applied sciences

MDPI

Supplementary Material: Odor Emissions Factors for Bitumen-Related Production Sites

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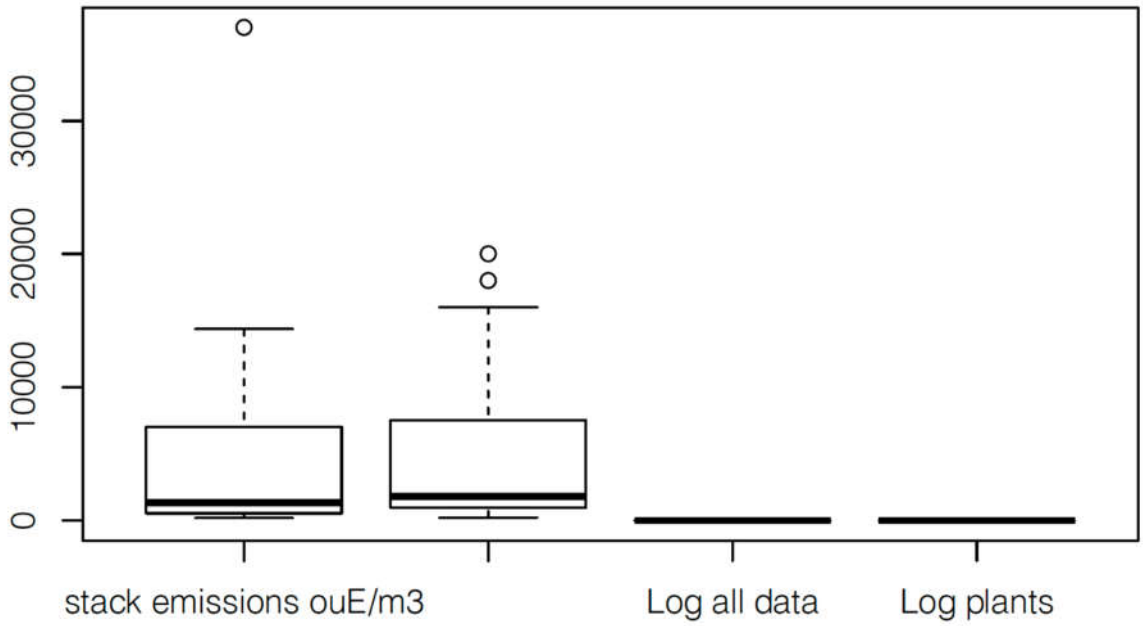

Figure S1. Overall view of raw data acquired. 85 bitumen-related production sites have been sampled.

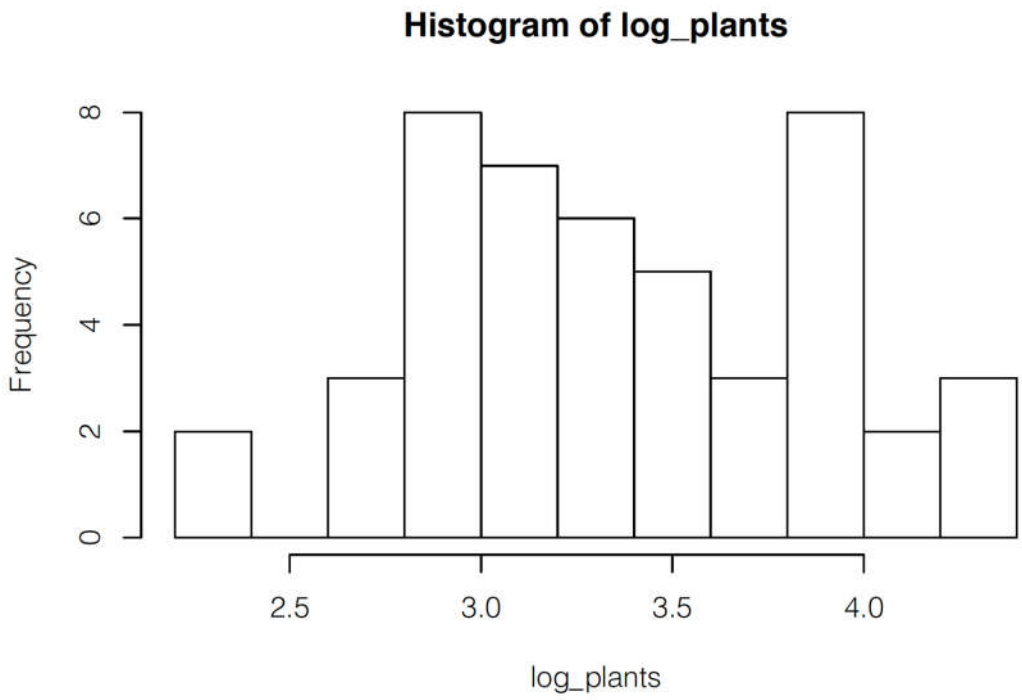

Figure S2. Overall view of raw data acquired. Distribution of odor concentration in stack emission for all bitumen-related production sites.

Table S1a. Complete raw dataset from bitumen related production sites acquired.

Plant ID		all data ou_E/m^3	overall stack emissions ouE/m3	plants stack emissions ouE/m3	fugitive emissions ou_E/m^3	amabient air $ou_E/m3$	plant filters ou_E/m^5	Q [m^3/h]	OER [OUE/s]	Plant capacity [ton/year]	OEF ouE/ton
	n=	**113**	**85**	**47**	**12**	**10**	**6**		**8**		**6**
	mean	**4625**	**4135**	**4494**	**11085**	**130**	**6135**		**1,0,E+05**		**1,8,E+07**
	median	**1400**	**1500**	**1800**	**1775**	**125**	**807**		**8,4,E+04**		**1,1,E+07**
	RSD %	**7203**	**6779**	**10538**	**146497**	**569**	**165790**		**1,3,E+06**		**3,5,E+08**
	Min	**60**	**200**	**240**	**964**	**60**	**198**		**7,9,E+03**		**1,8,E+06**
	Max	**49000**	**37000**	**20000**	**49000**	**220**	**25000**		**3,2,E+05**		**5,8,E+07**

Plant ID	Emission type	all data ou_E/m^3	overall stack emissions ouE/m3	plants stack emissions ouE/m3	fugitive emissions ou_E/m^3	amabient air $ou_E/m3$	plant filters ou_E/m^5	Q [m^3/h]	OER [OUE/s]	Plant capacity [ton/year]	OEF ouE/ton
	stack emissions	8700	8700								
	Loading trucks	1900			1900						
A	Loading trucks	35000			35000						
	Tank venting	49000			49000						
	ambient air	220				220					
	ambient air	60				60					
	average plant stack emissions			**8700**							
	stack emissions	220	220					24000		60000	
	stack emissions	320	320					82500			
	stack emissions	610	610					22500			
	stack emissions	510	510					82500			
	stack emissions	290	290					24000			
	stack emissions	430	430					57500			
	stack emissions	580	580					24000			
B	stack emissions	720	720					82500			
	stack emissions	290	290					24000			
	stack emissions	810	810					82500			
	stack emissions	320	320					24000			
	stack emissions	650	650					82500			
	stack emissions	1500	1500					24000			
	stack emissions	480	480					82500			
	stack emissions	270	270					82500			
	stack emissions	200	200					82500			
	stack emissions	320	320					82500			
	average plant stack emissions			**501**				**56853**	7914,8212		**4160030**
	inlet filter	25000					25000	120000			
	outlet filter - stack emissions	7300	7300					120000			
	ambient air	130				130		669540			
	ambient air	100				100		669540			
	ambient air	140				140		669540			
C	ambient air	220				220		234000			
	inlet filter	9700					9700	120000			
	outlet filter - stack emissions	12000	12000					120000			
	ambient air	160				160		669540			
	ambient air	70				70		669540			
	ambient air	120				120		669540			
	ambient air	81				81		234000			
	average plant stack emissions			**9650**				120000	321666,67		
	stack emissions	770	770					60500		80000	
	stack emissions	1050	1050					60500			
	stack emissions	9230	9230					60500			
D	stack emissions	37000	37000					60500			
	stack emissions	2450	2450					60500			
	stack emissions	1450	1450					60500			
	stack emissions	8905	8905					60500			
	stack emissions	10400	10400					60500			
	stack emissions	7790	7790					60500			
	average plant stack emissions			**8783**				**60500**	147599,46		**58183707**
	stack emissions	14375	14375					50000		80000	
E	stack emissions	7790	7790					50000			
	stack emissions	8905	8905					50000			
	stack emissions	9230	9230					50000			

Table S1b.. Complete raw dataset from bitumen related production sites acquired.

Plant ID	Emission type	all data ou_E/m^3	overall stack emissions ouE/m3	plants stack emissions ouE/m3	fugitive emissions ou_E/m^3	amabient air $ou_E/m3$	plant filters ou_E/m^5	Q [m^3/h]	OER [OUE/s]	Plant capacity [ton/year]	OEF ouE/ton
F	**average plant stack emissions**			**10075**				50000	139930,56		
	stack emissions	220	220					35000		206000	
	stack emissions	610	610					35000			
	stack emissions	1750	1750					35000			
	stack emissions	1350	1350					35000			
	stack emissions	980	980					35000			
	stack emissions	2300	2300					35000			
	loading trucks	1750			1750			35000			
	loading trucks	1550			1550			35000			
	loading trucks	1400			1400			35000			
G	**average plant stack emissions**			**1202**				**35000**	11682,87		**1788500**
	filter	295					295	35000			
	filter	198					198	35000			
	filter							35000			
	filter	695					695	35000			
H	filter	919					919				
	stack emissions	1000	1000					114000		162000	
	stack emissions	6800	6800					114000			
	stack emissions	3800	3800					114000			
	stack emissions	3600	3600					114000			
	filter	1800			1800						
	filter	2100			2100						
I	**average plant stack emissions**			**3800**				**114000**	120333,33		**23424889**
	stack emissions	685	685					79000		157000	
	stack emissions	4668	4668					40000			
	loading trucks	964			964						
	loading trucks	1469			1469						
	loading trucks	1084			1084						
	stack emissions	1706	1706					40000			
	average plant stack emissions			**2353**				**53000**	**34641**		**6958286**
M	stack emissions	3422	3422	3422				**50000**	47527,778	95000	**15777221**
N	stack emissions	1750	1750	1750							
O	stack emissions	16000	16000	16000							
P	stack emissions	13000	13000	13000							
Q	stack emissions	800	800	800							
R	stack emissions	1400	1400	1400							
S	stack emissions	1700	1700	1700							
T	stack emissions	1300	1300	1300							
U	stack emissions	8700	8700	8700							
V	loading trucks	35000			35000						
W	stack emissions	6500	6500	6500							
X	stack emissions	2600	2600	2600							
Y	stack emissions	1200	1200	1200							
Z	stack emissions	2000	2000	2000							
AA	stack emissions	20000	20000	20000							
AB	stack emissions	18000	18000	18000							
AC	stack emissions	10000	10000	10000							
AD	stack emissions	9200	9200	9200							
AE	stack emissions	6200	6200	6200							
AF	stack emissions	1800	1800	1800							
AG	stack emissions	1300	1300	1300							
AH	stack emissions	860	860	860							
AI	stack emissions	8600	8600	8600							
AL	stack emissions	760	760	760							
AM	stack emissions	6200	6200	6200							
AN	stack emissions	600	600	600							
AO	stack emissions	760	760	760							
AP	stack emissions	240	240	240							
AQ	stack emissions	5200	5200	5200							
AR	stack emissions	1700	1700	1700							
AS	stack emissions	3800	3800	3800							
AT	stack emissions	820	820	820							
AU	stack emissions	3600	3600	3600							
AV	stack emissions	460	460	460							
AW	stack emissions	240	240	240							
AX	stack emissions	1000	1000	1000							
AY	stack emissions	1500	1500	1500							
AZ	stack emissions	960	960	960							
BA	stack emissions	860	860	860							
BC	stack emissions	1100	1100	1100							
	n=	**113**	**85**	**47**	**12**	**10**	**6**	**70**	**8**	**7**	**6**