

DOCKETED	
Docket Number:	01-AFC-19C
Project Title:	SMUD Cosumnes Power Plant - Compliance
TN #:	244288-25
Document Title:	Screening Health Risk Assessment - Appendix 8_1E
Description:	N/A
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Organization:	Ch2mhill/Carrier
Submitter Role:	Applicant Consultant
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Docketed Date:	8/1/2022

APPENDIX 8.1E

Screening Health Risk Assessment

Table 8.1E-1
Screening Health Risk Assessment
SMUD Cosumnes Power Plant

Acute Inhalation Hazard Index

Pollutant Name	Max. Modeled 1-hr Conc, ug/m3		Acute REL, ug/m3 (1)	Toxicological Endpoints	Acute Inhalation Hazard Index	
	Combustion Sources	Cooling Tower			Combustion Sources	Cooling Tower
Acrolein	1.18E-02		1.90E-01	Eye irritation	6.18E-02	
Ammonia	4.35E+01		3.20E+03	Eye and respiratory irritation	1.36E-02	
Arsenic		1.87E-03	1.90E-01	Reproductive/ Developmental		9.83E-03
Benzene	1.06E-02		1.30E+03	Reproductive/ Developmental	8.15E-06	
Copper		8.71E-04	1.00E+02	Respiratory Irritation		8.71E-06
Formaldehyde	6.54E-01		9.40E+01	Eye irritation	6.96E-03	
Propylene oxide	9.42E-02		3.10E+03	Eye and respiratory irritation	3.04E-05	
Toluene	4.23E-01		3.70E+04	CNS (mild); Eye and respiratory irritation	1.14E-05	
Xylenes	2.08E-01		2.20E+04	Eye and respiratory irritation	9.45E-06	
Total Acute Hazard Index					0.092	

Table 8.1E-2
Screening Health Risk Assessment
SMUD Cosumnes Power Plant

Chronic Inhalation Hazard Index

	Pathway (1)							
	Resp	CV/BL	CNS	Skin	Repro	Kidn	GI/LV	Immun
Cooling Tower	<.0001	<.0001	<.0001	<.0001	0	0	0	--
Gas Turbines/Aux. Boiler	0.0131	<.0001	0.0001	0.0100	<.0001	<.0001	<.0001	--
Total Chronic	0.0131	<.0001	0.0002	0.0100	<.0001	<.0001	<.0001	--
Total, All Pathways	0.0231							

Notes:

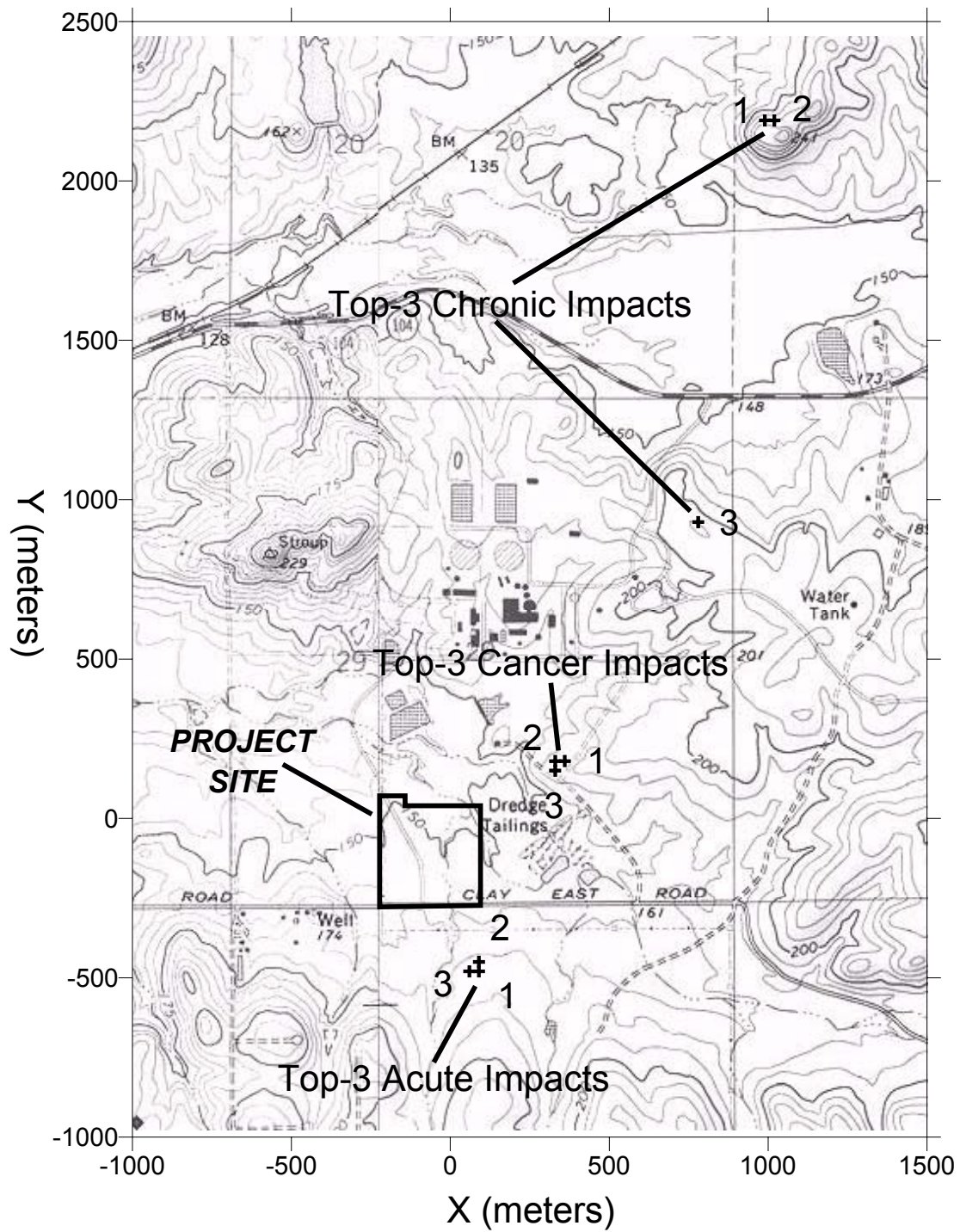
(1) Resp: respiratory; CV/BL: cardiovascular/blood; CNS: central nervous system; Repro: reproductive system;
 Kidn: renal system; GI/LV: gastrointestinal/liver; Immun: immunological system

Table 8.1E-3
Screening Health Risk Assessment
SMUD Cosumnes Power Plant

Individual Cancer Risk

	Air	Soil	Skin	Garden	Mmilk	Other	Total by Source
Gas Turbines	6.54E-08	1.96E-09	1.19E-09	0.00E+00	0.00E+00	0.00E+00	6.85E-08
Cooling Tower	9.66E-08	1.14E-07	2.42E-09	0.00E+00	0.00E+00	0.00E+00	2.13E-07
Total by Route	1.62E-07	1.16E-07	3.61E-09	0.00E+00	0.00E+00	0.00E+00	--
TOTAL RISK	0.28 in one million						

Locations of Acute, Chronic, and Cancer Impacts



California Air Resources Board
And
Office of Environmental Health Hazard Assessment
Health Risk Assessment Program
Version 2.0e

CHRONIC INHALATION EXPOSURE REPORT

Run Made By
nlm

Sierra Research

Project : SMUD CPP

Aug. 31, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: ANNAVG.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	1.724E-05
ACETALDEHYDE	1.602E-03
ACROLEIN	1.449E-04
AMMONIA	5.628E-01
ARSENIC AND COMPOUNDS (INOR	2.926E-05
BENZENE	1.308E-04
COPPER AND COMPOUNDS	1.363E-05
ETHYL BENZENE	1.280E-03
FORMALDEHYDE	8.073E-03
LEAD AND COMPOUNDS	2.009E-06
MANGANESE AND COMPOUNDS	1.579E-05
N-HEXANE	1.017E-02
NAPHTHALENE	5.223E-05
PAH:BENZ(A)ANTHRACENE	8.875E-07
PAH:BENZO(A)PYRENE	5.458E-07
PAH:BENZO(B)FLUORANTHENE	4.437E-07
PAH:BENZO(K)FLUORANTHENE	4.319E-07
PAH:CHRYSENE	9.896E-07
PAH:DIBENZ(A,H)ANTHRACENE	9.228E-07
PAH:INDENO(1,2,3-C,D)PYRENE	9.228E-07
PROPYLENE (PROPENE)	3.028E-02
PROPYLENE OXIDE	1.162E-03
TOLUENE	5.223E-03
XYLENES	2.564E-03
ZINC COMPOUNDS	3.086E-05

CHRONIC INHALATION HAZARD INDEX

Pollutant	Resp	CV/BL	CNS	Skin	Repro	Kidn	GI/LV	Immun
ACETALDEHYDE	0.0002	--	--	--	--	--	--	--
ACROLEIN	0.0072	--	--	0.0072	--	--	--	--
AMMONIA	0.0028	--	--	--	--	--	--	--
ARSENIC AND COM	<.0001	--	<.0001	<.0001	--	--	--	--
BENZENE	--	<.0001	<.0001	--	<.0001	--	--	--
COPPER AND COMP	<.0001	--	--	--	--	--	--	--
ETHYL BENZENE	--	--	--	--	<.0001	<.0001	<.0001	--
FORMALDEHYDE	0.0027	--	--	0.0027	--	--	--	--
MANGANESE AND C	--	--	<.0001	--	--	--	--	--
N-HEXANE	--	--	<.0001	--	--	--	--	--
NAPHTHALENE	<.0001	--	--	--	--	--	--	--
PROPYLENE (PROP	<.0001	--	--	--	--	--	--	--
PROPYLENE OXIDE	<.0001	--	--	--	--	--	--	--
TOLUENE	<.0001	--	<.0001	--	<.0001	--	--	--
XYLENES	<.0001	--	<.0001	--	--	--	--	--
ZINC COMPOUNDS	<.0001	<.0001	--	--	--	--	--	--
Total Chronic	0.0131	<.0001	0.0002	0.0100	<.0001	<.0001	<.0001	--

A Zero Background Concentration file was used to perform this analysis, therefore, there is no contribution from background pollutants.

California Air Resources Board
And
Office of Environmental Health Hazard Assessment
Health Risk Assessment Program
Version 2.0e

CHRONIC NONINHALATION EXPOSURE REPORT

Run Made By

nlm

Sierra Research

Project : SMUD CPP

Aug. 31, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

8.1E-6

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: ANNAVG.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	1.724E-05
ACETALDEHYDE	1.602E-03
ACROLEIN	1.449E-04
AMMONIA	5.628E-01
ARSENIC AND COMPOUNDS (INOR	2.926E-05
BENZENE	1.308E-04
COPPER AND COMPOUNDS	1.363E-05
ETHYL BENZENE	1.280E-03
FORMALDEHYDE	8.073E-03
LEAD AND COMPOUNDS	2.009E-06
MANGANESE AND COMPOUNDS	1.579E-05
N-HEXANE	1.017E-02
NAPHTHALENE	5.223E-05
PAH:BENZ(A)ANTHRACENE	8.875E-07
PAH:BENZO(A)PYRENE	5.458E-07
PAH:BENZO(B)FLUORANTHENE	4.437E-07
PAH:BENZO(K)FLUORANTHENE	4.319E-07
PAH:CHRYSENE	9.896E-07
PAH:DIBENZ(A,H)ANTHRACENE	9.228E-07
PAH:INDENO(1,2,3-C,D)PYRENE	9.228E-07
PROPYLENE (PROPENE)	3.028E-02
PROPYLENE OXIDE	1.162E-03
TOLUENE	5.223E-03
XYLENES	2.564E-03
ZINC COMPOUNDS	3.086E-05

EXPOSURE ROUTE INFORMATION

File: EXPOSURE.I96

Deposition Velocity (m/s): 0.020

Fraction of Homegrown Produce ..: 0.000

Dilution Factor for Farm/Ranch X/Q (ug/m3)/(g/s): 0.0000

Fraction of Animals' Diet From Grazing: 0.0000

Fraction of Animals' Diet From Impacted Feed: 0.0000

Fraction of Animals' Water Impacted by Deposition ...: 0.0000

Surface Area (m2): 0.000E+00

Volume (liters): 0.000E+00

Volume Changes: 0.000E+00

Fraction of Meat in Diet Impacted ...: 0.0000

Beef: 0.0000

Pork: 0.0000

Lamb/Goat: 0.0000

Chicken: 0.0000

Fraction of Milk in Diet Impacted ...: 0.0000

Goat Milk Fraction ...: 0.0000

Fraction of Eggs in Diet Impacted ...: 0.0000

Fraction of Impacted Drinking Water : 0.0000

X/Q at water source ...: 0.0000

Surface Area (m2): 0.000E+00

Volume (liters): 0.000E+00

Volume changes: 0.000E+00

Fraction of Fish from Impacted Water: 0.0000

X/Q at Fish Source ...: 0.0000

Surface Area (m2): 0.000E+00

Volume (liters): 0.000E+00

Volume changes: 0.000E+00

CHRONIC NONINHALATION EXPOSURE

Pollutant	Avg. Dose (mg/kg-d)	REL (mg/kg-d)	Avg Dose/REL
1,3-BUTADIENE	---	---	---
ACETALDEHYDE	---	---	---
ACROLEIN	---	---	---
AMMONIA	---	---	---
ARSENIC AND COMPOUNDS (I	7.78E-08	3.00E-04	2.59E-04
BENZENE	---	---	---
COPPER AND COMPOUNDS	---	---	---
ETHYL BENZENE	---	---	---
FORMALDEHYDE	---	---	---
LEAD AND COMPOUNDS	5.34E-09	---	---
MANGANESE AND COMPOUNDS	---	---	---
N-HEXANE	---	---	---
NAPHTHALENE	2.23E-08	---	---
PAH:BENZ (A) ANTHRACENE	1.99E-10	---	---
PAH:BENZO (A) PYRENE	1.22E-10	---	---
PAH:BENZO (B) FLUORANTHENE	9.96E-11	---	---
PAH:BENZO (K) FLUORANTHENE	9.69E-11	---	---
PAH:CHRYSENE	2.22E-10	---	---
PAH:DIBENZ (A,H) ANTHRACEN	2.07E-10	---	---
PAH:INDENO (1,2,3-C,D) PYR	2.07E-10	---	---
PROPYLENE (PROPENE)	---	---	---
PROPYLENE OXIDE	---	---	---
TOLUENE	---	---	---
XYLENES	---	---	---
ZINC COMPOUNDS	---	---	---

California Air Resources Board
And
Office of Environmental Health Hazard Assessment
Health Risk Assessment Program
Version 2.0e

INDIVIDUAL CANCER RISK REPORT

Run Made By
nlm

Sierra Research

Project : SMUD CPP

Aug. 31, 2001

Pollutant Database Date : Oct. 5, 2000
Database Reference..... : CAPCOA Risk Assessment Guidelines

8.1E-10

DILUTION FACTOR FOR POINT UNDER EVALUATION

X/Q (ug/m3)/(g/s) : 1.00E+00

ANNUAL AVERAGE EMISSION RATE INFORMATION

File: ANNAVG.E96

Pollutant Name	Emission Rate (g/s)
1,3-BUTADIENE	1.724E-05
ACETALDEHYDE	1.602E-03
ACROLEIN	1.449E-04
AMMONIA	5.628E-01
ARSENIC AND COMPOUNDS (INOR	2.926E-05
BENZENE	1.308E-04
COPPER AND COMPOUNDS	1.363E-05
ETHYL BENZENE	1.280E-03
FORMALDEHYDE	8.073E-03
LEAD AND COMPOUNDS	2.009E-06
MANGANESE AND COMPOUNDS	1.579E-05
N-HEXANE	1.017E-02
NAPHTHALENE	5.223E-05
PAH:BENZ(A)ANTHRACENE	8.875E-07
PAH:BENZO(A)PYRENE	5.458E-07
PAH:BENZO(B)FLUORANTHENE	4.437E-07
PAH:BENZO(K)FLUORANTHENE	4.319E-07
PAH:CHRYSENE	9.896E-07
PAH:DIBENZ(A,H)ANTHRACENE	9.228E-07
PAH:INDENO(1,2,3-C,D)PYRENE	9.228E-07
PROPYLENE (PROPENE)	3.028E-02
PROPYLENE OXIDE	1.162E-03
TOLUENE	5.223E-03
XYLENES	2.564E-03
ZINC COMPOUNDS	3.086E-05

EXPOSURE ROUTE INFORMATION

File: EXPOSURE.I96

Deposition Velocity (m/s): 0.020

Fraction of Homegrown Produce ..: 0.000

Dilution Factor for Farm/Ranch X/Q (ug/m3)/(g/s): 0.0000

Fraction of Animals' Diet From Grazing: 0.0000

Fraction of Animals' Diet From Impacted Feed: 0.0000

Fraction of Animals' Water Impacted by Deposition ...: 0.0000

Surface Area (m2): 0.000E+00

Volume (liters): 0.000E+00

Volume Changes: 0.000E+00

Fraction of Meat in Diet Impacted ...: 0.0000

Beef: 0.0000

Pork: 0.0000

Lamb/Goat: 0.0000

Chicken: 0.0000

Fraction of Milk in Diet Impacted ...: 0.0000

Goat Milk Fraction ...: 0.0000

Fraction of Eggs in Diet Impacted ...: 0.0000

Fraction of Impacted Drinking Water : 0.0000

X/Q at water source ...: 0.0000

Surface Area (m2): 0.000E+00

Volume (liters): 0.000E+00

Volume changes: 0.000E+00

Fraction of Fish from Impacted Water: 0.0000

X/Q at Fish Source ...: 0.0000

Surface Area (m2): 0.000E+00

Volume (liters): 0.000E+00

Volume changes: 0.000E+00

44 YEAR
INDIVIDUAL CANCER RISK BY POLLUTANT AND ROUTE

Pollutant	Air	Soil	Skin	Garden	MMilk	Other
1,3-BUTADIENE	1.84E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ACETALDEHYDE	2.72E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ARSENIC AND COM	6.07E-08	9.85E-08	2.08E-09	0.00E+00	0.00E+00	0.00E+00
BENZENE	2.38E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FORMALDEHYDE	3.04E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
LEAD AND COMPOU	1.52E-11	3.83E-11	8.11E-13	0.00E+00	0.00E+00	0.00E+00
PAH:BENZ (A) ANTH	6.14E-11	9.45E-11	6.00E-11	0.00E+00	2.42E-10	0.00E+00
PAH:BENZO (A) PYR	3.77E-10	5.81E-10	3.69E-10	0.00E+00	1.49E-09	0.00E+00
PAH:BENZO (B) FLU	3.07E-11	4.72E-11	3.00E-11	0.00E+00	1.21E-10	0.00E+00
PAH:BENZO (K) FLU	2.99E-11	4.60E-11	2.92E-11	0.00E+00	1.18E-10	0.00E+00
PAH:CHRYSENE	6.84E-12	1.05E-11	6.69E-12	0.00E+00	2.70E-11	0.00E+00
PAH:DIBENZ (A, H)	6.96E-10	3.36E-10	2.13E-10	0.00E+00	8.59E-10	0.00E+00
PAH:INDENO (1,2,	6.38E-11	9.82E-11	6.24E-11	0.00E+00	2.51E-10	0.00E+00
PROPYLENE OXIDE	2.70E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route Total	1.02E-07	9.97E-08	2.85E-09	0.00E+00	3.11E-09	0.00E+00
TOTAL RISK: 2.08E-07						

70 YEAR
INDIVIDUAL CANCER RISK BY POLLUTANT AND ROUTE

Pollutant	Air	Soil	Skin	Garden	MMilk	Other
1,3-BUTADIENE	2.93E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ACETALDEHYDE	4.33E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ARSENIC AND COM	9.66E-08	1.14E-07	2.42E-09	0.00E+00	0.00E+00	0.00E+00
BENZENE	3.79E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FORMALDEHYDE	4.84E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
LEAD AND COMPOU	2.41E-11	4.44E-11	9.40E-13	0.00E+00	0.00E+00	0.00E+00
PAH:BENZ (A) ANTH	9.76E-11	1.46E-10	9.28E-11	0.00E+00	0.00E+00	0.00E+00
PAH:BENZO (A) PYR	6.00E-10	8.99E-10	5.71E-10	0.00E+00	0.00E+00	0.00E+00
PAH:BENZO (B) FLU	4.88E-11	7.31E-11	4.64E-11	0.00E+00	0.00E+00	0.00E+00
PAH:BENZO (K) FLU	4.75E-11	7.11E-11	4.52E-11	0.00E+00	0.00E+00	0.00E+00
PAH:CHRYSENE	1.09E-11	1.63E-11	1.03E-11	0.00E+00	0.00E+00	0.00E+00
PAH:DIBENZ (A, H)	1.11E-09	5.19E-10	3.30E-10	0.00E+00	0.00E+00	0.00E+00
PAH:INDENO (1,2,	1.02E-10	1.52E-10	9.65E-11	0.00E+00	0.00E+00	0.00E+00
PROPYLENE OXIDE	4.30E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Route Total	1.62E-07	1.16E-07	3.61E-09	0.00E+00	0.00E+00	0.00E+00

TOTAL RISK: 2.82E-07