1.00E+00	2.70E-04	4.30E+00	6.67E-14	1.00E-01	6.67E-13
Lead-210	2.40E+02	1.00E+00	1.00E+00	1.33E-03	4.30E+00	1.63E-12	1.00E-01	1.63E-11
Thorium-232	2.40E+02	1.00E+00	1.00E+00	3.23E-07	4.00E+00	8.89E-20	1.00E-01	8.89E-19
Radium-228	2.40E+02	1.00E+00	1.00E+00	5.72E-04	5.50E+00	3.84E-13	1.00E-01	3.84E-12
Thorium-228	2.40E+02	1.00E+00	1.00E+00	5.51E-07	5.40E+00	3.49E-19	1.00E-01	3.49E-18
					Totals:	2.16E-12	1.00E-01	2.16E-11

Notes:

IR_C = Ingestion rate of herbivores by carnivores
FI_C = Fraction ingested by a carnivore from a contaminated source = 1.0
B_{mmr} = Muscle-to-muscle transfer factor (assumed to be 1.0)
C_{Cr} = Radionuclide concentration in carnivore
MeV_{Cr} = Average effective energy of decay of radionuclide r in the carnivore
D_{Cr} = Radiation dose in the carnivore.

Carnivore = red fox

302881

American Robin Exposure Calculations Using
95% UCL Soil Concentrations
Li Tungsten Site

Chemical	Concentration in Soil (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)
Benzo(b)fluoranthene	9.66E-01	NC	9.27E-01	1.16E-02	9.12E-03	NC
Pyrene	1.03E+00	NC	7.62E-01	4.12E-02	9.72E-03	NC
Endrin	6.49E-03	NC	5.84E-02	1.30E-04	6.13E-05	NC
Total PCBs	7.64E-01	1.00E-03	4.58E+00	8.40E-03	7.21E-03	9.24E-05
Aluminum	1.01E+04	2.39E+01	1.01E+04	4.04E+01	9.53E+01	2.21E+00
Antimony	1.26E+03	8.53E-01	1.26E+03	2.52E+02	1.19E+01	7.88E-02
Arsenic	2.88E+03	2.16E+00	2.88E+03	1.15E+02	2.72E+01	1.99E-01
Barium	4.29E+02	NC	4.29E+02	6.44E+01	4.05E+00	NC
Beryllium	8.93E-01	5.50E-03	8.93E-01	8.93E-03	8.43E-03	5.08E-04
Cadmium	9.77E+00	3.16E-01	3.61E+01	5.37E+00	9.22E-02	2.92E-02
Cobalt	8.59E+02	1.44E+01	8.59E+02	1.72E+01	8.11E+00	1.33E+00
Copper	2.88E+03	5.60E+00	5.76E+03	1.15E+03	2.72E+01	5.17E-01
Iron	6.46E+04	1.60E+02	6.46E+04	2.58E+02	6.10E+02	1.48E+01
Lead	1.96E+04	5.58E+02	1.86E+04	8.82E+02	1.85E+02	5.16E+01
Magnesium	6.87E+03	NC	6.87E+03	6.87E+03	6.48E+01	NC
Manganese	6.91E+03	3.80E+00	6.91E+03	1.73E+03	6.52E+01	3.51E-01
Mercury	2.47E+00	1.40E-03	2.47E+00	2.22E+00	2.33E-02	1.29E-04
Nickel	1.17E+03	5.65E+00	2.34E+03	7.02E+01	1.10E+01	5.22E-01
Selenium	6.47E+01	1.12E-01	6.21E+02	1.62E+00	6.11E-01	1.03E-02
Silver	1.14E+02	9.10E-02	1.14E+02	4.56E+01	1.08E+00	8.41E-03
Thallium	1.56E+00	NC	1.56E+00	6.24E-03	1.47E-02	NC
Vanadium	3.89E+01	1.29E-01	3.89E+01	2.14E-01	3.67E-01	1.19E-02
Zinc	6.80E+02	2.46E+01	3.88E+03	1.02E+03	6.42E+00	2.27E+00
	Cs = 95% UCL of detected conc.	Cw = average detected conc. NC = Not a COPC for this medium	Cp = Cs x EUF	Cv = Cs x PUF	EEsoil = Cs x FS x IR x FR / FS = 10.4% IR = 0.011 kg/day FR = 0.66 BW = 0.08 kg	EEwater = Cw x FRw x NIR FRw = 0.66 NIRw = 0.14 g/g-day

302882

American Robin Exposure Calculations Using
95% UCL Soil Concentrations
Li Tungsten Site

Chemical	Concentration in Soil (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)

302883

American Robin Exposure Calculations Using
95% UCL Soil Concentrations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Robin TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Benzo(b)fluoranthene	2.75E-01	5.81E-03	2.90E-01	NA	NA
Pyrene	2.26E-01	2.07E-02	2.57E-01	NA	NA
Endrin	1.73E-02	6.51E-05	1.75E-02	3.00E-01	5.82E-02
Total PCBs	1.36E+00	4.22E-03	1.37E+00	1.80E-01	7.63E+00
Aluminum	3.00E+03	2.03E+01	3.12E+03	1.11E+02	2.80E+01
Antimony	3.74E+02	1.26E+02	5.13E+02	NA	NA
Arsenic	8.55E+02	5.78E+01	9.41E+02	5.14E+00	1.83E+02
Barium	1.27E+02	3.23E+01	1.64E+02	2.09E+01	7.85E+00
Beryllium	2.65E-01	4.48E-03	2.79E-01	NA	NA
Cadmium	1.07E+01	2.70E+00	1.36E+01	1.45E+00	9.35E+00
Cobalt	2.55E+02	8.62E+00	2.73E+02	NA	NA
Copper	1.71E+03	5.78E+02	2.32E+03	3.32E+01	6.97E+01
Iron	1.92E+04	1.30E+02	1.99E+04	NA	NA
Lead	5.53E+03	4.42E+02	6.21E+03	3.85E+00	1.61E+03
Magnesium	2.04E+03	3.45E+03	5.55E+03	NA	NA
Manganese	2.05E+03	8.67E+02	2.98E+03	9.77E+02	3.05E+00
Mercury	7.34E-01	1.12E+00	1.87E+00	6.40E-03	2.93E+02
Nickel	6.95E+02	3.52E+01	7.42E+02	7.74E+01	9.58E+00
Selenium	1.84E+02	8.11E-01	1.86E+02	5.00E-01	3.72E+02
Silver	3.39E+01	2.29E+01	5.78E+01	NA	NA
Thallium	4.63E-01	3.13E-03	4.81E-01	NA	NA
Vanadium	1.16E+01	1.07E-01	1.20E+01	1.14E+01	1.06E+00
Zinc	1.15E+03	5.12E+02	1.67E+03	3.00E+00	5.57E+02
	EEprey = Cp x FRp x NIp FRp = 0.66 NIRp = 0.45 g/g-day	EEveg = Cv x FRv x NIRv FRv = 0.66 NIRv = 0.76	EEtotal = EEsoil + EEwater + EEprey + EEveg	NA = Not Available	HQ = EEtotal / NOAELr

302884

American Robin Exposure Calculations Using
95% UCL Soil Concentrations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Robin TRV (mg/kg BW-day)	Hazard Quotient (unitless)

302885

Red Fox Exposure Calculations
Using 95% UCL Soil Concentrations
Li Tungsten Site

Chemical	Concentration in Soil (mg/kg)	Concentration in Water (mg/l)	Concentration in Prey (mg/kg)	Concentration in Vegetation (mg/kg)	Estimated Exposure from Soil (mg/kg BW-day)	Estimated Exposure from Water (mg/kg BW-day)
Benzo(b)fluoranthene	9.66E-01	NC	9.27E-01	1.16E-02	1.44E-03	NC
Pyrene	1.03E+00	NC	7.62E-01	4.12E-02	1.54E-03	NC
Endrin	6.49E-03	NC	5.84E-02	1.30E-04	9.69E-06	NC
Total PCBs	7.64E-01	1.00E-03	4.58E+00	8.40E-03	1.14E-03	8.50E-05
Aluminum	1.01E+04	2.39E+01	1.01E+04	4.04E+01	1.51E+01	2.03E+00
Antimony	1.26E+03	8.53E-01	1.26E+03	2.52E+02	1.88E+00	7.25E-02
Arsenic	2.88E+03	2.16E+00	2.88E+03	1.15E+02	4.30E+00	1.83E-01
Barium	4.29E+02	NC	4.29E+02	6.44E+01	6.41E-01	NC
Beryllium	8.93E-01	5.50E-03	8.93E-01	8.93E-03	1.33E-03	4.68E-04
Cadmium	9.77E+00	3.16E-01	3.61E+01	5.37E+00	1.46E-02	2.69E-02
Cobalt	8.59E+02	1.44E+01	8.59E+02	1.72E+01	1.28E+00	1.23E+00
Copper	2.88E+03	5.60E+00	5.76E+03	1.15E+03	4.30E+00	4.76E-01
Iron	6.46E+04	1.60E+02	6.46E+04	2.58E+02	9.65E+01	1.36E+01
Lead	1.96E+04	5.58E+02	1.86E+04	8.82E+02	2.93E+01	4.74E+01
Magnesium	6.87E+03	NC	6.87E+03	6.87E+03	1.03E+01	NC
Manganese	6.91E+03	3.80E+00	6.91E+03	1.73E+03	1.03E+01	3.23E-01
Mercury	2.47E+00	1.40E-03	2.47E+00	2.22E+00	3.69E-03	1.19E-04
Nickel	1.17E+03	5.65E+00	2.34E+03	7.02E+01	1.75E+00	4.80E-01
Selenium	6.47E+01	1.12E-01	6.21E+02	1.62E+00	9.66E-02	9.52E-03
Silver	1.14E+02	9.10E-02	1.14E+02	4.56E+01	1.70E-01	7.74E-03
Thallium	1.56E+00	NC	1.56E+00	6.24E-03	2.33E-03	NC
Vanadium	3.89E+01	1.29E-01	3.89E+01	2.14E-01	5.81E-02	1.10E-02
Zinc	6.80E+02	2.46E+01	3.88E+03	1.02E+03	1.02E+00	2.09E+00
	Cs = 95% UCL of detected conc.	Cw = average detected conc. NC = Not a COPC for this medium	Cp = Cs x EUF	Cv = Cs x PUF	EEsoil = Cs x FS x IR x FR / BW FS = 2.8% IR = 0.24 kg/day FR = 1 BW = 4.5 kg	EEwater = Cw x FRw x NIRw FRw = 1 NIRw = 0.085 g/g-day

302886

Red Fox Exposure Calculations
Using 95% UCL Soil Concentrations
Li Tungsten Site

Chemical	Estimated Exposure from Prey (mg/kg BW-day)	Estimated Exposure from Vegetation (mg/kg BW-day)	Total Estimated Exposure (mg/kg BW-day)	Red Fox TRV (mg/kg BW-day)	Hazard Quotient (unitless)
Benzo(b)fluoranthene	6.90E-02	6.49E-05	7.05E-02	2.80E-01	2.52E-01
Pyrene	5.67E-02	2.31E-04	5.85E-02	2.80E-01	2.09E-01
Endrin	4.35E-03	7.27E-07	4.36E-03	3.00E-02	1.45E-01
Total PCBs	3.41E-01	4.71E-05	3.42E-01	1.50E-03	2.28E+02
Aluminum	7.51E+02	2.26E-01	7.69E+02	5.40E-01	1.42E+03
Antimony	9.37E+01	1.41E+00	9.71E+01	3.00E-02	3.24E+03
Arsenic	2.14E+02	6.45E-01	2.19E+02	4.00E-02	5.49E+03
Barium	3.19E+01	3.60E-01	3.29E+01	2.32E+00	1.42E+01
Beryllium	6.64E-02	5.00E-05	6.83E-02	3.00E-01	2.28E-01
Cadmium	2.69E+00	3.01E-02	2.76E+00	5.00E-02	5.52E+01
Cobalt	6.39E+01	9.62E-02	6.65E+01	1.37E+01	4.86E+00
Copper	4.29E+02	6.45E+00	4.40E+02	4.51E+00	9.75E+01
Iron	4.81E+03	1.45E+00	4.92E+03	8.24E+00	5.97E+02
Lead	1.39E+03	4.94E+00	1.47E+03	3.66E+00	4.01E+02
Magnesium	5.11E+02	3.85E+01	5.60E+02	2.56E+01	2.19E+01
Manganese	5.14E+02	9.67E+00	5.34E+02	4.03E+01	1.33E+01
Mercury	1.84E-01	1.24E-02	2.00E-01	3.67E+00	5.45E-02
Nickel	1.74E+02	3.93E-01	1.77E+02	1.83E+01	9.66E+00
Selenium	4.62E+01	9.06E-03	4.63E+01	2.00E-02	2.32E+03
Silver	8.48E+00	2.55E-01	8.91E+00	5.60E-01	1.59E+01
Thallium	1.16E-01	3.49E-05	1.18E-01	3.40E-03	3.48E+01
Vanadium	2.89E+00	1.20E-03	2.96E+00	1.00E-01	2.96E+01
Zinc	2.88E+02	5.71E+00	2.97E+02	7.33E+01	4.05E+00
	EEprey = Cp x FRp x NIp FRp = 1 NIRp = 0.0744 g/g-day	EEveg = Cv x FRv x NIRv FRv = 1 NIRv = 0.0056	EEtotal = EEsoil + EEwater + EEprey + EEveg	NA = Not Available	HQ = EEtotal / NOAELr

302887

APPENDIX Q

302888

Appendix Q

Glen Cove Creek Sampling Data

MATTIACE PETROCHEMICAL SITE
OPERABLE UNIT ONE REMEDIAL ACTION

GLEN COVE CREEK SAMPLING

1.0 Introduction

In June 1995 Ebasco Services conducted a one-time sampling event within the Glen Cove Creek. The objectives of the sampling event, as defined within the approved Remedial Action Project Plan dated February 1994, were:

- Evaluate the Glen Cove Creek water column in the vicinity of the site to establish a baseline water quality and to determine in the future any increase or decrease in the levels of contamination; and,

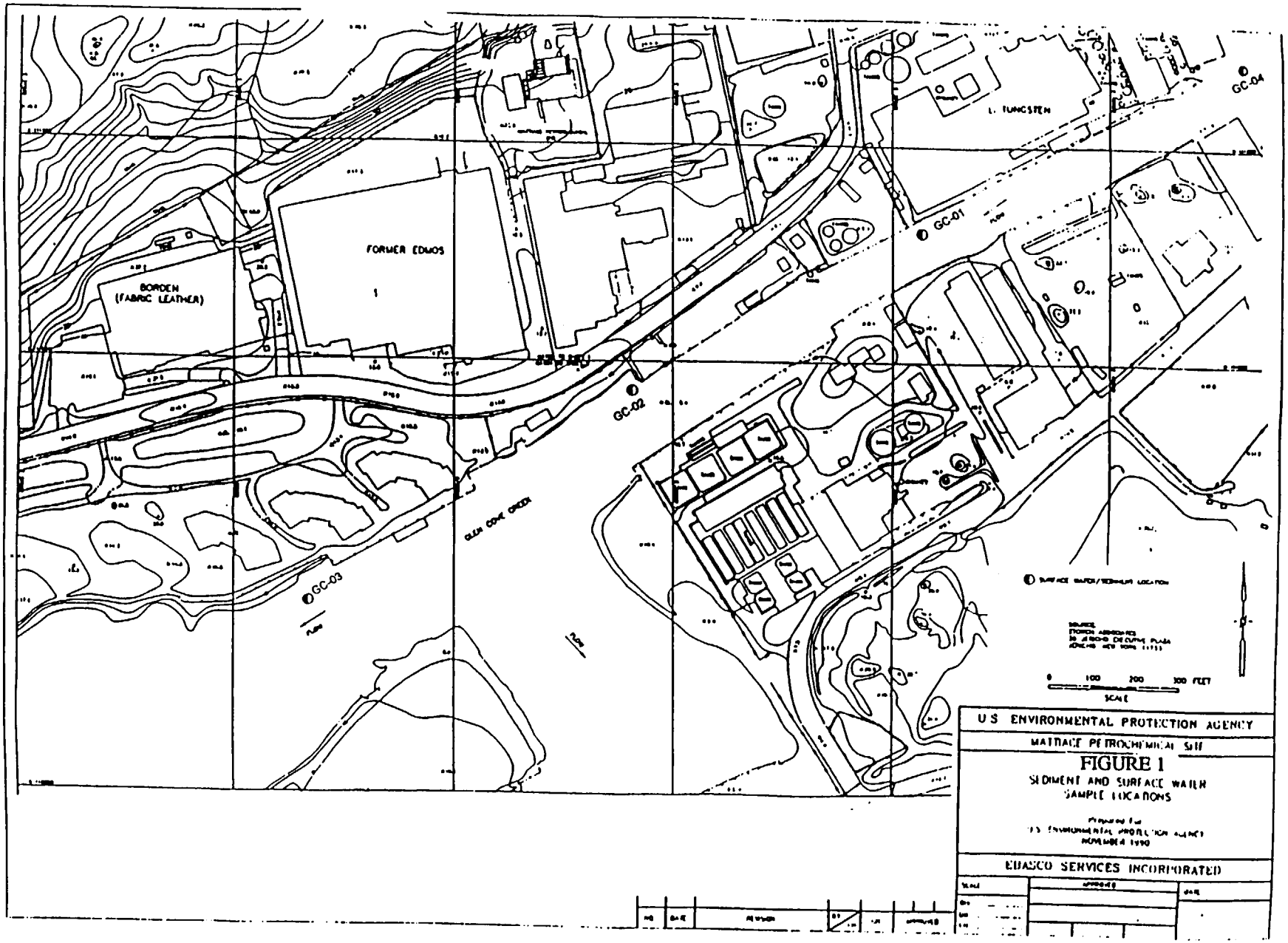
- Evaluate the Glen Cove Creek sediments in the vicinity of the site to establish a baseline quality and to determine in the future any increase or decrease in the levels of contamination.

2.0 Summary of Field Program

The objectives of the sampling event were accomplished via the collection of sediment and water samples from four (4) locations on Glen Cove Creek as presented within Figure 1. A sediment and surface water sample were collected at each location in addition to QA/QC samples. The sediment samples were analyzed for target compound list (TCL) organics, target analyte list (TAL) inorganics, total and dissolved tungsten, and conventional parameters (total organic carbon and grain size). The surface water samples were analyzed for TCL organics, TAL inorganics, total and dissolved tungsten, and hardness. In addition, field measurements of specific conductivity, pH and temperature were performed on the surface water samples at the time of collection. All laboratory analytical work was performed by American Environmental Network, Inc, with the exception of grain-size analysis which was performed by EM Laboratories. Both of these laboratories are NYSDEC certified.

3.0 Analytical Results/Conclusions

Tables 1 through 9 present the analytical data for the June 1995 sediment and surface water sampling event. It should be noted that only those contaminants exhibiting concentrations greater than the detection limits are presented within the data tables. Attachment A presents the complete sediment and surface water data packages. Figures 2 through 6 present the grain size analysis results of the sediment samples. The data provides a baseline quality assessment of the surface water and the sediments within Glen Cove Creek and can be used to determine in the future any increase or decrease in the levels of contamination.


FORMER EDWOS
BORDEN
(FABRIC LEATHER)
GC-01
GC-02
GC-03
GC-04
L. TUNGSTEN
GULF COAST GREEN
0 100 200 300 FEET
SCALE
U S ENVIRONMENTAL PROTECTION AGENCY
MATTIACE PETROCHEMICAL SITE
FIGURE 1
SEDIMENT AND SURFACE WATER SAMPLE LOCATIONS
NOVEMBER 1990
EDASCO SERVICES INCORPORATED

302891

TABLE 1
MATTIACE PETROCHEMICAL SITE
SEDIMENT ANALYTICAL RESULTS

TARGET ANALYTE LIST METALS					
	Sample Designation				
Analyte	GC-01 MPRS-SD01-01	GC-02 MPRS-SD02-01	GC-02D MPRD-SD02-01	GC-03 MPRS-SD03-01	GC-04 MPRS-SD04-01
Aluminum, total	6,700	8,800	9,600	14,000	1,200
Antimony, total	16	15 U	15 U	26 U	8.4 U
Arsenic, total	2.1 U	18	16	16	0.42
Barium, total	509	70	83	96	28 U
Cadmium, total	10	12	14	4.3 U	1.4 U
Calcium, total	6,200	10,000	17,000	12,000	3,100
Chromium, total	43	58	62	94	6.9 J
Cobalt, total	30	26	30	18 J	2.8 J
Copper, total	260	400	410	640	20
Iron, total	15,000	17,000	19,000	30,000	3600
Lead, total	260	330	380	290	39
Magnesium, total	180	6,100	6,800	12,000	1900
Mercury, total	0	1	0.24 J	0	0.14 U
Nickel, total	46	50	50	51	5.6 J
Potassium, total	1,400	1,900	2,000	4,000	2300
Selenium, total	2.1 U	0.96 J	1 J	2 J	1.4
Silver, total	27	47	45	83	5.6 J
Sodium, total	10,000	8,000	8,300	26,000	3100
Tungsten, total	210	160	180	97 J	70
Vanadium, total	23	33	35	55	5.6 J
Zinc, total	340	430	480	460	39

NOTES:

1. All measurements are reported in mg/kg.
2. U - Compound was analyzed for but not detected. The preceding number is the practical quantitation limit for the compound.
3. J - Compund was detected at levels below the practical quantitation limit. The level reported is approximate.

302892

TABLE 2
MATTIACE PETROCHEMICAL SITE
SEDIMENT ANALYTICAL RESULTS

TARGET COMPOUND LIST VOLATILE ORGANICS					
	Sample Designation				
Compound	GC-01 MPRS-SD01-01	GC-02 MPRS-SD02-01	GC-02D MPRD-SD02-01	GC-03 MPRS-SD03-01	GC-04 MPRS-SD04-01
Methylene Chloride	4.0 JB	12 JB	12 JB	74	2.5 JB
2 - Propane (Acetone)	51 JB	43 JB	390 B	300 J	10 JB
2 - Butanone (MEK)	14 J	250 U	94 J	440 U	140 U
2 - Hexanone	100 U	130 U	17 J	220 U	70 U
Chlorobenzene	10 U	13 U	1.6 J	22 U	7.0 U

NOTES:

1. All measurements are reported in ug/kg.
2. U - Compound was analyzed for but not detected. The preceding number is the practical quantitation limit for the compound.
3. J - Compound was detected at levels below the practical quantitation limit. The level reported is approximate.
4. B - Analyte detected in associated blank as well as the sample. It indicates possible/probable blank contamination.

302893

TABLE 3
MATTIACE PETROCHEMICAL SITE
SEDIMENT ANALYTICAL RESULTS

TARGET COMPOUND LIST SEMIVOLATILE ORGANICS					
	Sample Designation				
Compound	GC-01 MPRS-SD01-01	GC-02 MPRS-SD02-01	GC-02D MPRD-SD02-01	GC-03 MPRS-SD03-01	GC-04 MPRS-SD04-01
Acenaphthene	690 U	820 U	850 U	1,400 U	94 J
Fluorene	120 J	820 U	850 U	1,400 U	98 J
Phenanthrene	970	190 J	150 J	1,400 U	860
Anthracene	200 J	820 U	850 U	1,400 U	190 J
Dibutyl Phthalate	390 J	380 J	420 J	1,400 U	160 J
Fluoranthene	1500	440 J	370 J	460 J	1600
Pyrene	990	330 J	260 J	330 J	1400
Butylbenzyl Phthalate	690 U	820 U	850 U	1,400 U	460 U
Benzo (a) anthracene	530 J	220 J	850 U	1,400 U	790
Bis (2 - ethylhexyl) Phthalate	870	980	610 J	600 J	280 J
Chrysene	660 J	250 J	210 J	1,400 U	890
Benzo (b) fluoranthene	590 J	230 J	190 J	1,400 U	580
Benzo (k) fluoranthene	730	820 U	250 J	1,400 U	660
Benzo (a) pyrene	540 J	230 J	180 J	1,400 U	640
Indeno (1, 2, 3 - cd) pyrene	690 U	820 U	850 U	1,400 U	230 J

NOTES:

1. All measurements are reported in ug/kg.
2. U - Compound was analyzed for but not detected. The preceding number is the practical quantitation limit for the compound.
3. J - Compound was detected at levels below the practical quantitation limit. The level reported is approximate.

302894

TABLE 4
MATTIACE PETROCHEMICAL SITE
SEDIMENT ANALYTICAL RESULTS

TARGET COMPOUND LIST PESTICIDES AND PCBs				
	Sample Designation			
Compound	GC-01 MPRS-SD01-01	GC-02D MPRD-SD02-01	GC-03 MPRS-SD03-01	GC-04 MPRS-SD04-01
Endosulfan I	57	20	33	28
gamma - Chlordane	16	1.3 U	2.3 U	0.72 U

NOTES:

1. All measurements in ug/kg or ppb unless otherwise noted.
2. U - Compound was analyzed for but not detected. The preceding number is the practical quantitation limit for the compound

302895

TABLE 5
MATTIACE PETROCHEMICAL SITE
SURFACE WATER ANALYTICAL RESULTS

TARGET ANALYTE LIST METALS					
Analyte	Sample Designation				
	GC-01 MPRS-SW01-01	GC-02 MPRS-SW02-01	GC-02D MPRD-SW02-01	GC-03 MPRS-SW03-01	GC-04 MPRS-SW04-01
Aluminum, total	220	170 J	180 J	270	210
Calcium, total	310,000	140,000	140,000	290,000	300,000
Cobalt, total	55	50 U	50 U	40 J	51
Iron, total	250	340	390 U	260	430
Magnesium, total	960,000	420,000	420,000	960,000	900,000
Manganese, total	55	52	55	51	75
Potassium, total	290,000	120,000	110,000	270,000	280,000
Silver, total	40 U	120 B	60 B	65 B	40 U
Sodium, total	7,500,000	3,800,000	4,000,000	7,800,000	7,100,000
Zinc, total	20 U	29	28	52	17 J

NOTES:

1. All measurements reported in ug/l.
2. U - Compound was analyzed for but not detected. The precedeing number is the practical quantitation limit for the compound.
3. J - Compound was detected at levels below the practical quantitation limit. The level reported is approximate.
4. B - Analyte detected in associated blank as well as the sample. It indicates possible/probable blank contamination.

302896

TABLE 6
MATTIACE PETROCHEMICAL SITE
SURFACE WATER ANALYTICAL RESULTS

TARGET COMPOUND LIST ORGANICS					
	Sample Designation				
Compound	GC-01 MPRS-SW01-01	GC-02 MPRS-SW02-01	GC-02D MPRD-SW02-01	GC-03 MPRS-SW03-01	GC-04 MPRS-SW04-01
Volatile Organics					
Methylene Chloride	1.5 JB	5.0 U	5.0 U	1.0 J	1.8 JB
2 - Propane (Acetone)	50 U	8.6 JB	14 JB	50 U	50 U
2 - Butanone (MEK)	50 U	6.5 J	6.0 J	50 U	50 U
2 - Hexanone	5.0 U	0. 41 J	0.46 J	5.0 U	5.0 U
Chlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U	0.62 J
Semivolatile Organics					
Butylbenzyl Phthalate	11 U	1.9 J	11 U	10 U	11 U

NOTES:

1. All measurements are reported in ug/l.
2. U - Compound was analyzed for but not detected. The preceding number is the practical quantitation limit for the compound.
3. J - Compound was detected at levels below the practical quantitation limit. The level reported is approximate.

B - Analyte detected in associated blank as well as the sample. It indicates possible/probable blank contamination.

302897

TABLE 7
MATTIACE PETROCHEMICAL SITE
SEDIMENT AND SURFACE WATER ANALYTICAL RESULTS

GENERAL CHEMISTRY					
Sediment	**Sample Designation**				
Parameter	GC-01 MPRS-SD01-01	GC-02 MPRS-SD02-01	GC-02D MPRD-SD02-01	GC-03 MPRS-SD03-01	GC-04 MPRS-SD04-01
Total Solids (%)	48	40	39	23	71
Total Organic Carbon (ug/kg)	210,000 U	250,000 U	250,000 U	430,000 U	440,000
Surface Water	**Sample Designation**				
Parameter	GC-01 MPRS-SW01-01	GC-02 MPRS-SW02-01	GC-02D MPRD-SW02-01	GC-03 MPRS-SW03-01	GC-04 MPRS-SW04-01
Hardness, as $CaCO_3$ (ug/kg)	5,000,000	3,700,000	2,900,000	5,000,000	4,800,000

NOTES:

1. U - Compound was analyzed for but not detected. The preceding number is the practical quantitation limit for the compound.

302898

TABLE 9
MATTIACE PETROCHEMICAL SITE
SURFACE WATER RESULTS

FIELD PARAMETERS				
Surface Water	**Sample Designation**			
Parameter	GC-01	GC-02	GC-03	GC-04
Depth of Water (ft.)	13	9	13	8
Depth of Sample (ft.)	7	4	6	3
Temperature (°C)	11	11	12	13
pH	7	7	5	7
Conductivity (umhos/cm)	42	41	42	41

302899

A-6

SURFACE WATER ANALYSES

MATTIACE PETROCHEMICAL SITE
SURFACE WATER SAMPLES
TOTAL (TTM) AND DISSOLVED (TDM) METALS

SAMPLE ID	MP-GC01-SW01	MP-GC01-SW01	MP-GC02-SW01	MP-GC02-SW01	MP-GC03-SW01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L
ANALYSIS	TDM	TTM	TDM	TTM	TTM
INORGANIC PARAMETERS:					
ALUMINUM	---	279.000	---	---	205.000
ANTIMONY	---	---	69.400J	---	---
ARSENIC	---	---	---	---	---
BARIUM	---	---	---	---	---
BERYLLIUM	---	---	---	---	---
CADMIUM	---	---	---	---	---
CALCIUM	159,000.000	171,000.000	156,000.000	161,000.000	177,000.000
CHROMIUM	19.400J	---	---	---	---
COBALT	---	---	---	---	---
COPPER	---	---	---	---	---
IRON	---	---	---	---	---
LEAD	---	---	---	---	---
MAGNESIUM	571,000.000	588,000.000	600,000.000	552,000.000	661,000.000
MANGANESE	110.000J	110.000J	99.500J	97.900J	74.800J
MERCURY	---	.230	---	---	---
NICKEL	---	---	---	---	---
POTASSIUM	193,000.000	204,000.000	193,000.000	191,000.000	210,000.000
SELENIUM	---	---	---	---	---
SILVER	---	---	---	9.500	---
SODIUM	48,200.000	5,330,000.000	46,600.000	4,700,000.000	5,530,000.000
THALLIUM	---	---	11.500J	---	---
VANADIUM	---	---	---	---	---
ZINC	---	---	---	---	---
CYANIDE	---	---	---	---	---

EXPLANATION OF CODES :

(no codes)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
B	COMPOUND FOUND IN BLANK
U or ---	UNDETECTED
NA	NOT ANALYZED FOR
X,R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED
JN	PRESUMPTIVE EVIDENCE FOR THE PRESENCE OF THE MATERIAL AT AN ESTIMATED VALUE

MATTIACE PETROCHEMICAL SITE
SURFACE WATER SAMPLES
TOTAL (TTM) AND DISSOLVED (TDM) METALS

SAMPLE ID	MP-GC03-SW01	MP-GC03-SW02
UNITS	UG/L	UG/L
ANALYSIS	TDM	TTM
INORGANIC PARAMETERS:		
ALUMINUM	138.000	200.000
ANTIMONY	---	---
ARSENIC	---	---
BARIUM	---	---
BERYLLIUM	---	---
CADMIUM	---	---
CALCIUM	189,000.000	180,000.000
CHROMIUM	---	---
COBALT	---	---
COPPER	---	---
IRON	---	---
LEAD	---	---
MAGNESIUM	64,300.000	622,000.000
MANGANESE	64.200J	88.100J
MERCURY	---	---
NICKEL	---	---
POTASSIUM	215,000.000	207,000.000
SELENIUM	---	---
SILVER	---	10.200J
SODIUM	5,400,000.000	517,000.000
THALLIUM	---	---
VANADIUM	---	---
ZINC	---	---
CYANIDE	---	---

EXPLANATION OF CODES :

(no codes)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
B	COMPOUND FOUND IN BLANK
U or ---	UNDETECTED
NA	NOT ANALYZED FOR
X,R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED
JN	PRESUMPTIVE EVIDENCE FOR THE PRESENCE OF THE MATERIAL AT AN ESTIMATED VALUE

MATTIACE PETROCHEMICAL SITE
SURFACE WATER SAMPLES
PESTICIDE/PCB ANALYSES

DATE:01/02/91
TIME:08:58:15
PAGE: 1
Report format 1

SAMPLE ID	MP-GC01-SW01	MP-GC02-SW01	MP-GC03-SW01	MP-GC03-SW02
UNITS	UG/L	UG/L	UG/L	UG/L
PESTICIDE/PCB PARAMETERS:				
ALPHA-BHC	---	---	---	---
BETA-BHC	---	---	---	---
DELTA-BHC	---	---	---	---
GAMMA-BHC	---	---	---	---
HEPTACHLOR	---	---	---	---
ALDRIN	---	---	---	---
HEPTACHLOR EPOXIDE	---	---	---	---
ENDOSULFAN I	---	---	---	---
DIELDRIN	---	---	---	---
4-4-DDE	---	---	---	---
ENDRIN	---	---	---	---
ENDOSULFAN II	---	---	---	---
4-4-DDD	---	---	---	---
ENDOSULFAN SULFATE	---	---	---	---
4-4-DDT	---	---	---	---
METHOXYCHLOR	---	---	---	---
ENDRIN KETONE	---	---	---	---
ALPHA CHLORDANE	---	---	---	---
GAMMA CHLORDANE	.500	.500	.500	.500
TOXAPHENE	---	---	---	---
AROCLOR 1016	---	---	---	---
AROCLOR 1221	---	---	---	---
AROCLOR 1232	---	---	---	---
AROCLOR 1242	---	---	---	---
AROCLOR 1248	---	---	---	---
AROCLOR 1254	---	---	---	---
AROCLOR 1260	---	---	---	---

EXPLANATION OF CODES :

(no codes)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
B	COMPOUND FOUND IN BLANK
U or ---	UNDETECTED
NA	NOT ANALYZED FOR
R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED
JN	PRESUMPTIVE EVIDENCE FOR THE PRESENCE OF THE MATERIAL AT AN ESTIMATED VALUE

MATTIACE PETROCHEMICAL SITE
SURFACE WATER SAMPLES
BASE NEUTRAL ANALYSES

DATE:12,
TIME:16:
PAGE: 1
Report for

SAMPLE ID	MP-GC01-SW01	MP-GC02-SW01	MP-GC03-SW01	MP-GC03-SW02
UNITS	UG/L	UG/L	UG/L	UG/L
BASE/NEUTRAL PARAMETERS:				
PHENOL	---	---	---	---
BIS[2-CHLOROETHYL] ETHER	---	---	---	---
2-CHLOROPHENOL	---	---	---	---
1,3-DICHLOROBENZENE	---	---	---	---
1,4-DICHLOROBENZENE	---	---	---	---
BENZYL ALCOHOL	---	---	---	---
1,2-DICHLOROBENZENE	---	---	---	---
2-METHYLPHENOL	---	---	---	---
BIS[2-CHLOROISOPROPYL] ETHER	---	---	---	---
4-METHYLPHENOL	---	---	---	---
N-NITROSO-DIPROPYLAMINE	---	---	---	---
HEXACHLOROETHANE	---	---	---	---
NITROBENZENE	---	---	---	---
ISOPHORONE	---	---	---	---
2-NITROPHENOL	---	---	---	---
2,4-DIMETHYLPHENOL	---	---	---	---
BENZOIC ACID	---	---	---	---
BIS[2-CHLOROETHOXY] METHANE	---	---	---	---
2,4-DICHLOROPHENOL	---	---	---	---
2,2,4-TRICHLOROBENZENE	---	---	---	---
NAPHTHALENE	---	---	---	---
4-CHLOROANILINE	---	---	---	---
HEXACHLOROBUTADIENE	---	---	---	---
4-CHLORO-3-METHLYPHENOL	---	---	---	---
ACENAPHTHENE	---	---	---	---
2,4-DINITROPHENOL	---	---	---	---
4-NITROPHENOL	---	---	---	---
DIBENZOFURAN	---	---	---	---
2,4-DINITROTOLUENE	---	---	---	---
2,6-DINITROTOLUENE	---	---	---	---
DIETHYLPHTHALATE	---	---	---	---
4-CHLOROPHENYL PHENYL ETHER	---	---	---	---
FLUORENE	---	---	---	---
4-NITROANILINE	---	---	---	---

EXPLANATION OF CODES :

(no codes)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
B	COMPOUND FOUND IN BLANK
U or ---	UNDETECTED
NA	NOT ANALYZED FOR
X,R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED
JN	PRESUMPTIVE EVIDENCE FOR THE PRESENCE OF THE MATERIAL AT AN ESTIMATED VALUE

SAMPLE ID	MP-GC01-SW01	MP-GC02-SW01	MP-GC03-SW01	MP-GC03-SW02
UNITS	UG/L	UG/L	UG/L	UG/L
4,6-DINITRO-2-METHYLPHENOL	---	---	---	---
N-NITROSODIPHENYLAMINE	---	---	---	---
4-BROMOPHENYL PHENYL ETHER	---	---	---	---
HEXACHLOROBENZENE	---	---	---	---
PENTACHLOROPHENOL	---	---	---	---
PHENANTHRENE	---	---	---	---
ANTHRACENE	---	---	---	---
DI-n-BUTYLPHTHALATE	---	---	---	---
FLUORANTHRENE	---	---	---	---
PYRENE	---	---	---	---
BUTYL BENZYL PHTHALATE	---	---	---	---
3,3-DICHLOROBENZIDINE	---	---	---	---
BENZO[a]ANTHRACENE	---	---	---	---
BIS[2-ETHYLHEXYL]PHTHALATE	---	---	---	---
2-METHYLNAPHTHALENE	---	---	---	---
HEXACHLOROCYCLOPENTADIENE	---	---	---	---
2,4,6-TRICHLOROPHENOL	---	---	---	---
2,4,5-TRICHLOROPHENOL	---	---	---	---
2-CHLORONAPHTHALENE	---	---	---	---
2-NITROANILINE	---	---	---	---
DIMETHYL PHTHALATE	---	---	---	---
ACENAPHTHYLENE	---	---	---	---
3-NITROANILINE	---	---	---	---
CHRYSENE	---	---	---	---
DI-n-OCTYL PHTHALATE	---	---	---	---
BENZO[b]FLUORANTHENE	---	---	---	---
BENZO[k]FLUORANTHENE	---	---	---	---
BENZO[a]PYRENE	---	---	---	---
INDENO[1,2,3-CD]PYRENE	---	---	---	---
DIBENZ[A,H]ANTHRACENE	---	---	---	---
BENZO[G,H,I]PERYLENE	---	---	---	---
TOTAL 4 & 3-METHYLPHENOL	---	---	---	---
PYRIDINE	---	---	---	---
2,3,4,6-TETRACHLOROPHENOL	---	---	---	---
TOTAL TICS	0	2	0	1
TIC CONCENTRATION	--- J	8.600	---	7.000

EXPLANATION OF CODES :

(no codes)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
B	COMPOUND FOUND IN BLANK
U or ---	UNDETECTED
NA	NOT ANALYZED FOR
X,R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED
JN	PRESUMPTIVE EVIDENCE FOR THE PRESENCE OF THE MATERIAL AT AN ESTIMATED VALUE

MATTIACE PETROCHEMICAL SITE
SURFACE WATER SAMPLES
TCL VOLATILES

DATE:12/27,
TIME:13:24:
PAGE: 1
Report format

SAMPLE ID	MP-GC01-SW01	MP-GC02-SW01	MP-GC03-SW01	MP-GC03-SW02
UNITS	UG/L	UG/L	UG/L	UG/L
TCL VOLATILE PARAMETERS:				
CHLOROMETHANE	---	---	---	---
BROMOMETHANE	---	---	---	---
VINYL CHLORIDE	---	---	---	---
CHLOROETHANE	---	---	---	---
METHYLENE CHLORIDE	---	---	---	---
ACETONE	---	---	---	---
CARBON DISULFIDE	---	---	---	---
1,1-DICHLOROETHENE	---	---	---	---
1,1-DICHLOROETHANE	---	---	---	---
TRANS-1,2-DICHLOROETHENE	2.000	.800J	.400J	.300J
CHLOROFORM	---	.700J	.600J	.600J
1,2-DICHLOROETHANE	---	---	---	---
2-BUTANONE	---	---	---	---
1,1,1-TRICHLOROETHANE	---	---	---	---
CARBON TETRACHLORIDE	---	---	---	---
VINYL ACETATE	---	---	---	---
BROMODICHLOROMETHANE	.200J	1.000J	1.000J	1.000J
1,2-DICHLOROPROPANE	---	---	---	---
TRANS-1,3-DICHLOROPROPENE	---	---	---	---
TRICHLOROETHENE	---	.600J	.300J	.300J
DIBROMOCHLOROMETHANE	---	.600J	.600J	1.000J
1,1,2-TRICHLOROETHANE	---	---	---	---
BENZENE	---	---	---	---
CIS-1,3-DICHLOROPROPENE	---	---	---	---
2-CHLOROETHYLVINYLETHER	---	---	---	---
BROMOFORM	---	---	---	---
4-METHYL-2-PENTANONE	---	---	---	---
2-HEXANONE	---	---	---	---
TETRACHLOROETHENE	5.000	3.000J	1.000J	1.000J
1,1,2,2-TETRACHLOROETHANE	---	---	---	---
TOLUENE	---	---	---	---
CHLOROBENZENE	---	---	---	---
ETHYLBENZENE	---	---	---	---
STYRENE	---	---	---	---

EXPLANATION OF CODES :

(no codes)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
B	COMPOUND FOUND IN BLANK
U or ---	UNDETECTED
NA	NOT ANALYZED FOR
X,R	REJECTED VALUE
P	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED
	PRESUMPTIVE EVIDENCE FOR THE PRESENCE OF THE MATERIAL AT AN ESTIMATED VALUE

302906

SAMPLE ID	MP-GC01-SW01	MP-GC02-SW01	MP-GC03-SW01	MP-GC03-SW02
UNITS	UG/L	UG/L	UG/L	UG/L
TOTAL XYLENES	---	---	---	---
ACRYLONITRILE	---	---	---	---
1,1,1,2-TETRACHLOROETHANE	---	---	---	---
ISOBUTANOL	---	---	---	---
TOTAL TICS	1	1	0	0
TIC CONCENTRATION	2.000J	1.000	---	---

EXPLANATION OF CODES :

(no codes)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
B	COMPOUND FOUND IN BLANK
U or ---	UNDETECTED
NA	NOT ANALYZED FOR
X,R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED
JN	PRESUMPTIVE EVIDENCE FOR THE PRESENCE OF THE MATERIAL AT AN ESTIMATED VALUE

A-7

SEDIMENT ANALYSES

MATTIACE PETROCHEMICAL SITE
SEDIMENT SAMPLES
BASE NEUTRAL ANALYSES

SAMPLE ID	MP-GC01-SD01	MP-GC02-SD01	MP-GC03-SD01	MP-GC03-SD02
UNITS	UG/KG	UG/KG	UG/KG	UG/KG
BASE/NEUTRAL PARAMETERS:				
PHENOL	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
BIS(2-CHLOROETHYL) ETHER	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2-CHLOROPHENOL	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
1,3-DICHLOROBENZENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
1,4-DICHLOROBENZENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
BENZYL ALCOHOL	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
1,2-DICHLOROBENZENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2-METHYLPHENOL	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
BIS(2-CHLOROISOPROPYL) ETHER	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
4-METHYLPHENOL	1,700.000 U	3,300.000	1,700.000 U	1,400.000 U
N-NITROSO-DIPROPYLAMINE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
HEXACHLOROETHANE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
NITROBENZENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
ISOPHORONE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2-NITROPHENOL	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2,4-DIMETHYLPHENOL	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
BENZOIC ACID	8,200.000 U	10,000.000 U	8,000.000 U	7,000.000 U
BIS(2-CHLOROETHOXY) METHANE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2,4-DICHLOROPHENOL	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
,4-TRICHLOROBENZENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
HTHALENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
4-CHLOROANILINE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
HEXACHLOROBUTADIENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
4-CHLORO-3-METHLYPHENOL	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2-METHYLNAPHTHALENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
HEXACHLOROCYCLOPENTADIENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2,4,6-TRICHLOROPHENOL	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2,4,5-TRICHLOROPHENOL	8,200.000 U	10,000.000 U	8,000.000 U	7,000.000 U
2-CHLORONAPHTHALENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2-NITROANILINE	8,200.000 U	10,000.000 U	8,000.000 U	7,000.000 U
DIMETHYL PHTHALATE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
ACENAPHTHYLENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
TROANILINE	8,200.000 U	10,000.000 U	8,000.000 U	7,000.000 U
APHTHENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
-DINITROPHENOL	8,200.000 U	10,000.000 U	8,000.000 U	7,000.000 U
-NITROPHENOL	8,200.000 U	10,000.000 U	8,000.000 U	7,000.000 U
DIBENZOFURAN	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2,4-DINITROTOLUENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
2,6-DINITROTOLUENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
DIETHYLPHTHALATE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
4-CHLOROPHENYL PHENYL ETHER	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U

EXPLANATION OF CODES:

(no code)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
	COMPOUND FOUND IN BLANK
or ---	UNDETECTED
NA	NOT ANALYZED FOR
R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED

MATTIACE PETROCHEMICAL SITE
SEDIMENT SAMPLES
TCL VOLATILES

SAMPLE ID	MP-GC01-SD01	MP-GC02-SD01	MP-GC03-SD01	MP-GC03-SD02
UNITS	UG/KG	UG/KG	UG/KG	UG/KG
TCL VOLATILE PARAMETERS:				
CHLOROMETHANE	130.000 U	160.000 U	130.000 U	110.000 U
BROMOMETHANE	130.000 U	160.000 U	130.000 U	110.000 U
VINYL CHLORIDE	130.000 U	160.000 U	130.000 U	110.000 U
CHLOROETHANE	130.000 U	160.000 U	130.000 U	110.000 U
METHYLENE CHLORIDE	49.000 BJ	63.000 BJ	54.000 BJ	52.000 BJ
ACETONE	1,400.000	2,100.000	540.000	290.000
CARBON DISULFIDE	260.000	640.000	100.000	70.000
1,1-DICHLOROETHENE	64.000 U	81.000 U	63.000 U	54.000 U
1,1-DICHLOROETHANE	64.000 U	81.000 U	63.000 U	54.000 U
TRANS-1,2-DICHLOROETHENE	13.000 J	81.000 U	63.000 U	54.000 U
CHLOROFORM	21.000 BJ	34.000 BJ	17.000 BJ	17.000 BJ
1,2-DICHLOROETHANE	64.000 U	81.000 U	63.000 U	54.000 U
2-BUTANONE	130.000 U	160.000 U	1,200.000	110.000 U
1,1,1-TRICHLOROETHANE	64.000 U	81.000 U	63.000 U	54.000 U
CARBON TETRACHLORIDE	64.000 U	81.000 U	63.000 U	54.000 U
VINYL ACETATE	130.000 U	160.000 U	130.000 U	110.000 U
BROMODICHLOROMETHANE	64.000 U	81.000 U	63.000 U	54.000 U
1,2-DICHLOROPROPANE	64.000 U	81.000 U	63.000 U	54.000 U
TRANS-1,3-DICHLOROPROPENE	64.000 U	81.000 U	63.000 U	54.000 U
TRICHLOROETHENE	41.000 J	81.000 U	63.000 U	54.000 U
DIBROMOCHLOROMETHANE	64.000 U	81.000 U	63.000 U	54.000 U
1,1,2-TRICHLOROETHANE	64.000 U	81.000 U	63.000 U	54.000 U
BENZENE	64.000 U	81.000 U	63.000 U	54.000 U
CIS-1,3-DICHLOROPROPENE	64.000 U	81.000 U	63.000 U	54.000 U
2-CHLOROETHYLVINYLETHER	0.000 NA	0.000 NA	0.000 NA	0.000 NA
BROMOFORM	64.000 U	81.000 U	63.000 U	54.000 U
4-METHYL-2-PENTANONE	130.000 U	160.000 U	130.000 U	110.000 U
2-HEXANONE	130.000 U	160.000 U	130.000 U	110.000 U
TETRACHLOROETHENE	64.000 U	81.000 U	63.000 U	54.000 U
1,1,2,2-TETRACHLOROETHANE	64.000 U	81.000 U	63.000 U	54.000 U
TOLUENE	64.000 U	25.000 J	6.000 J	54.000 U
CHLOROBENZENE	64.000 U	81.000 U	63.000 U	54.000 U
ETHYLBENZENE	64.000 U	81.000 U	63.000 U	54.000 U
STYRENE	64.000 U	81.000 U	63.000 U	54.000 U
TOTAL XYLENES	64.000 U	81.000 U	63.000 U	54.000 U
TOTAL TICS	NR	10	NR	NR
TIC CONCENTRATION	NR	2,725.000 J	NR	NR

EXPLANATION OF CODES:

(no code)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
B	COMPOUND FOUND IN BLANK
U or ---	UNDETECTED
NA	NOT ANALYZED FOR
R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED

SAMPLE ID	MP-GC01-SD01	MP-GC02-SD01	MP-GC03-SD01	MP-GC03-SD02
UNITS	MG/KG	MG/KG	MG/KG	MG/KG
INORGANIC PARAMETERS:				
ALUMINUM	10,700.000 J	16,300.000 J	16,200.000 J	13,600.000 J
ANTIMONY	30.500 R	---	---	---
ARSENIC	22.000 R	35.400 J	17.500 J	16.500 J
BARIUM	60.400 BJ	89.900 BJ	91.300 BJ	75.200 BJ
BERYLLIUM	---	---	---	---
CADMIUM	6.900 J	10.000 J	11.300 J	7.200 J
CALCIUM	11,800.000 J	10,100.000 J	6,550.000 J	38,500.000 J
CHROMIUM	42.500 J	88.100 J	97.300 J	79.200 J
COBALT	46.500 J	28.200 BJ	34.200 J	22.300 BJ
COPPER	377.000 J	571.000 J	663.000 J	510.000 J
IRON	20,600.000 J	3,010.000 J	28,900.000 J	23,000.000 J
LEAD	410.000 R	770.000 R	490.000 R	2.100 R
MAGNESIUM	8,200.000 J	12,300.000 J	9,930.000 J	7,780.000 J
MANGANESE	277.000 J	311.000 J	279.000 J	218.000 J
MERCURY	1.700 J	2.500 J	2.000 J	2.400 J
NICKEL	98.200 J	41.100 J	40.500 J	31.900 J
POTASSIUM	2,080.000 BJ	4,590.000 J	4,190.000 J	3,540.000 J
SELENIUM	---	---	---	2.600 BJ
SILVER	---	---	---	6.600 J
SODIUM	16,300.000 J	31,600.000 J	20,800.000 J	17,400.000 J
THALLIUM	---	---	---	---
VANADIUM	28.100 BJ	54.500 J	60.000 J	48.100 J
ZINC	361.000 J	533.000 J	442.000 J	349.000 J

EXPLANATION OF CODES:

(no code)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
B	CONCENTRATION < CRDL BUT > IDL
U or ---	UNDETECTED
.	NOT ANALYZED FOR
R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED

MATTIACE PETROCHEMICAL SITE
SEDIMENT SAMPLES
BASE NEUTRAL ANALYSES

SAMPLE ID	MP-GC01-SD01	MP-GC02-SD01	MP-GC03-SD01	MP-GC03-SD02
UNITS	UG/KG	UG/KG	UG/KG	UG/KG
FLUORENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
4-NITROANILINE	8,200.000 U	10,000.000 U	8,000.000 U	7,000.000 U
4,6-DINITRO-2-METHYLPHENOL	8,200.000 U	10,000.000 U	8,000.000 U	7,000.000 U
N-NITROSODIPHENYLAMINE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
4-BROMOPHENYL PHENYL ETHER	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
HEXACHLOROBENZENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
PENTACHLOROPHENOL	8,200.000 U	10,000.000 U	8,000.000 U	7,000.000 U
PHENANTHRENE	4,200.000	1,400.000 J	550.000 J	1,400.000 U
ANTHRACENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
DI-n-BUTYLPHTHALATE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
FLUORANTHRENE	7,100.000	3,600.000	1,600.000 J	1,100.000 J
PYRENE	5,900.000	3,700.000	1,800.000 U	1,400.000 J
BUTYL BENZYL PHTHALATE	1,200.000 J	2,100.000 U	1,700.000 U	1,400.000 U
3,3-DICHLOROBENZIDINE	3,400.000 U	4,300.000 U	3,300.000 U	2,900.000 U
BENZO[a]ANTHRACENE	2,200.000	2,100.000 U	680.000 J	490.000 J
BIS[2-ETHYLHEXYL]PHTHALATE	13,000.000	21,000.000	12,000.000	10,000.000
CHRYSENE	3,700.000	2,200.000	940.000 J	880.000 J
DI-n-OCTYL PHTHALATE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
BENZO[b]FLUORANTHENE	1,700.000 U	2,600.000	1,400.000 J	1,100.000 J
BENZO[k]FLUORANTHENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
BENZO[a]PYRENE	2,300.000	1,700.000 J	900.000 J	680.000 J
INDENO[1,2,3-CD]PYRENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
DIBENZ[A,H]ANTHRACENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
BENZO[G,H,I]PERYLENE	1,700.000 U	2,100.000 U	1,700.000 U	1,400.000 U
TOTAL TICS	NR	NR	NR	NR
TIC CONCENTRATION	NR	NR	NR	NR

EXPLANATION OF CODES:

(no code)	DETECTED AT CONCENTRATION INDICATED
J	ESTIMATED VALUE
B	COMPOUND FOUND IN BLANK
U or ---	UNDETECTED
NA	NOT ANALYZED FOR
R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED

MATTIACE PETROCHEMICAL SITE
SEDIMENT SAMPLES
PESTICIDE/PCB ANALYSES

SAMPLE ID	MP-GC01-SD01	MP-GC02-SD01	MP-GC03-SD01	MP-GC03-SD02
UNITS	UG/KG	UG/KG	UG/KG	UG/KG
**PESTICIDE/PCB PARAMETERS:				
ALPHA-BHC	41.000 U	15.000 J	40.000 U	35.000 U
BETA-BHC	41.000 U	52.000 U	40.000 U	35.000 U
DELTA-BHC	600.000	980.000	280.000	190.000
GAMMA-BHC	41.000 U	52.000 U	40.000 U	35.000 U
HEPTACHLOR	41.000 U	52.000 U	40.000 U	35.000 U
ALDRIN	31.000 J	13.000 J	11.000 J	8.200 J
HEPTACHLOR EPOXIDE	41.000 U	52.000 U	40.000 U	35.000 U
ENDOSULFAN I	41.000 U	52.000 U	40.000 U	35.000 U
DIELDRIN	36.000 J	20.000 J	80.000 U	70.000 U
4-4-DDE	140.000	98.000 J	52.000 J	46.000 J
ENDRIN	82.000 U	18.000 J	80.000 U	70.000 U
ENDOSULFAN II	82.000 U	100.000 U	80.000 U	70.000 U
4-4-DDD	270.000	160.000	59.000 J	51.000 J
ENDOSULFAN SULFATE	480.000	100.000 U	80.000 U	70.000 U
4-4-DDT	230.000	78.000 J	80.000 U	70.000 U
METHOXYCHLOR	410.000 U	520.000 U	400.000 U	350.000 U
ENDRIN KETONE	82.000 U	100.000 U	80.000 U	70.000 U
ALPHA CHLORDANE	89.000 J	48.000 J	25.000 J	21.000 J
GAMMA CHLORDANE	140.000 J	71.000 J	36.000 J	31.000 J
TOXAPHENE	820.000 U	1,000.000 U	800.000 U	700.000 U
AROCLOR 1016	410.000 U	520.000 U	400.000 U	350.000 U
AROCLOR 1221	410.000 U	520.000 U	400.000 U	350.000 U
AROCLOR 1232	410.000 U	520.000 U	400.000 U	350.000 U
AROCLOR 1242	410.000 U	520.000 U	400.000 U	350.000 U
AROCLOR 1248	410.000 U	520.000 U	400.000 U	350.000 U
AROCLOR 1254	820.000 U	1,000.000 U	800.000 U	700.000 U
AROCLOR 1260	820.000 U	1,000.000 U	800.000 U	700.000 U

'PLANATION OF CODES:

) code)	DETECTED AT CONCENTRATION INDICATED
	ESTIMATED VALUE
	COMPOUND FOUND IN BLANK
or ---	UNDETECTED
/A	NOT ANALYZED FOR
R	REJECTED VALUE
NR	VALIDATED RESULTS NOT RECEIVED OR RESULT NOT REPORTED