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Table C.18 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Arsenic

Two Parameters at High End	Area (m ²)	Wst. Vol (m ³)	TCLP (mg/L)	Wst Conc (mg/kg)	Oil Cl (L/kg)	Wst. Den (g/cm ³)	Infil (m/yr)	X-Well (m)	Y-Well (m)	Z-Well (m)	Maximum 9-year Avg. Conc. (mg/L)	Relative Conc. *	Rank
Base Case	2020	476	1.1	393.3	357.5	0.84	0.17	430	5284	6.5	1.92E-03		
Wst. Conc. & Y-Well	2020	476	1.1	1600	1454.5	0.84	0.17	430	0.00	6.5	2.11E-02	9.94	1
Wst. Vol & Y-Well	2020	18429	1.1	393.3	357.5	0.84	0.17	430	0.00	6.5	2.06E-02	9.69	2
X-Well & Y-Well	2020	476	1.1	393.3	357.5	0.84	0.17	102	0.00	6.5	1.58E-02	7.19	3
Y-Well & Infil	2020	476	1.1	393.3	357.5	0.84	0.46	430	0.00	6.5	1.17E-02	5.07	4
Wst. Conc. & X-Well	2020	476	1.1	1600	1454.5	0.84	0.17	102	34.38	6.5	1.15E-02	4.96	5
Wst. Vol & X-Well	2020	18429	1.1	393.3	357.5	0.84	0.17	102	34.38	6.5	1.12E-02	4.84	6
X-Well & Infil	2020	476	1.1	393.3	357.5	0.84	0.46	102	34.38	6.5	1.11E-02	4.74	7
Y-Well & TCLP	2020	476	49	393.3	803	0.84	0.17	430	0.00	6.5	9.66E-03	4.02	8
Wst. Conc. & Infil	2020	476	1.1	1600	1454.5	0.84	0.46	430	5284	6.5	8.58E-03	3.46	9
Wst. Vol & Infil	2020	18429	1.1	393.3	357.5	0.84	0.46	430	5284	6.5	8.31E-03	3.32	10
Wst. Vol & TCLP	2020	18429	49	393.3	803	0.84	0.17	430	5284	6.5	7.63E-03	2.97	11
X-Well & Z-Well	2020	476	1.1	393.3	357.5	0.84	0.17	102	34.38	13	7.58E-03	2.94	12
Wst. Vol & Wst Conc	2020	18429	1.1	1600	1454.5	0.84	0.17	430	5284	6.5	7.46E-03	2.87	13
X-Well & TCLP	2020	476	49	393.3	803	0.84	0.17	102	34.38	6.5	5.90E-03	2.07	14
Y-Well & Z-Well	2020	476	1.1	393.3	357.5	0.84	0.17	430	0.00	13	4.00E-03	1.08	15
Wst. Conc. & Area	162000	476	1.1	1600	1454.5	0.84	0.17	430	155.71	6.5	3.54E-03	0.84	16
Wst. Vol & Area	162000	18429	1.1	393.3	357.5	0.84	0.17	430	155.71	6.5	3.37E-03	0.75	17
TCLP & Infil	2020	476	49	393.3	803	0.84	0.46	430	5284	6.5	2.89E-03	0.50	18
Wst. Conc. & TCLP	2020	476	49	1600	3265	0.84	0.17	430	5284	6.5	2.16E-03	0.12	19
Wst. Conc. & Z-Well	2020	476	1.1	1600	1454.5	0.84	0.17	430	5284	13	2.02E-03	0.05	20
Wst. Vol & Z-Well	2020	18429	1.1	393.3	357.5	0.84	0.17	430	5284	13	1.98E-03	0.03	21
X-Well & Area	162000	476	1.1	393.3	357.5	0.84	0.17	102	143.51	6.5	1.76E-03	-0.09	22
Infil & Z-Well	2020	476	1.1	393.3	357.5	0.84	0.46	430	5284	13	1.16E-03	-0.40	23
Y-Well & Area	162000	476	1.1	393.3	357.5	0.84	0.17	430	0.00	6.5	9.45E-04	-0.51	24
TCLP & Z-Well	2020	476	49	393.3	803	0.84	0.17	430	5284	13	9.25E-04	-0.52	25
Infil & Area	162000	476	1.1	393.3	357.5	0.84	0.46	430	155.71	6.5	8.88E-04	-0.54	26
TCLP & Area	162000	476	49	393.3	803	0.84	0.17	430	155.71	6.5	8.71E-04	-0.55	27
Area & Z-Well	162000	476	1.1	393.3	357.5	0.84	0.17	430	155.71	13	3.80E-04	-0.80	28

*Relative concentration is equal to (Well Conc. - Basecase Conc.)/Basecase Conc.

Table C.18 Sensitivity Analysis Hydrotreating Off-site Landfill Scenario, Arsenic

Two Parameters at High End	Area (m ²)	Wst. Vol (m ³)	TCLP (mg/L)	Wst. Conc (mg/kg)	Qw/Cl (L/kg)	Wst. Den (g/cm ³)	Infil (m/yr)	X-Well (m)	Y-Well (m)	Z-Well (m)	Maximum 9-year Avg. Conc. (mg/L)	Relative Conc. *	Rank
Base Case	2020	476	1.1	393.3	357.5	0.84	0.17	430	52.84	65	1.92E-03		
Wst. Conc. & Y-Well	2020	476	1.1	1600	1454.5	0.84	0.17	430	0.00	65	2.11E-02	9.94	1
Wst. Vol & Y-Well	2020	18429	1.1	393.3	357.5	0.84	0.17	430	0.00	65	2.06E-02	9.69	2
X-Well & Y-Well	2020	476	1.1	393.3	357.5	0.84	0.17	102	0.00	65	1.58E-02	7.19	3
Y-Well & Infil	2020	476	1.1	393.3	357.5	0.84	0.46	430	0.00	65	1.17E-02	5.07	4
Wst. Conc. & X-Well	2020	476	1.1	1600	1454.5	0.84	0.17	102	34.38	65	1.15E-02	4.96	5
Wst. Vol & X-Well	2020	18429	1.1	393.3	357.5	0.84	0.17	102	34.38	65	1.12E-02	4.84	6
X-Well & Infil	2020	476	1.1	393.3	357.5	0.84	0.46	102	34.38	65	1.11E-02	4.74	7
Y-Well & TCLP	2020	476	49	393.3	80.3	0.84	0.17	430	0.00	65	9.66E-03	4.02	8
Wst. Conc. & Infil	2020	476	1.1	1600	1454.5	0.84	0.46	430	52.84	65	8.58E-03	3.46	9
Wst. Vol & Infil	2020	18429	1.1	393.3	357.5	0.84	0.46	430	52.84	65	8.31E-03	3.32	10
Wst. Vol & TCLP	2020	18429	49	393.3	80.3	0.84	0.17	430	52.84	65	7.63E-03	2.97	11
X-Well & Z-Well	2020	476	1.1	393.3	357.5	0.84	0.17	102	34.38	1.3	7.58E-03	2.94	12
Wst. Vol & Wst. Conc	2020	18429	1.1	1600	1454.5	0.84	0.17	430	52.84	65	7.46E-03	2.87	13
X-Well & TCLP	2020	476	49	393.3	80.3	0.84	0.17	102	34.38	65	5.90E-03	2.07	14
Y-Well & Z-Well	2020	476	1.1	393.3	357.5	0.84	0.17	430	0.00	1.3	4.00E-03	1.08	15
Wst. Conc. & Area	162000	476	1.1	1600	1454.5	0.84	0.17	430	155.71	65	3.54E-03	0.84	16
Wst. Vol & Area	162000	18429	1.1	393.3	357.5	0.84	0.17	430	155.71	65	3.37E-03	0.75	17
TCLP & Infil	2020	476	49	393.3	80.3	0.84	0.46	430	52.84	65	2.89E-03	0.50	18
Wst. Conc. & TCLP	2020	476	49	1600	326.5	0.84	0.17	430	52.84	65	2.16E-03	0.12	19
Wst. Conc. & Z-Well	2020	476	1.1	1600	1454.5	0.84	0.17	430	52.84	1.3	2.02E-03	0.05	20
Wst. Vol & Z-Well	2020	18429	1.1	393.3	357.5	0.84	0.17	430	52.84	1.3	1.98E-03	0.03	21
X-Well & Area	162000	476	1.1	393.3	357.5	0.84	0.17	102	143.51	65	1.76E-03	-0.09	22
Infil & Z-Well	2020	476	1.1	393.3	357.5	0.84	0.46	430	52.84	1.3	1.16E-03	-0.40	23
Y-Well & Area	162000	476	1.1	393.3	357.5	0.84	0.17	430	0.00	65	9.45E-04	-0.51	24
TCLP & Z-Well	2020	476	49	393.3	80.3	0.84	0.17	430	52.84	1.3	9.25E-04	-0.52	25
Infil & Area	162000	476	1.1	393.3	357.5	0.84	0.46	430	155.71	65	8.88E-04	-0.54	26
TCLP & Area	162000	476	49	393.3	80.3	0.84	0.17	430	155.71	65	8.71E-04	-0.55	27
Area & Z-Well	162000	476	1.1	393.3	357.5	0.84	0.17	430	155.71	1.3	3.80E-04	-0.80	28

* Relative concentration is equal to (Well Conc. - Basecase Conc.)/Basecase Conc.

Table C.19 Parameter Distributions for Hydrorefining Catalyst/Benzene

Parameter	Onsite		Offsite	
	Median¹	High-End²	Median¹	High-End²
Area (m²)	31323	121406	2020	162000
Wst. Vol (m³)	1476	8333.33	1476	8333.33
TCLP (mg/L)	1.49	4.2	1.49	4.2
Wst Conc (mg/kg)	43.73	100	43.73	100
Cw / Cl (L/kg)	10.41	29.35	10.41	29.35
Infil (m/yr)	0.17	0.46	0.17	0.46
X-well (m)	430	102	430	102
Y- Well (m)	*	0	*	0
Z-Well (m)	6.5	1.3	6.5	1.3

* The median values of Y-well is taken as 1/2 the plume width and is therefore a function of X-well and landfill area.

1. Mean value in the case of waste and leachate concentration.
2. High-End refers to the 10th % for X-well, maximum value for waste and leachate concentrations and 90th % for all other parameters

Table C.20 Sensitivity Analysis for Hydrorefining On-site Landfill Scenario/Benzene

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	Maximum 9-year Avg. Conc. (mg/L)	Relative Conc. *	Rank
Base Case	31323	2.08	1476	1.49	43.73	29.35	1.2	0.17	430	91.28	6.5	6.05E-02		
Wst. Vol & X-Well	31323	2.08	8333.3	1.49	43.73	29.35	1.2	0.17	102	76.13	6.5	2.54E-01	3.20	1
Infil & Xwell	31323	2.08	1476	1.49	43.73	29.35	1.2	0.46	102	76.13	6.5	2.47E-01	3.08	2
Wst. Vol & TCLP	31323	2.08	8333.3	4.2	43.73	10.41	1.2	0.17	430	91.28	6.5	2.32E-01	2.83	3
Wst. Vol & Infil	31323	2.08	8333.3	1.49	43.73	29.35	1.2	0.46	430	91.28	6.5	2.32E-01	2.83	4
Wst. Vol & Y-Well	31323	2.08	8333.3	1.49	43.73	29.35	1.2	0.17	430	0.00	6.5	2.30E-01	2.79	5
Area & Wst. Vol	121406	2.08	8333.3	1.49	43.73	29.35	1.2	0.17	430	140.38	6.5	2.22E-01	2.67	6
TCLP & X-Well	31323	2.08	1476	4.2	43.73	10.41	1.2	0.17	102	76.13	6.5	2.16E-01	2.57	7
X-Well & Y-well	31323	2.08	1476	1.49	43.73	29.35	1.2	0.17	102	0.00	6.5	2.15E-01	2.55	8
Wst Conc & X-Well	31323	2.08	1476	1.49	100	67.11	1.2	0.17	102	76.13	6.5	2.08E-01	2.44	9
Wst Conc & Y-Well	31323	2.08	1476	1.49	100	67.11	1.2	0.17	430	0.00	6.5	1.84E-01	2.04	10
TCLP & Y-Well	31323	2.08	1476	4.2	43.73	10.41	1.2	0.17	430	0.00	6.5	1.81E-01	1.99	11
X-Well & Z-well	31323	2.08	1476	1.49	43.73	29.35	1.2	0.17	102	76.13	1.3	1.61E-01	1.65	12
Infil & Ywell	31323	2.08	1476	1.49	43.73	29.35	1.2	0.46	430	0.00	6.5	1.61E-01	1.65	13
Wst Conc & Infil	31323	2.08	1476	1.49	100	67.11	1.2	0.46	430	91.28	6.5	1.60E-01	1.65	14
TCLP & Wst. Conc	31323	2.08	1476	4.2	100	23.81	1.2	0.17	430	91.28	6.5	1.52E-01	1.50	15
Area & X-Well	121406	2.08	1476	1.49	43.73	29.35	1.2	0.17	102	127.63	6.5	1.36E-01	1.25	16
Area & Wst.Conc	121406	2.08	1476	1.49	100	67.11	1.2	0.17	430	140.38	6.5	1.32E-01	1.18	17
Wst. Vol & Wst. Conc	31323	2.08	8333.3	1.49	100	67.11	1.2	0.17	430	91.28	6.5	1.17E-01	0.93	18
TCLP & Infil	31323	2.08	1476	4.2	43.73	10.41	1.2	0.46	430	91.28	6.5	1.10E-01	0.82	19
Area & Y-Well	121406	2.08	1476	1.49	43.73	29.35	1.2	0.17	430	0.00	6.5	7.98E-02	0.32	20
Area & TCLP	121406	2.08	1476	4.2	43.73	10.41	1.2	0.17	430	140.38	6.5	7.26E-02	0.20	21
Area & Infil	121406	2.08	1476	1.49	43.73	29.35	1.2	0.46	430	140.38	6.5	6.62E-02	0.09	22
Y- Well & Z-Well	31323	2.08	1476	1.49	43.73	29.35	1.2	0.17	430	0.00	1.3	5.23E-02	-0.14	23
Wst. Vol & Z-Well	31323	2.08	8333.3	1.49	43.73	29.35	1.2	0.17	430	91.28	1.3	4.33E-02	-0.28	24
infil & Z-well	31323	2.08	1476	1.49	43.73	29.35	1.2	0.46	430	91.28	1.3	3.61E-02	-0.40	25
Wst Conc & Z-Well	31323	2.08	1476	1.49	100	67.11	1.2	0.17	430	91.28	1.3	3.49E-02	-0.42	26
TCLP & Z-Well	31323	2.08	1476	4.2	43.73	10.41	1.2	0.17	430	91.28	1.3	3.45E-02	-0.43	27
Area & Z-Well	121406	2.08	1476	1.49	43.73	29.35	1.2	0.17	430	140.38	1.3	2.85E-02	-0.53	28

* Relative concentration is equal to (Well Conc. - Basecase Conc)/Basecase Conc.

Table C.21 Sensitivity Analysis for Hydrorefining On-site Landfill Scenario/TC Capped Benzene

Two Parameters at High End	Area (m2)	Depth (m)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	Maximum 9-year Avg. Conc. (mg/L)	Relative Conc. *	Rank
Base Case	31323	2.08	1476	0.5	43.73	87.46	1.2	0.17	430	91.28	6.5	3.16E-02		
Infil & Xwell	31323	2.08	1476	0.5	43.73	87.46	1.2	0.46	102	76.13	6.5	1.52E-01	3.79	1
X-Well & Y-well	31323	2.08	1476	0.5	43.73	87.46	1.2	0.17	102	0.00	6.5	1.09E-01	2.44	2
Area & Wst. Vol	121406	2.08	8333.3	0.5	43.73	87.46	1.2	0.17	430	140.38	6.5	1.08E-01	2.41	3
Infil & Ywell	31323	2.08	1476	0.5	43.73	87.46	1.2	0.46	430	0.00	6.5	1.03E-01	2.27	4
Area & X-Well	121406	2.08	1476	0.5	43.73	87.46	1.2	0.17	102	127.63	6.5	1.02E-01	2.23	5
Wst. Vol & Infil	31323	2.08	8333.3	0.5	43.73	87.46	1.2	0.46	430	91.28	6.5	9.87E-02	2.12	6
Wst. Vol & X-Well	31323	2.08	8333.3	0.5	43.73	87.46	1.2	0.17	102	76.13	6.5	9.43E-02	1.99	7
Wst Conc & X-Well	31323	2.08	1476	0.5	100	200.00	1.2	0.17	102	76.13	6.5	8.85E-02	1.80	8
Wst. Vol & Y-Well	31323	2.08	8333.3	0.5	43.73	87.46	1.2	0.17	430	0.00	6.5	8.66E-02	1.74	9
Wst Conc & Infil	31323	2.08	1476	0.5	100	200.00	1.2	0.46	430	91.28	6.5	8.23E-02	1.60	10
Area & Wst.Conc	121406	2.08	1476	0.5	100	200.00	1.2	0.17	430	140.38	6.5	8.10E-02	1.56	11
X-Well & Z-well	31323	2.08	1476	0.5	43.73	87.46	1.2	0.17	102	76.13	1.3	8.08E-02	1.56	12
Wst Conc & Y-Well	31323	2.08	1476	0.5	100	200.00	1.2	0.17	430	0.00	6.5	8.01E-02	1.53	13
Area & Y-Well	121406	2.08	1476	0.5	43.73	87.46	1.2	0.17	430	0.00	6.5	6.18E-02	0.96	14
Area & Infil	121406	2.08	1476	0.5	43.73	87.46	1.2	0.46	430	140.38	6.5	5.95E-02	0.88	15
Wst. Vol & Wst. Conc	31323	2.08	8333.3	0.5	100	200.00	1.2	0.17	430	91.28	6.5	4.28E-02	0.35	16
Y- Well & Z-Well	31323	2.08	1476	0.5	43.73	87.46	1.2	0.17	430	0.00	1.3	2.71E-02	-0.14	17
infil & Z-well	31323	2.08	1476	0.5	43.73	87.46	1.2	0.46	430	91.28	1.3	2.30E-02	-0.27	18
Area & Z-Well	121406	2.08	1476	0.5	43.73	87.46	1.2	0.17	430	140.38	1.3	2.19E-02	-0.31	19
Wst. Vol & Z-Well	31323	2.08	8333.3	0.5	43.73	87.46	1.2	0.17	430	91.28	1.3	1.63E-02	-0.48	20
Wst Conc & Z-Well	31323	2.08	1476	0.5	100	200.00	1.2	0.17	430	91.28	1.3	1.51E-02	-0.52	21

* Relative concentration is equal to (Well Conc. - Basecase Conc)/Basecase Conc.

Table C.22 Sensitivity Analysis for Hydrorefining Off-site Landfill Scenario/ Benzene

Two Parameters at High End	Area (m2)	Wst. Vol (m3)	TCLP (mg/L)	Wst Conc (mg/kg)	Cw / Cl (L/kg)	Wst. Den (g/cm3)	Infil (m/yr)	X-well (m)	Y- Well (m)	Z-Well (m)	Maximum 9-year Avg. Conc. (mg/L)	Relative Conc. *	Rank
Base Case	2020	1476	1.49	43.73	29.35	1.2	0.17	430	52.84	6.5	3.93E-03		
Area & Wst. Vol	162000	8333.3	1.49	43.73	29.349	1.2	0.17	430	155.71	6.5	2.26E-01	56.59	1
Area & Wst. Conc	162000	1476	1.49	100	67.11	1.2	0.17	430	155.71	6.5	1.25E-01	30.74	2
Ywell & TCLP	2020	1476	4.2	43.73	10.41	1.2	0.17	430	0.00	6.5	1.23E-01	30.33	3
Ywell & Infil	2020	1476	1.49	43.73	29.35	1.2	0.46	430	0.00	6.5	1.15E-01	28.37	4
Area & Xwell	162000	1476	1.49	43.73	29.35	1.2	0.17	102	143.51	6.5	1.15E-01	28.32	5
Ywell & Xwell	2020	1476	1.49	43.73	29.35	1.2	0.17	102	0.00	6.5	7.69E-02	18.58	6
Infil & Xwell	2020	1476	1.49	43.73	29.35	1.2	0.46	102	34.38	6.5	7.33E-02	17.66	7
Area & Ywell	162000	1476	1.49	43.73	29.35	1.2	0.17	430	0.00	6.5	6.66E-02	15.97	8
Infil & TCLP	2020	1476	4.2	43.73	10.41	1.2	0.46	430	52.84	6.5	6.45E-02	15.43	9
TCLP & xwell	2020	1476	4.2	43.73	10.41	1.2	0.17	102	34.38	6.5	6.40E-02	15.30	10
Area & TCLP	162000	1476	4.2	43.73	10.41	1.2	0.17	430	155.71	6.5	6.35E-02	15.16	11
Area & Infil	162000	1476	1.49	43.73	29.35	1.2	0.46	430	155.71	6.5	5.46E-02	12.90	12
Ywell & Wst Conc	2020	1476	1.49	100	67.11	1.2	0.17	430	0.00	6.5	5.09E-02	11.97	13
Ywell & Wst. Vol	2020	8333.3	1.49	43.73	29.349	1.2	0.17	430	0.00	6.5	4.98E-02	11.67	14
Xwell & Zwell	2020	1476	1.49	43.73	29.35	1.2	0.17	102	34.38	1.3	3.65E-02	8.30	15
TCLP & Wst. Vol	2020	8333.3	4.2	43.73	10.412	1.2	0.17	430	52.84	6.5	3.20E-02	7.15	16
TCLP & Wst Conc	2020	1476	4.2	100	23.81	1.2	0.17	430	52.84	6.5	3.12E-02	6.94	17
Infil & Wst. Vol	2020	8333.3	1.49	43.73	29.349	1.2	0.46	430	52.84	6.5	3.11E-02	6.92	18
Infil & Wst. Conc	2020	1476	1.49	100	67.11	1.2	0.46	430	52.84	6.5	3.08E-02	6.83	19
Area & Zwell	162000	1476	1.49	43.73	29.35	1.2	0.17	430	155.71	1.3	2.61E-02	5.64	20
Xwell & Wst. Conc	2020	1476	1.49	100	67.11	1.2	0.17	102	34.38	6.5	2.53E-02	5.44	21
Xwell & Wst Vol	2020	8333.3	1.49	43.73	29.349	1.2	0.17	102	34.38	6.5	2.49E-02	5.34	22
Ywell & Zwell	2020	1476	1.49	43.73	29.35	1.2	0.17	430	0.00	1.3	2.25E-02	4.74	23
TCLP & Zwell	2020	1476	4.2	43.73	10.41	1.2	0.17	430	52.84	1.3	1.18E-02	2.02	24
Infil & Zwell	2020	1476	1.49	43.73	29.35	1.2	0.46	430	52.84	1.3	1.15E-02	1.94	25
Wst. Vol & Wst. Conc	2020	8333.3	1.49	100	67.11	1.2	0.17	430	52.84	6.5	1.15E-02	1.93	26
Wst Conc & Zwell	2020	1476	1.49	100	67.11	1.2	0.17	430	52.84	1.3	4.86E-03	0.24	27
Wst. Vol & Zwell	2020	8333.3	1.49	43.73	29.35	1.2	0.17	430	52.84	1.3	4.79E-03	0.22	28

* Relative concentration is equal to (Well Conc. - Basecase Conc.)/Basecase Conc.