

Appendix C - Intake Factor Worksheets



Worksheet 5.1
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	Current or Future Resident
Exposure Route:	Dermal: Bath
Receptor Age:	Child

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm ² -event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm ²	6,600	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm ² /kg-day	3.62E+01	calculated
IF-N	Intake Factor (Non-cancer)	event-cm ² /kg-day	4.22E+02	calculated

- MRBCA= Missouri Risk-Based Corrective Action
- VA DEQ= Virginia Department of Environmental Quality VRP
- EPA, 1989= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.
- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1992= Dermal Exposure Assessment: Principles and Applications. Office of Health and Environmental Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
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- EPA, 2002= Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24

Worksheet 5.2
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	Current or Future Resident
Exposure Route:	Dermal: Bath
Receptor Age:	Child

Intake Equation:	DAD=DAevent x IF
Intake Factor Equation:	IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm ² -event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm ²	360	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm ² /kg-day	1.97E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm ² /kg-day	2.30E+01	calculated

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Worksheet 5.3
 VALUES USED FOR DAILY INTAKE CALCULATIONS
 Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	Current or Future Resident
Exposure Route:	Ingestion
Receptor Age:	Child

Intake Equation: $CDI = CW \times IF$ Intake Factor Equation: $IF = IR-W \times EF \times ED \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/day	1	EPA, 1999
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	5.48E-03	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	6.39E-02	calculated

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Worksheet 5.4
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Tapwater
Exposure Medium:	Air
Receptor Population:	Current or Future Resident
Exposure Route:	Inhalation
Receptor Age:	Child

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	0.3625	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
ET	Exposure Time (Bath)	hours/day	0.75	EPA, 1997
BW	Body Weight	kg	15	EPA, 1997
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	1.49E-03	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	1.74E-02	calculated

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Worksheet 5.5
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Indoor Air
Receptor Population:	Current or Future Resident
Exposure Route:	Inhalation
Receptor Age:	Child

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	0.3625	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
ET	Exposure Time (Indoors)	hours/day	16.4	EPA, 1991
BW	Body Weight	kg	15	EPA, 1997
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	3.26E-02	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	3.80E-01	calculated

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Worksheet 5.6
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	Current or Future Resident
Exposure Route:	Inhalation
Receptor Age:	Child

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	0.3625	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
ET	Exposure Time (Indoors)	hours/day	5.57	EPA, 1991
BW	Body Weight	kg	15	EPA, 1997
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	1.11E-02	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	1.29E-01	calculated

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Worksheet 5.7
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	Current or Future Resident
Exposure Route:	Dermal: Shower
Receptor Age:	Adult

Intake Equation: DAD=DAevent x IF
Intake Factor Equation: IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm ² -event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm ²	18,000	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm ² /kg-day	8.45E+01	calculated
IF-N	Intake Factor (Non-cancer)	event-cm ² /kg-day	2.47E+02	calculated

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Worksheet 5.8
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	Current or Future Resident
Exposure Route:	Dermal: Shower
Receptor Age:	Adult

Intake Equation: $DAD = DA_{event} \times IF$ Intake Factor Equation: $IF = EV \times SA \times EF \times ED \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm ² -event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm ²	800	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm ² /kg-day	3.76E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm ² /kg-day	1.10E+01	calculated

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- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
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Worksheet 5.9
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	Current or Future Resident
Exposure Route:	Ingestion
Receptor Age:	Adult

Intake Equation: $CDI = CW \times IF$ Intake Factor Equation: $IF = IR-W \times EF \times ED \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/day	2	EPA, 1991
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	9.39E-03	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	2.74E-02	calculated

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Worksheet 5.10
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Tapwater
Exposure Medium:	Air
Receptor Population:	Current or Future Resident
Exposure Route:	Inhalation
Receptor Age:	Adult

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time	hours/day	0.167	EPA, 1997
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	6.53E-04	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	1.91E-03	calculated

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Worksheet 5.11
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Indoor Air
Receptor Population:	Current or Future Resident
Exposure Route:	Inhalation
Receptor Age:	Adult

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time (Indoors)	hours/day	16.4	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	6.42E-02	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	1.87E-01	calculated

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Worksheet 5.12
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	Current or Future Resident
Exposure Route:	Inhalation
Receptor Age:	Adult

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time (Outdoors)	hours/day	2	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	7.82E-03	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	2.28E-02	calculated

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Worksheet 5.13
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Surface Water
Exposure Medium:	Groundwater/Surface Water
Receptor Population:	Commercial/Industrial Worker
Exposure Route:	Dermal
Receptor Age:	Adult

Intake Equation:
DAD=DAevent x IF
Intake Factor Equation:
IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm ² -event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm ²	800	EPA, 1997
EF	Exposure Frequency	days/years	250	EPA, 1991
ED	Exposure Duration	years	25	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm ² /kg-day	2.80E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm ² /kg-day	7.83E+00	calculated

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- EPA, 1992= Dermal Exposure Assessment: Principles and Applications. Office of Health and Environmental Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
- EPA, 2002= Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24

Worksheet 5.14
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Surface Water
Exposure Medium:	Groundwater/Surface Water
Receptor Population:	Construction/Utility Worker
Exposure Route:	Dermal
Receptor Age:	Adult

Intake Equation: $DAD = DA_{event} \times IF$
Intake Factor Equation: $IF = EV \times SA \times EF \times ED \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm ² -event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm ²	3,300	EPA, 1997
EF	Exposure Frequency	days/years	225	EPA, 2002
ED	Exposure Duration	years	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	365	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm ² /kg-day	4.15E-01	calculated
IF-N	Intake Factor (Non-cancer)	event-cm ² /kg-day	2.91E+01	calculated

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Worksheet 5.15
 VALUES USED FOR DAILY INTAKE CALCULATIONS
 Westinghouse Electric Co. Hematite Site

Medium:	Groundwater
Exposure Medium:	Groundwater
Receptor Population:	Commercial/Industrial Worker
Exposure Route:	Ingestion
Receptor Age:	Adult

Intake Equation: $CDI = CW \times IF$ Intake Factor Equation: $IF = IR-W \times EF \times ED \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/day	1	EPA, 1991
EF	Exposure Frequency	days/year	250	EPA, 1991
ED	Exposure Duration	years	25	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	3.49E-03	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	9.78E-03	calculated

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Worksheet 5.16
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Indoor Air
Receptor Population:	Commercial/Industrial Worker
Exposure Route:	Inhalation
Receptor Age:	Adult

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
--

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	250	EPA, 1997
ED	Exposure Duration	years	25	EPA, 1991
ET	Exposure Time	hours/day	8	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	2.33E-02	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	6.52E-02	calculated

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- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.17
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	Commercial/Industrial Worker
Exposure Route:	Inhalation
Receptor Age:	Adult

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
--

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	250	EPA, 1997
ED	Exposure Duration	years	25	EPA, 1991
ET	Exposure Time	hours/day	1.5	EPA, 1997
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	4.37E-03	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	1.22E-02	calculated

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Worksheet 5.18
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	Construction/Utility Worker
Exposure Route:	Inhalation
Receptor Age:	Adult

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
--

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	1.5	EPA, 1997
EF	Exposure Frequency	days/year	225	EPA, 2002
ED	Exposure Duration	years	1	MRBCA
ET	Exposure Time (Outdoors)	hours/day	10	10-hour workday
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	1.89E-03	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	1.32E-01	calculated

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Worksheet 5.19
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	Recreational
Exposure Route:	Inhalation
Receptor Age:	Child

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
--

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	0.3625	EPA, 1997
EF	Exposure Frequency	days/year	195	VA DEQ
ED	Exposure Duration	years	6	EPA, 1991
ET	Exposure Time (Outdoors)	hours/day	0.83	EPA, 1997
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	9.19E-04	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	1.07E-02	calculated

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Worksheet 5.20
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	Recreational
Exposure Route:	Inhalation
Receptor Age:	Adult

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
--

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	1.39	EPA, 1997
EF	Exposure Frequency	days/year	195	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time (Outdoors)	hours/day	0.83	EPA, 1997
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	3.02E-03	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	8.81E-03	calculated

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Worksheet 5.21
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	Visitor/Trespasser
Exposure Route:	Inhalation
Receptor Age:	Adult

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
--

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	0.833	EPA, 1997
EF	Exposure Frequency	days/year	24	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time (Outdoors)	hours/day	2	VA DEQ
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	5.37E-04	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	1.56E-03	calculated

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Worksheet 5.22
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Groundwater/Soil
Exposure Medium:	Outdoor Air
Receptor Population:	Agricultural
Exposure Route:	Inhalation
Receptor Age:	Adult

Intake Equation: $CDI = CA \times IF$ Intake Factor Equation: $IF = IR-A \times EF \times ED \times ET \times 1/BW \times 1/AT$
--

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CA	Chemical Concentration in Air	mg/m ³		
CDI	Chronic Daily Intake	mg/kg-day		
IR-A	Inhalation Rate	m ³ /hour	1.5	EPA, 1997
EF	Exposure Frequency	days/year	225	EPA, 2002
ED	Exposure Duration	years	30	EPA, 1991
ET	Exposure Time (Outdoors)	hours/day	10	10-hour workday
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989
IF-C	Intake Factor (Cancer)	m ³ /kg-day	5.66E-02	calculated
IF-N	Intake Factor (Non-Cancer)	m ³ /kg-day	1.32E-01	calculated

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Worksheet 5.23
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	Resident, Recreational
Exposure Route:	Dermal
Receptor Age:	Child
Swimming possible?	Yes

Intake Equation: DAD=DAevent x IF Intake Factor Equation: IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm ² -event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm ²	6,600	EPA, 2004
EF	Exposure Frequency	days/years	12	EPA, 1997
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm ² /kg-day	1.24E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm ² /kg-day	1.45E+01	calculated

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- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
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- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.24
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	Resident, Recreational
Exposure Route:	Ingestion
Receptor Age:	Child
Swimming possible?	Yes

Intake Equation: $CDI = CW \times IF$ Intake Factor Equation: $IF = IR-W \times EF \times ED \times ET \times 1/BW \times 1/AT$
--

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/hour	0.05	VA DEQ
EF	Exposure Frequency	days/year	12	EPA, 1997
ED	Exposure Duration	years	6	EPA, 1991
ET	Exposure Time	hours	3	EPA, 1997
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	2.82E-05	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	3.29E-04	calculated

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Worksheet 5.25
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	Resident, Recreational, Visitor/Trespasser
Exposure Route:	Dermal
Receptor Age:	Adult
Swimming possible?	Yes

Intake Equation: DAD=DAevent x IF Intake Factor Equation: IF=EV x SA x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm ² -event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm ²	18,000	EPA, 2004
EF	Exposure Frequency	days/years	12	EPA, 1997
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm ² /kg-day	2.90E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm ² /kg-day	8.45E+00	calculated

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- VA DEQ= Virginia Department of Environmental Quality VRP
- EPA, 1989= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.
- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
- EPA, 2002= Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.26
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	Resident, Recreational, Visitor/Trespasser
Exposure Route:	Ingestion
Receptor Age:	Adult
Swimming possible?	Yes

Intake Equation:
$CDI = CW \times IF$
Intake Factor Equation:
$IF = IR-W \times EF \times ED \times ET \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/hour	0.05	VA DEQ
EF	Exposure Frequency	days/year	12	EPA, 1997
ED	Exposure Duration	years	24	EPA, 1991
ET	Exposure Time	hours	3	EPA, 1997
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	2.42E-05	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	7.05E-05	calculated

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- VA DEQ= Virginia Department of Environmental Quality VRP
- EPA, 1989= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.
- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
- EPA, 2002= Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.27
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	Commercial/Industrial Worker
Exposure Route:	Ingestion
Receptor Age:	Adult
Swimming possible?	Yes

Intake Equation:
$CDI = CW \times IF$
Intake Factor Equation:
$IF = IR-W \times EF \times ED \times ET \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/hour	0.005	REI
EF	Exposure Frequency	days/year	250	EPA, 2002
ED	Exposure Duration	years	25	EPA, 1991
ET	Exposure Time	hours	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	1.75E-05	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	4.89E-05	calculated

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VA DEQ= Virginia Department of Environmental Quality VRP
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EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
EPA, 2002= Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: OSWER 9355.4-24
REI= Riverfront Environmental Incorporated Professional Judgment

Worksheet 5.28
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	Construction Worker
Exposure Route:	Dermal
Receptor Age:	Adult
Swimming possible?	Yes

Intake Equation: $DAD = DA_{event} \times IF$ Intake Factor Equation: $IF = EV \times SA \times EF \times ED \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm ² -event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm ²	18,000	EPA, 2004
EF	Exposure Frequency	days/years	12	EPA, 1997
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm ² /kg-day	2.90E+00	calculated
IF-N	Intake Factor (Non-cancer)	event-cm ² /kg-day	8.45E+00	calculated

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- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.29
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	Construction Worker
Exposure Route:	Ingestion
Receptor Age:	Adult
Swimming possible?	Yes

Intake Equation:
$CDI = CW \times IF$
Intake Factor Equation:
$IF = IR-W \times EF \times ED \times ET \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/hour	0.005	REI
EF	Exposure Frequency	days/year	225	EPA, 2002
ED	Exposure Duration	years	1	EPA, 1991
ET	Exposure Time	hours	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	6.29E-07	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	4.40E-05	calculated

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EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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REI= Riverfront Environmental Incorporated Professional Judgment

Worksheet 5.30
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	Agricultural
Exposure Route:	Dermal
Receptor Age:	Adult

Intake Equation: $DAD = DA_{event} \times IF$
Intake Factor Equation: $IF = EV \times SA \times EF \times ED \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
DAevent	Absorbed dose per event	mg/cm ² -event	Chemical specific	EPA, 1992
EV	Event frequency	events/day	1	EPA, 1992
SA	Skin Surface Area Available for Contact	cm ²	3,300	EPA, 1997
EF	Exposure Frequency	days/years	225	EPA, 2002
ED	Exposure Duration	years	30	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-cancer)	days	10,950	EPA, 1989
IF-C	Intake Factor (Cancer)	event-cm ² /kg-day	1.25E+01	calculated
IF-N	Intake Factor (Non-cancer)	event-cm ² /kg-day	2.91E+01	calculated

- MRBCA= Missouri Risk-Based Corrective Action
- VA DEQ= Virginia Department of Environmental Quality VRP
- EPA, 1989= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.
- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1992= Dermal Exposure Assessment: Principles and Applications. Office of Health and Environmental Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
- EPA, 2002= Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Solid Waste and Emergency Response. OSWER 9355.4-24

Worksheet 5.31
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Surface Water
Exposure Medium:	Surface Water
Receptor Population:	Agricultural
Exposure Route:	Ingestion
Receptor Age:	Adult
Swimming possible?	Yes

Intake Equation: $CDI = CW \times IF$ Intake Factor Equation: $IF = IR-W \times EF \times ED \times ET \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CW	Chemical Concentration in Water	mg/L		
IR-W	Ingestion Rate of Water	liters/hour	0.005	REI
EF	Exposure Frequency	days/year	225	EPA, 1997
ED	Exposure Duration	years	30	EPA, 1991
ET	Exposure Time	hours	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989
IF-C	Intake Factor (Cancer)	liters/kg-day	1.89E-05	calculated
IF-N	Intake Factor (Non-Cancer)	liters/kg-day	4.40E-05	calculated

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- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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- REI= Riverfront Environmental Incorporated Professional Judgment

Worksheet 5.32
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Current or Future Resident
Exposure Route:	Dermal
Receptor Age:	Child

Intake Equation: $DAD = CS \times ABS \times IF$ Intake Factor Equation: $IF = SA \times CF \times AF \times EF \times ED \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/ Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm ²	0.2	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm ² /day	2,800	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	3.07E-06	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	3.58E-05	calculated

- MRBCA= Missouri Risk-Based Corrective Action
- VA DEQ= Virginia Department of Environmental Quality VRP
- EPA, 1989= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.
- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.33
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Current or Future Resident
Exposure Route:	Ingestion
Receptor Age:	Child

Intake Equation: $CDI = CS \times IF$ Intake Factor Equation: $IF = IR-S \times FI \times EF \times ED \times CF \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	200	EPA, 1991
FI	Fraction Ingested from source	unitless	1	EPA, 1991
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	1.10E-06	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	1.28E-05	calculated

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- EPA, 1989= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.
- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.34
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Current or Future Resident
Exposure Route:	Dermal
Receptor Age:	Adult

Intake Equation: DAD=CS x ABS x IF Intake Factor Equation: IF=SA x CF x AF x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm ²	0.07	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm ² /day	5,700	EPA, 2004
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	1.87E-06	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	5.47E-06	calculated

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- EPA, 1989= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.
- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.35
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Current or Future Resident
Exposure Route:	Ingestion
Receptor Age:	Adult

Intake Equation: $CDI = CS \times IF$ Intake Factor Equation: $IF = IR-S \times FI \times EF \times ED \times CF \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	100	EPA, 1991
FI	Fraction Ingested from source	unitless	1	EPA, 1991
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	4.70E-07	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	1.37E-06	calculated

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- EPA, 1989= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.
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Worksheet 5.36
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Commercial/Industrial Worker
Exposure Route:	Dermal
Receptor Age:	Adult

Intake Equation: $DAD = CS \times ABS \times IF$ Intake Factor Equation: $IF = SA \times CF \times AF \times EF \times ED \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm ²	0.2	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm ² /day	3,300	EPA, 2004
EF	Exposure Frequency	days/years	250	EPA, 1991
ED	Exposure Duration	years	25	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	2.31E-06	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	6.46E-06	calculated

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- EPA, 1989= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.
- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.37
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Commercial/Industrial Worker
Exposure Route:	Ingestion
Receptor Age:	Adult

Intake Equation: $CDI = CS \times IF$ Intake Factor Equation: $IF = IR-S \times FI \times EF \times ED \times CF \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	100	EPA, 1991
FI	Fraction Ingested from source	unitless	1	
EF	Exposure Frequency	days/years	250	EPA, 1991
ED	Exposure Duration	years	25	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	9,125	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	3.49E-07	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	9.78E-07	calculated

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- EPA, 1989= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response. EPA/540/1-89/002.
- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.38
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Construction/Utility Worker
Exposure Route:	Dermal
Receptor Age:	Adult

Intake Equation: $DAD = CS \times ABS \times IF$ Intake Factor Equation: $IF = SA \times CF \times AF \times EF \times ED \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm ²	0.3	EPA, 2002
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm ² /day	3,300	EPA, 2004
EF	Exposure Frequency	days/years	225	EPA, 2002
ED	Exposure Duration	years	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	1.25E-07	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	8.72E-06	calculated

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- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.39
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Construction/Utility Worker
Exposure Route:	Ingestion
Receptor Age:	Adult

Intake Equation: $CDI = CS \times IF$ Intake Factor Equation: $IF = IR-S \times FI \times EF \times ED \times CF \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	330	EPA, 2002
FI	Fraction Ingested from source	unitless	1	
EF	Exposure Frequency	days/years	225	MRBCA
ED	Exposure Duration	years	1	MRBCA
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	365	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	4.15E-08	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	2.91E-06	calculated

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Worksheet 5.41
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Recreational
Exposure Route:	Dermal
Receptor Age:	Adult

Intake Equation: $DAD = CS \times ABS \times IF$ Intake Factor Equation: $IF = SA \times CF \times AF \times EF \times ED \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm ²	0.07	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm ² /day	5,700	EPA, 2004
EF	Exposure Frequency	days/years	195	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	1.04E-06	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	3.05E-06	calculated

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- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
- EPA, 2002= Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites: OSWER 9355.4-24

Worksheet 5.41
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Recreational
Exposure Route:	Ingestion
Receptor Age:	Adult

Intake Equation: $CDI = CS \times IF$ Intake Factor Equation: $IF = IR-S \times FI \times EF \times ED \times CF \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	100	EPA, 1991
FI	Fraction Ingested from source	unitless	1	
EF	Exposure Frequency	days/years	195	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	3.27E-08	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	9.54E-08	calculated

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- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.42
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Recreational
Exposure Route:	Dermal
Receptor Age:	Child

Intake Equation: DAD=CS x ABS x IF Intake Factor Equation: IF=SA x CF x AF x EF x ED x 1/BW x 1/AT

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm ²	0.2	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm ² /day	2,800	EPA, 2004
EF	Exposure Frequency	days/years	195	VA DEQ
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	1.71E-06	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	1.99E-05	calculated

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- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.43
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Recreational
Exposure Route:	Ingestion
Receptor Age:	Child

Intake Equation: $CDI = CS \times IF$ Intake Factor Equation: $IF = IR-S \times FI \times EF \times ED \times CF \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	200	EPA, 1991
FI	Fraction Ingested from source	unitless	1	EPA, 1991
EF	Exposure Frequency	days/years	195	VA DEQ
ED	Exposure Duration	years	6	EPA, 1991
BW	Body Weight	kg	15	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	2,190	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	3.27E-08	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	9.54E-08	calculated

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- EPA, 1997= Exposure Factors Handbook. Office of Research and Development. EPA/600/P-95/002Fa.
- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.44
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Visitor/Trespasser
Exposure Route:	Dermal
Receptor Age:	Adult

Intake Equation: $DAD = CS \times ABS \times IF$ Intake Factor Equation: $IF = SA \times CF \times AF \times EF \times ED \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm ²	0.07	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm ² /day	5,700	EPA, 2004
EF	Exposure Frequency	days/years	24	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	1.29E-07	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	3.75E-07	calculated

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- EPA, 1991= Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors. Office of Solid Waste and Emergency Response. OSWER Directive 9285.6-03 Assessment. EPA/600/8-91/011B.
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- EPA, 2004= Risk Assessment Guidance for Superfund: Volume I -- Human Health Evaluation Manual (Part E). Office of Emergency and Remedial Response. EPA/540/R/99/005.
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Worksheet 5.45
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Visitor/Trespasser
Exposure Route:	Ingestion
Receptor Age:	Adult

Intake Equation: $CDI = CS \times IF$ Intake Factor Equation: $IF = IR-S \times FI \times EF \times ED \times CF \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	100	EPA, 1991
FI	Fraction Ingested from source	unitless	1	
EF	Exposure Frequency	days/years	24	VA DEQ
ED	Exposure Duration	years	24	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	8,760	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	4.03E-09	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	1.17E-08	calculated

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Worksheet 5.46
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Agricultural
Exposure Route:	Dermal
Receptor Age:	Adult

Intake Equation: $DAD = CS \times ABS \times IF$ Intake Factor Equation: $IF = SA \times CF \times AF \times EF \times ED \times 1/BW \times 1/AT$

Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
DAD	Dermally Absorbed Dose	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
AF	Soil to Skin Adherence Factor	mg/cm ²	0.3	EPA, 2004
ABS	Absorption Factor	unitless	Chemical Specific	EPA, 1995 and EPA, 2004
SA	Skin Surface Area Available for Contact	cm ² /day	3,300	EPA, 2004
EF	Exposure Frequency	days/years	225	EPA, 1991
ED	Exposure Duration	years	30	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	3.74E-06	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	8.72E-06	calculated

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Worksheet 5.47
VALUES USED FOR DAILY INTAKE CALCULATIONS
Westinghouse Electric Co. Hematite Site

Medium:	Soil
Exposure Medium:	Soil
Receptor Population:	Agricultural
Exposure Route:	Ingestion
Receptor Age:	Adult

Intake Equation: $CDI = CS \times IF$ Intake Factor Equation: $IF = IR-S \times FI \times EF \times ED \times CF \times 1/BW \times 1/AT$
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Parameter Code	Parameter Definition	Units	Value	Rationale/Reference
CDI	Chronic Daily Intake	mg/kg-day		
CS	Chemical Concentration in Soil	mg/kg		
CF	Conversion Factor	kg/mg	1E-06	
IR-S	Ingestion Rate - Soil	mg/day	200	EPA, 1991
FI	Fraction Ingested from source	unitless	1	EPA, 1991
EF	Exposure Frequency	days/years	350	EPA, 1991
ED	Exposure Duration	years	30	EPA, 1991
BW	Body Weight	kg	70	EPA, 1991
AT-C	Averaging Time (Cancer)	days	25,550	EPA, 1989
AT-N	Averaging Time (Non-Cancer)	days	10,950	EPA, 1989
IF-C	Intake Factor (Cancer)	days ⁻¹	1.17E-06	calculated
IF-N	Intake Factor (Non-cancer)	days ⁻¹	2.74E-06	calculated

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