CORRES CONTROL
OUTGOING LTR NO
41001
DOE ORDER# ~~95RF04753~~
95 RF 04753

56325

DIST	LTR	ENC
AMARAL M E		
BURLINGAME A H		
BUSBY W S		
BRANCH D B		
CARNIVAL G J		
DAVIS J G		
FERRERA D W		
FRAY R E		
GEIS J A		
GLOVER W S		
GOLAN P M		
HANNI B J		
HARMAN L K		
HEALY T J		
HEDAHL T		
HILBIG J G		
HUTCHINS N M		
JACKSON D T		
KELL R E		
KUESTER A W		
MARX G E		
McDONALD M M		
McKENNA F G		
MONTROSE J K		
MORGAN R V		
POTTER G L		
PIZZUTO V M		
RISING T L		
SANDLIN N B		
SCHWARTZ J K		
SETLOCK G H		
STEWART D L		
STIGER S G	X	
TOBIN P M		
VOORHEIS G M		
WILSON J M		
Chromec, W	X	
CORRES CONTROL	X	X
ADMN RECORD/080	X	X
TRAFFIC		
PATS/T130G		

CLASSIFICATION

UCNI		
UNCLASSIFIED		
CONFIDENTIAL		
SECRET		

AUTHORIZED CLASSIFIER SIGNATURE
~~DOCUMENT CLASSIFICATION REVIEW WAIVER PER CLASSIFICATION OFFICE~~
DATE

IN REPLY TO RFP CC NO

ACTION ITEM STATUS
PARTIAL/OPEN
CLOSED
LTR APPROVALS

ORIG & TYPIST INITIALS
WC pap

EG&G ROCKY FLATS

EG&G ROCKY FLATS, INC
ROCKY FLATS PLANT P O BOX 464 GOLDEN COLORADO 80402 0464 (303) 966 7000

June 1, 1995

95-RF-04753

Jessie M Roberson
Assistant Manager
for Environmental Restoration
DOE/RFFO

ATTN Norma I Castaneda

OPEN SPACE EXPOSURE SCENARIOS – SGS-172-95

Action Send to agencies

EG&G Rocky Flats, Inc and the Department of Energy have received comments on the open space exposure parameters from the Environmental Protection Agency (April 11) and the Colorado Department of Public Health and the Environment (May 23) The attached open space exposure factor tables have been changed to reflect these comments

- The Central Tendency (CT) values for soil ingestion for adults and children have been changed to 25 mg/day and 50 mg/day, respectively Although it is felt that their comment is not scientifically supportable and is overly conservative, it will not drive risks and should have no impact on risk management decisions
- The fraction from contaminated source for dermal contact with soil has been changed to 1 0 for the Reasonable Maximum Exposure (RME) and 0 5 for the Central Tendency This is highly conservative, but dermal contact should not drive the risks for the open space exposure scenario

If you agree with these changes please convey them to the agencies If you have any questions please contact Win Chromec at X8641

Susan G Stiger, Director
Environmental Restoration Program Division

WC pap

Orig and 1 cc - J M Roberson

Attachment
As Stated

ADMIN RECORD
A-SW-002606

TABLE 10A—OPEN-SPACE EXPOSURE PARAMETERS INCIDENTAL INGESTION

	DUST, SURFACE SOIL, OR SEDIMENT	
	Typical Exposure (CT)	High-End Exposure (RME)
Ingestion Rate—Child (mg/visit)	50 (1)	100 (1)
Ingestion Rate—Adult (mg/visit)	25(1)	50 (1)
Matrix Effect in GI Tract (*Absorption Factor*)	CS	CS
Exposure Frequency (visits/yr)	10 (2)	25 (2)
Exposure Duration—Child (yr)	2	6
Exposure Duration—Adult (yr)	7	24
Body Weight—Child (kg)	15	15
Body Weight—Adult (kg)	70	70
Averaging Time—Child, Noncarcinogen (days)	730	2,190
Averaging Time—Adult, Noncarcinogen (days)	2,555	8,760
Averaging Time—Carcinogen (days)	25,550	25,550

(1) Open space use RME ingestion rates are based on the assumption that outdoor ingestion of soil accounts for one-half the daily residential intake (200 mg/day for children and 100 mg/day for adults) and that all of the out door intake occurs during an open space visit The CT is one-half the RME, as it is for residential exposure Actual open-space recreational intakes would vary, depending on the activity, possibly with dirt biking at one extreme and photographing wildlife at the other

(2) Exposure frequency based on Boulder County's Park and Open Space Visitor Interviews of 1985 (estimated 7 days/year, CT, 25 days/year, RME), DOE's Hanford Site recreational user (7days/year, CT), and DOI's National Survey of Fishing, Hunting, and Nonconsumptive Wildlife Recreation of 1985 for Colorado (9 4 days/year for nonconsumptive use, CT, 15 4 days/year for fishing and hunting, CT)

TABLE 10B—OPEN-SPACE EXPOSURE PARAMETERS PARTICULATE INHALATION

	DUST, SURFACE SOIL, OR DRY SEDIMENT	
	Typical Exposure (CT)	High-End Exposure (RME)
Inhalation Rate (m^3/hr)	0 83 (1)	1 4 (1)
Respirable Fraction (PM_{10})	0 36	0 46
Respiratory Deposition Factor	0 85	0 85
Exposure Time (hr/visit)	1 5 (2)	5 0 (2)
Exposure Frequency (visits/yr)	10 (3)	25 (3)
Exposure Duration (yr)	9	30
Body Weight (kg)	70	70
Averaging Time— Noncarcinogen (days)	3,285	10,950
Averaging Time— Carcinogen (days)	25,550	25,550

(1) Inhalation Rate based upon DOE's Fernald Site and Hanford Site recreational users (0 83 m^3/hr, CT) and on EPA's *Exposure Factors Handbook* (1 4 m^3/hr, RME), which assumes 7% heavy activity, 37% moderate activity, 28% light activity, and 28% resting for an adult

(2) Exposure Time based upon Boulder County's Park and Open Space Visitor Interviews of 1992 (est 1 6 hr/day, CT, 5 0 hr/day, RME), DOD's Rocky Mountain Arsenal Site recreational user (1 6 hr/day, CT, 5 0 hr/day, RME), and City of Boulder's Open Space Visitation Study of 1993 (1 0 hr/day, CT, 2 0 hr/day, RME)

(3) See Table 10A, note 2

TABLE 10C—OPEN-SPACE EXPOSURE PARAMETERS DERMAL CONTACT

	DUST, SURFACE SOIL, OR SEDIMENT	
	Typical Exposure (CT)	High-End Exposure (RME)
Exposed Skin Surface (cm^2)	2,000 (1)	5,300 (1)
Fraction Contacted from Contaminated Source	0 5 (2)	1 0 (2)
Soil Adherence to Skin (mg/cm^2)	0 2	1 0
Skin Absorption Factor	CS	CS
Exposure Frequency (days/yr)	10 (3)	25 (3)
Exposure Duration (yr)	9	30
Body Weight (kg)	70	70
Averaging Time— Noncarcinogen (days)	3,285	10,950
Averaging Time— Carcinogen (days)	25,550	25,550

(1) Exposed Skin Surface based upon EPA's *Dermal Exposure Assessment Principles and Applications*, which specifies typical and high-end default values for the adult outdoors (2,000 cm^2 and 5,300 cm^2) The CT exposed skin surface is limited to head and hands, while the RME value assumes head, hands, forearms, and lower legs are exposed DOE's Fernald Site recreational user adopts a comparable RME value (5,000 cm^2) It is conservatively assumed that a person's head will contact sediments

(2) The fraction contacted for the RME is very conservatively set at 1 0 This assumes that soil dermally contacted during a 5 hour visit to the open space contributes 100% of the dermal dose The CT assumes that 50% of the dermal dose is site related This is consistent with the ingestion parameters

(3) See Table 10A, note 2

5/31/95

TABLE 10D—OPEN-SPACE EXPOSURE PARAMETERS INGESTION WHILE WADING

	SHALLOW SURFACE WATER	
	Typical Exposure (CT)	High-End Exposure (RME)
Ingestion Rate (mL/hr)	25 (1)	50 (1)
Exposure Time (hr/visit)	0 5 (2)	1 0 (2)
Exposure Frequency (visits/yr)	5 (3)	15 (3)
Exposure Duration (yr)	9	30
Body Weight (kg)	70	70
Averaging Time— Noncarcinogen (days)	3,285	10,950
Averaging Time— Carcinogen (days)	25,550	25,550

(1) Ingestion Rate based upon open-space recreational user wading at Denver's Lowry Landfill Superfund Site (50 mL/day, RME, 25 mL/day, CT) For comparison, a single value of 35 mL/day is specified for DOE's Fernald Site (wading in shallow Paddy's Run)

(2) Exposure Time based upon DOE's Fernald Site recreational user (0 5 hr/day, CT) and on the Clear Creek/Central City Superfund Site recreational user (1 0 hr/day, RME, assuming that wading time would be the same as swimming time)

(3) Assumes that CT Exposure Frequency for *wading* is one-half the EF of 10 days/yr for all visitors (0 5 x 10 = 5 days/yr) and RME is 60% of the EF of 25 (0 6 x 25 = 15 days/yr) See Table 10A, Note 3 On the average, users are very unlikely to wade on a year-round basis during each visit to the site

TABLE 10E—OPEN-SPACE EXPOSURE PARAMETERS DERMAL CONTACT WHILE WADING

	SHALLOW SURFACE WATER	
	Typical Exposure (CT)	High-End Exposure (RME)
Exposed Skin Surface (cm^2)	4,550 (1)	9,275 (1)
Dermal Permeability (cm/hr)	CS	CS
Exposure Time (hr/visit)	0 5 (2)	1 0 (2)
Exposure Frequency (visits/yr)	5 (3)	15 (3)
Exposure Duration (yr)	9	30
Body Weight (kg)	70	70
Averaging Time—Noncarcinogen (days)	3,285	10,950
Averaging Time—Carcinogen (days)	25,550	25,550

(1) Typical exposed adult skin surface while wading and reaching underwater (4,550 cm^2) assumes the lower legs, feet, and hands are exposed, high-end exposed surface (9,275 cm^2) assumes the thighs, lower legs, feet, forearms, and hands are exposed (EPA's *Exposure Factors Handbook*)

(2) See Table 10D, note 2

(3) See Table 10D, note 3

TABLE 10F—OPEN-SPACE EXPOSURE PARAMETERS

	EXTERNAL IRRADIATION	
	Typical Exposure (CT)	High-End Exposure (RME)
Gamma Exposure Time Factor (T_e)	0 1 (1)	0 2 (1)
Gamma Shielding Factor ($1-S_e$)	0 8	1 0
Exposure Frequency (days/yr)	10 (2)	25 (2)
Exposure Duration (yr)	9	30

(1) Assumes the high-end fraction of time exposed (1 5 out of 24 hours, CT, 5 0 out of 24 hours, RME) (1 5/24 = 0 1, 5 0/24 = 0 2) (see Table 10B, Note 2)

(2) See Table 10A, note 2