

**Potential human exposure to mercury (Hg) in a chlor-alkali plant impacted zone: Risk
characterization using updated site assessment data**

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Table S1. Exposure parameters and their deterministic values for inhalation pathway used to
assess exposure to Hg

		Scenario for Inhalation Pathway			
		Value			
	Parameter	Chronic		Sub-chronic	
		Residential Exposure	Fishing	Recreational Activities	Soil contact- intensive work
EC_{inh}	Exposure Concentration from Air Inhalation ($\mu\text{g}/\text{m}^3$)	to be determined	to be determined	to be determined	to be determined
CA	Contaminant Concentration in Air ($\mu\text{g}/\text{m}^3$)	Hg concentrations (Table 6)	Hg concentrations (Table 6)	Hg concentrations (Table 6)	Hg concentrations (Table 6)
ET	Exposure Time (hours/day)	24	8	5	8
EF	Exposure Frequency (days/year for chronic, days/week for sub-chronic)	350	180	1	5
ED	Exposure Duration (years for chronic, weeks for sub- chronic)	6 for children, 70 (lifetime), 30 (90th), 9 (50th) for adults	70 (lifetime), 30 (90th), 9 (50th) for adults	156 for children, 1820 (lifetime), 780 (90th), 234 (50th) for children	780 (90th), 234 (50th) for adults
AT	Averaging Time (hours/exposure period for chronic, hours for sub- chronic)	365*24*ED	365*24*ED	24*7*ED	24*7*ED

Table S2. Exposure parameters and their deterministic values for soil ingestion pathway used to assess exposure to Hg

Scenario for Soil and Dust Ingestion Pathway					
Parameter		Value			
		CAP-affected zone		Urban zone	
		Recreational Activities	Fishing	Residential Exposure	Soil contact-intensive work
CDI_{ing}	CDI from Soil Ingestion (mg/kg*day)	to be determined	to be determined	to be determined	to be determined
CS	Soil Concentration (mg/kg)	Hg concentrations (Table 6)	Hg concentrations (Table 6)	Hg concentrations (Table 6)	Hg concentrations (Table 6)
IR	Ingestion Rate (mg soil / day)	59 (50th), 72 (90th) for children; 16 (50th), 20 (90th) for adults	30 (50th), 100 (90th) for adults	60 (50th), 200 (90th) for children; 30 (50th), 100 (90th) for adults	30 (50th), 100 (90th) for adults
CF	Conversion Factor (kg/mg)	10 ⁻⁶	10 ⁻⁶	10 ⁻⁶	10 ⁻⁶
FI	Fraction Ingested from the Contaminated Source (unitless)	1	1	1	1
EF	Exposure Frequency (days/year)	26	90	180	130
ED	Exposure Duration (years)	9 (50th), 30 (90th), 70 (lifetime)	9 (50th), 30 (90th), 70 (lifetime)	9 (50th), 30 (90th), 70 (lifetime)	9 (50th), 30 (90th)
BW	Body Weight (kg)	17.5kg (50th), 19.7kg (75th), 23.2kg (90th) for children, 77.9kg (50th), 92.4kg (75th), 107kg (90th) for adults	77.9kg (50th), 92.4kg (75th), 107kg (90th) for adults	17.5kg (50th), 19.7kg (75th), 23.2kg (90th) for children, 77.9kg (50th), 92.4kg (75th), 107kg (90th) for adults	77.9kg (50th), 92.4kg (75th), 107kg (90th) for adults
AT	Averaging Time (days)	365*ED	365*ED	365*ED	365*ED

Table S3. Exposure parameters and their deterministic values for water ingestion pathway used to assess exposure to Hg

Scenario for Water Ingestion Pathway			
Parameter		Value	
		CAP-affected zone	
		Recreational Activities	Fishing
CDI_{wing}	CDI from Water Ingestion (mg/kg*day)	to be determined	to be determined
C_w	Chemical Concentration in water (mg/L)	Hg concentrations (Table 6)	Hg concentrations (Table 6)
CR	Contact Rate (L/hr)	0.103 (90th), 0.048 (75th), 0.029 (50th) for children; 0.050 (90th), 0.029 (75th), 0.013 (50th) for adults	0.0108 (90th), 0.0108 (75th), 0.0036 (50th) for adults
ET	Exposure Time (hr/event)	2	8
EF	Exposure Frequency (events/year)	40	180
ED	Exposure Duration (years)	6 for children; 70 (lifetime), 30 (90th), 9 (50th) for adults	70 (lifetime), 30 (90th), 9 (50th) for adults
BW	Body Weight (kg)	17.5kg (50th), 19.7kg (75th), 23.2kg (90th) for children, 77.9kg (50th), 92.4kg (75th), 107kg (90th) for adults	77.9kg (50th), 92.4kg (75th), 107kg (90th) for adults
AT	Averaging Time (days)	365*ED	365*ED

Table S4. Exposure parameters and their deterministic values for water dermal contact pathway used to assess exposure to Hg

Scenario for Water Dermal Contact Pathway			
Parameter		Value	
		CAP-affected zone	
		Recreational Activities	Fishing
DAD_{swder}	Dermally Absorbed Dose from Dermal Contact with Surface Water (mg/kg*day)	to be determined	to be determined
DA_{event}	Absorbed Dose per Event ((mg/cm ²)/event)	to be determined	to be determined
K_p	Dermal Permeability of a Compound in Water (cm/hr)	0.001	0.001
C_w	Chemical Concentration in Water (mg/cm ³)	Hg concentrations (Table 6)	Hg concentrations (Table 6)
t_{event}	Event Duration (hours/event)	8	8
EV	Event Frequency (events/day)	1	1
ED	Exposure Duration (years)	70 (lifetime), 30 (90th), 9 (50th) for children; 70 (lifetime), 30 (90th), 9 (50th) for adults	70 (lifetime), 30 (90th), 9 (50th) for adults
EF	Exposure Frequency (events/year)	40	180
SA	Skin Surface Area Available for Contact (cm ²)	7400 (50th), 8000 (75th), 8800 (90th) for children, 77.9kg (50th), 92.4kg (75th), 107kg (90th) for adults	19500 (50th), 21600 (75th), 23100 (90th) for adults
BW	Body Weight (kg)	17.5kg (50th), 19.7kg (75th), 23.2kg (90th) for children, 77.9kg (50th), 92.4kg (75th), 107kg (90th) for adults	77.9kg (50th), 92.4kg (75th), 107kg (90th) for adults
AT	Averaging Time (days)	365*ED	365*ED

Table S5. Daily intake values from deterministic exposure assessment of adults to Hg-contaminated soils for inhalation, dermal, and ingestion pathways under different exposure scenarios

Scenario		Percentile											
		Normal exposure, 50 th				Conservative exposure, 75 th				Maximum reasonable exposure, 90 th			
		CDI _{ing}	CDI _{wing}	EC	DAD	CDI _{ing}	CDI _{wing}	EC	DAD	CDI _{ing}	CDI _{wing}	EC	DAD
CAP-affected zone	Recreational Activities	4.47 $\times 10^{-9}$	1.08 $\times 10^{-8}$	2.68 $\times 10^{-4}$	4.06 $\times 10^{-9}$	3.52 $\times 10^{-8}$	5.31 $\times 10^{-9}$	4.46 $\times 10^{-4}$	9.89 $\times 10^{-9}$	1.05 $\times 10^{-7}$	2.47 $\times 10^{-8}$	7.74 $\times 10^{-4}$	2.46 $\times 10^{-8}$
	Fishing	5.38 $\times 10^{-8}$	7.69 $\times 10^{-9}$	4.93 $\times 10^{-3}$	7.59 $\times 10^{-9}$	2.73 $\times 10^{-6}$	5.24 $\times 10^{-8}$	8.22 $\times 10^{-3}$	1.72 $\times 10^{-8}$	3.53 $\times 10^{-6}$	2.89 $\times 10^{-7}$	1.42 $\times 10^{-2}$	4.07 $\times 10^{-8}$
Urban zone	Residential Exposure	2.18 $\times 10^{-9}$		3.84 $\times 10^{-3}$		1.10 $\times 10^{-8}$		4.79 $\times 10^{-3}$		1.32 $\times 10^{-7}$		5.75 $\times 10^{-3}$	
	Soil contact-intensive work	1.58 $\times 10^{-8}$		9.52 $\times 10^{-4}$		7.94 $\times 10^{-8}$		1.19 $\times 10^{-3}$		1.23 $\times 10^{-7}$		1.43 $\times 10^{-3}$	

Table S6. Daily intake values from deterministic exposure assessment of children to Hg-contaminated soils for inhalation, dermal, and ingestion pathways under different exposure scenarios

Scenario		Percentile											
		Normal exposure, 50 th				Conservative exposure, 75 th				Maximum reasonable exposure, 90 th			
		CDI _{ing}	CDI _{wing}	EC	DAD	CDI _{ing}	CDI _{wing}	EC	DAD	CDI _{ing}	CDI _{wing}	EC	DAD
CAP-affected zone	Recreational Activities	7.33×10^{-8}	1.06×10^{-9}	2.68×10^{-4}	6.74×10^{-9}	5.95×10^{-7}	4.00×10^{-8}	4.46×10^{-4}	1.67×10^{-8}	1.74×10^{-6}	1.99×10^{-7}	7.74×10^{-4}	4.25×10^{-8}
Urban zone	Residential Exposure	1.91×10^{-8}		3.84×10^{-3}		1.00×10^{-7}		4.79×10^{-3}		1.20×10^{-6}		5.75×10^{-3}	

Table S7. Daily intake parameter values from probabilistic exposure assessment of adults to Hg-contaminated soils for inhalation, dermal, and ingestion pathways under different exposure scenarios

Scenario		Percentile											
		Normal exposure, 50 th				Conservative exposure, 75 th				Maximum reasonable exposure, 90 th			
		CDI _{ing}	CDI _{wing}	EC	DAD	CDI _{ing}	CDI _{wing}	EC	DAD	CDI _{ing}	CDI _{wing}	EC	DAD
CAP-affected zone	Recreational Activities	1.88 $\times 10^{-8}$	2.12 $\times 10^{-11}$	1.46 $\times 10^{-4}$	4.44 $\times 10^{-10}$	4.92 $\times 10^{-8}$	5.40 $\times 10^{-11}$	2.22 $\times 10^{-4}$	9.06 $\times 10^{-10}$	1.13 $\times 10^{-7}$	1.26 $\times 10^{-10}$	3.21 $\times 10^{-4}$	1.70 $\times 10^{-9}$
	Fishing	3.00 $\times 10^{-7}$	5.69 $\times 10^{-9}$	1.70 $\times 10^{-3}$	1.74 $\times 10^{-8}$	9.94 $\times 10^{-7}$	1.42 $\times 10^{-8}$	2.51 $\times 10^{-3}$	3.33 $\times 10^{-8}$	3.12 $\times 10^{-6}$	3.40 $\times 10^{-8}$	3.57 $\times 10^{-3}$	5.95 $\times 10^{-8}$
Urban zone	Residential Exposure	8.43 $\times 10^{-10}$		3.72 $\times 10^{-3}$		2.27 $\times 10^{-9}$		4.95 $\times 10^{-3}$		5.46 $\times 10^{-9}$		6.45 $\times 10^{-3}$	
	Soil contact-intensive work	5.28 $\times 10^{-9}$		9.00 $\times 10^{-4}$		1.84 $\times 10^{-8}$		1.25 $\times 10^{-3}$		5.54 $\times 10^{-8}$		1.69 $\times 10^{-3}$	

Table S8. Daily intake parameter values from probabilistic exposure assessment of children to Hg-contaminated soils for inhalation, dermal, and ingestion pathways under different exposure scenarios

Scenario		Percentile											
		Normal exposure, 50 th				Conservative exposure, 75 th				Maximum reasonable exposure, 90 th			
		CDI _{ing}	CDI _{wing}	EC	DAD	CDI _{ing}	CDI _{wing}	EC	DAD	CDI _{ing}	CDI _{wing}	EC	DAD
CAP-affected zone	Recreational Activities	2.99×10^{-7}	9.45×10^{-11}	1.46×10^{-4}	7.50×10^{-10}	7.74×10^{-7}	2.39×10^{-10}	2.22×10^{-4}	1.53×10^{-9}	1.85×10^{-6}	5.43×10^{-10}	3.21×10^{-4}	2.84×10^{-9}
Urban zone	Residential Exposure	1.31×10^{-8}		3.72×10^{-3}		3.48×10^{-8}		4.95×10^{-3}		8.49×10^{-8}		6.45×10^{-3}	