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Ministry of Environment

INFORMATION RELEASE – June 13, 2011

Prince George Neighbourhood VOC Sampling Data

The Ministry of Environment (MoE) is working in collaboration with city residents to collect ambient air samples within selected neighbourhoods and have them analyzed for volatile organic compounds (VOCs). This study is in response to complaints from the Millar Addition regarding odour and a follow-up from the 2010 formaldehyde study that detected low levels of formaldehyde and associated parameters. MoE staff have trained volunteers to collect 1-hour air samples. These volunteers live in the neighbourhood so that samples can be collected while odour is present without a lag time. Priority for testing is given to locations where residents have reported high levels of odour causing discomfort. The results of this sampling will be available to the public following the sample analysis at the contracted lab and quality assurance procedures.

This release contains information on the first three 1-hour samples collected on the mornings of **March 9, 10 and 15, 2011**. Sampling will continue in 2011 through to March 2012. Due to the long list of VOCs (total of 190 compounds) analyzed, this release focuses on VOCs with the highest concentrations relative to objectives/screening levels (> 5% of objective) and the highest measured VOC. Samples collected on March 9, 10 and 15, 2011 did not exceed any specified objective levels (Table 1). Appendix A includes a summary of information on the VOCs listed in Table 1. Appendix B shows ALL VOC data including objectives/jurisdictions reported for the samples.

Since August 2005, VOC samples have been collected at the MoE Plaza 400 monitoring station. These samples are 24-hour averages and are collected on a regular schedule, every 6 days. A summary of this data is available in the MoE Prince George annual air quality reports located at:
http://www.env.gov.bc.ca/epd/regions/omineca/air/annual_info.htm

VOCs include a wide range of individual substances containing at least one carbon and one hydrogen atom, from many substance classes such as hydrocarbons, halocarbons and oxygenates (Source: http://www.ec.gc.ca/cov-voc/default.asp?lang=En&n=C8C72F33-1). Each VOC has different properties and chemical make-up but is generally associated with odour and/or health effects. Data collected is currently compared to 1-hour objectives and screening levels from other jurisdictions as a threshold for a basis of comparison; currently the province does not have any ambient air quality objectives associated with the VOCs measured in this project. Priority was given to Canadian jurisdictions with existing objectives.

This summary is posted on the BC Air Quality webpage at:
http://www.bcairquality.ca/reports/region_Omineca.html. Future test results will be posted to this website.

This bulletin has been distributed through the Ministry of Environment's air quality advisory distribution list to notify multiple stakeholders.

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Table 1: VOC Concentrations Measured as Compared to Objective/Screening Level (compounds with concentrations greater than 5% of objective levels and highest measured concentration included)

Sample Date	**2011-03-09 – Patricia Blvd 9:15-10:15 PST**		
VOC Name	Sampled Concentration ($\mu g/m^3$)	Objective Level ($\mu g/m^3$)	Concentration relative to Objective level (%)
Acrolein (2-Propenal)	1.69	4.5	37.6%
a-Pinene	10.39	60	17.3%
MVK (methyl vinyl ketone)	0.75	6	12.5%
b-Pinene	6.09	64	9.5%
Butylaldehyde (Butanal)	0.80	14	5.7%
Hexanal	4.55	80	5.7%
Acetaldehyde	4.99	90	5.5%
Methanol (methyl alcohol)	* 36.29	2600	1.4%
Sample Date	**2011-03-10 – Patricia Blvd 8:25-9:25 PST**		
VOC Name	Sampled Concentration ($\mu g/m^3$)	Objective Level ($\mu g/m^3$)	Concentration relative to Objective level (%)
Acrolein (2-Propenal)	1.31	4.5	29.0%
Hexanal	5.32	80	6.7%
a-Pinene	3.75	60	6.3%
Butylaldehyde (Butanal)	0.71	14	5.0%
Methanol (methyl alcohol)	* 13.90	2600	0.5%
Sample Date	**2011-03-15 – Ash St 6:33-7:33 PST**		
VOC Name	Sampled Concentration ($\mu g/m^3$)	Objective Level ($\mu g/m^3$)	Concentration relative to Objective level (%)
Acrolein (2-Propenal)	2.92	4.5	64.8%
a-Pinene	23.33	60	38.9%
b-Pinene	12.62	64	19.7%
Acetaldehyde	7.22	90	8.0%
Camphene	3.42	50	6.8%
Butylaldehyde (Butanal)	0.88	14	6.3%
Methanol (methyl alcohol)	* 75.75	2600	2.9%

* highest measured VOC concentration from sample date included even though concentration was < 5% of objective level

Appendix A: Characteristics of VOCs from Table 1

VOC	Odour Properties	Potential Sources/Exposure	Reference
Acetaldehyde	Acetaldehyde has a pungent suffocating odour, but at dilute concentrations it has a fruity and pleasant odour. The odour threshold of acetaldehyde is 0.05 parts per million (ppm) (90 µg/m^3).	Acetaldehyde can be measured throughout the ambient environment. It is an intermediate product of higher plant respiration and formed as a product of incomplete wood combustion in fireplaces and woodstoves, burning of tobacco, vehicle exhaust fumes, and waste processing. Hence, many individuals are exposed to acetaldehyde by breathing ambient air. Industries releasing acetaldehyde include pulp & paper, OSB plants and sawmills/wood preserving. In addition, acetaldehyde is formed in the body from the breakdown of ethanol; this would be a source of acetaldehyde among those who consume alcoholic beverages.	http://www.epa.gov/ttnatw01/hlthef/acetalde.html http://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1
Acrolein	Acrolein has a burned, sweet, pungent odour that most people may begin to smell at air concentrations around 0.25 ppm (600 µg/m^3).	Acrolein may be formed from the breakdown of certain pollutants found in outdoor air, from the burning of organic matter including tobacco, or from the burning of fuels such as gasoline or oil. Industries releasing acrolein include OSB plants and pulp & paper. Airborne exposure to acrolein may occur by breathing contaminated air, by smoking tobacco or by being in the proximity of someone who is smoking, or by being near vehicle exhaust. Small amounts of acrolein may be found in some foods, such as fried foods, cooking oils, and roasted coffee.	http://www.epa.gov/ttnatw01/hlthef/acrolein.html http://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1 http://www.atsdr.cdc.gov/toxprofiles/tp124-c6.pdf
Butylaldehyde (Butanal)	Butylaldehyde (also called butanal) has an odour threshold of 0.0046 ppm (13 µg/m^3).	Butylaldehyde occurs naturally in essential oils of plants and in foods such as fruits, vegetables, cheeses, meat, wines, coffee, honey, and nuts. It is produced by the poplar tree and ferns. Butylaldehyde is released to the environment from facilities that manufacture and use it. The largest users of butylaldehyde are companies that make rubber accelerators, synthetic resins, solvents, plasticizers, and high molecular weight polymers. Butylaldehyde has been detected in exhaust emissions from diesel engines, in gaseous emissions from fireplaces burning jack pine or red oak logs and at hazardous waste sites.	http://www.epa.gov/chemfact/butyr-fs.txt http://www.epa.gov/chemfact/butyr-sd.txt

Camphene	Camphene is described as having a camphor-like (aromatic and woody) odour. No odour threshold has been identified.	Camphene is produced and uses as a food additive, synthetic feedstock, and fragrance. Camphene is also a byproduct of pulp & paper production. Camphene is present in the emissions of various plant and tree species. It is found in various foods and essential oils.	http://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+900 https://www.atsdr.cdc.gov/ToxProviles/tp94-c5.pdf
Hexanal (hexaldehyde)	Hexanal (also called hexaldehyde) has a fruity, green grass, or sharp aldehyde odour. The odour threshold is 58 µg/m3.	Hexaldehyde is produced and used as a food additive, in organic synthesis of plasticizers, rubber chemicals, dyes, synthetic resins, and insecticides, and in perfumery. Hexaldehyde occurs naturally in many fruits, vegetables, meats, and shellfish. Hexaldehyde is also in vapor given off by northern red oak, dawn redwood, bass wood, tulip poplar trees, and many other plants.	http://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+560 Odour threshold: http://www.nrc-cnrc.gc.ca/obj/irc/doc/pubs/nrcc48314/nrcc48314
MVK (methyl vinyl ketone)	Methyl vinyl ketone has a pungent, powerfully irritating odor. No odour threshold has been identified.	Methyl vinyl ketone's production and use as a component of ionomer resins and a precursor of styrene-methyl vinyl ketone polymers may result in its release to the environment through various waste streams. Methyl vinyl ketone has been identified in the volatile emissions of trees and has been found in crabs.	http://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+716
a-Pinene	alpha-Pinene has a characteristic odour of pine or turpentine. The odour threshold is 3900 µg/m3.	alpha-Pinene has been widely detected in air samples as it is emitted by a wide variety of vegetation including trees, fruits, grasses, bushes, fungi, herbs, and flowers. It is also released in process vapours from pulp mills. The general population may be exposed to alpha-pinene via inhalation and by ingestion of foods where it occurs naturally or was added as a flavouring component, and skin contact with consumer products in which it is contained as a solvent or fragrance. alpha-Pinene's production and use as a solvent, synthetic intermediate, fragrance, and flavouring may result in its release to the environment through various waste streams.	http://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+720 http://ecb.jrc.it/documents/PBT_EVALUATION/PBT_sum084_CAS_91770-80-8.pdf Odour threshold: http://www.nrc-cnrc.gc.ca/obj/irc/doc/pubs/nrcc48314/nrcc48314

b-Pinene	beta-Pinene is has a characteristic turpentine/ woody/ resinous odour. No odour threshold has been identified.	beta-Pinene is a natural hydrocarbon emission product from softwood trees, in particular spruce. It is also released in process vapours from pulp mills. beta-Pinene is produced and used as an intermediate for perfumes and flavourings, in polyterpene resins, and as a fragrance ingredient.	http://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+5615 http://ecb.jrc.it/documents/PBT_EVALUATION/PBT_sum084_CAS_91770-80-8.pdf
Methanol (methyl alcohol)	Methanol has a slightly alcoholic odor when pure and a repulsive, pungent odor when in its crude form; it is difficult to smell methanol in the air at less than 2,000 parts per million (ppm) (2,622,000 µg/m3).	Methanol is primarily used as an industrial solvent for inks, resins, adhesives, and dyes. It is used as a solvent in the manufacture of cholesterol, streptomycin, vitamins, hormones, and other pharmaceuticals. Industries releasing methanol include pulp & paper, OSB plants, sawmills/wood preservers, chemical manufacturing and oil & gas. Methanol is also used as an antifreeze for automotive radiators, an ingredient of gasoline (as an antifreezing agent and octane booster), and as fuel for picnic stoves. Methanol is an ingredient in paint and varnish removers. Methanol is also used as an alternative motor fuel. Individuals may be exposed to methanol in the ambient air from its evaporation during solvent uses or from automobile exhaust, through the consumption of various foods, and through contact with various consumer products such as paint thinners and strippers, adhesives, cleaners, and inks. Natural emission sources of methanol include volcanic gases, vegetation, microbes, and insects; methanol is also formed during biological decomposition of biological wastes, sewage, and sludge.	http://www.epa.gov/ttnatw01/hlthef/methanol.html http://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1

Appendix B: Summary table of all VOC concentrations (µg/m3) measured **March 9, 10 and 15, 2011** (red font indicates no objective available)

VOC	Jurisdiction	1-hr Obj (µg/m^3)	2011-03-09 Concentration (µg/m^3)	2011-03-10 Concentration (µg/m^3)	2011-03-15 Concentration (µg/m^3)
1,1,1-Trichloroethane	Texas	10800	0.03	0.03	0.03
1,1,2,2-Tetrachloroethane	Texas	70	0.00	0.00	0.00
1,1,2-Trichloroethane	Texas	550	0.00	0.00	0.00
1,1-Dichloroethane	Texas	4000	0.01	0.01	0.00
1,1-Dichloroethene (1,1-dichloroethylene)	Texas	210	0.00	0.00	0.00
1,2,3-Trimethylbenzene (hemimellitene)	Texas	1250	0.26	0.17	0.36
1,2,4-Trichlorobenzene	Texas	400	0.01	0.01	0.00
1,2,4-Trimethylbenzene (pseudocumene)	Texas	1250	0.55	0.26	0.62
1,2-Dibromoethane (EDB)	Texas	4	0.00	0.00	0.00
1,2-Dichlorobenzene	Ontario	30500	0.00	0.00	0.00
1,2-Dichloroethane	Texas	160	0.06	0.06	0.06
1,2-Dichloropropane	Texas	460	0.02	0.02	0.02
1,2-Diethylbenzene	Texas	2500	0.03	0.01	0.01
1,3,5-Trimethylbenzene	Texas	1250	0.17	0.09	0.18
1,3-Butadiene	Texas	510	0.14	0.04	0.14
1,3-Dichlorobenzene	Texas	720	0.00	0.00	0.00
1,3-Diethylbenzene	Texas	2500	0.04	0.03	0.02
1,4-Dichlorobenzene	Texas	720	0.01	0.01	0.01
1,4-Dichlorobutane			0.00	0.00	0.00
1,4-Diethylbenzene			0.19	0.20	0.00
1-Butanol (Butyl alcohol)	Texas	610	0.00	0.00	0.00
1-Butene/2-Methylpropene	Texas	820	2.16	0.70	1.10
1-Butyne (ethyl acetylene)	Texas	16400	0.01	0.00	0.00
1-Decene	Texas	116	0.04	0.04	0.00
1-Heptene	Texas	16	0.00	0.04	0.00
1-Hexene/2-Methyl-1-Pentene	Texas	70	0.15	0.07	0.15
1-Methylcyclohexene	Texas	940	0.01	0.00	0.02
1-Methylcyclopentene	Texas	8100	0.04	0.01	0.08
1-Nonene	Texas	30	0.00	0.06	0.05
1-Octene	Texas	20	0.08	0.08	0.10
1-Pentene	Texas	290	0.19	0.09	0.14
1-Undecene	Texas	100	0.03	0.02	0.00

2,2,3-Trimethylbutane	Texas	3500	0.01	0.01	0.02
2,2,4-Trimethylpentane (isooctane)	Texas	3500	0.85	0.17	2.25
2,2,5-Trimethylhexane			0.02	0.00	0.04
2,2-Dimethylbutane (neohexane)	Texas	3500	0.24	0.57	0.57
2,2-Dimethylhexane	Texas	3500	0.00	0.00	0.00
2,2-Dimethylpentane	Texas	3500	0.05	0.03	0.06
2,2-Dimethylpropane (dimethyl propane)	Texas	3500	0.02	0.05	0.02
2,3,4-Trimethylpentane			0.07	0.01	0.21
2,3-Dimethylbutane	Texas	3500	0.24	0.28	0.47
2,3-Dimethylpentane	Texas	3500	0.43	0.09	0.61
2,4-Dimethylhexane	Texas	3500	0.11	0.02	0.13
2,4-Dimethylpentane	Texas	3500	0.16	0.06	0.27
2,5-Dimethylhexane	Texas	3500	0.08	0.02	0.10
2-Butanol (sec-butyl alcohol)	Texas	1240	0.06	0.00	0.00
2-Butenal (Crotonaldehdye)	Texas	9	0.00	0.00	0.00
2-Ethyl-1-Butene			0.00	0.00	0.00
2-Ethyltoluene			0.12	0.05	0.13
2-Heptanone	Texas	32	0.05	0.02	0.00
2-Hexanone	Texas	40	0.08	0.05	0.00
2-Methyl-1-Butene			0.24	0.06	0.29
2-Methyl-2-Butene (ß-isoamylene)	Texas	720	0.30	0.09	0.52
2-Methylbutanal(Isovaleraldehyde)	Texas	1800	0.19	0.12	0.00
2-Methylbutane (isopentane)	Texas	3500	3.67	6.42	5.09
2-Methylfuran	Texas	550	0.32	0.00	0.44
2-Methylheptane	Texas	3500	0.30	0.10	0.20
2-Methylhexane	Texas	3070	0.79	0.21	0.59
2-Methylpentane	Texas	290	1.23	1.27	2.07
2-Methyl-Propanal (Isobutylaldehyde)	Texas	140	0.25	0.40	0.65
2-Pentanone	Texas	5300	0.00	0.00	0.00
3,6-Dimethyloctane			0.05	0.02	0.00
3-Ethyltoluene			0.32	0.13	0.39
3-Methyl1-Butanol (isoamyl alcohol)	Texas	150	0.00	0.00	0.00
3-Methyl-1-Butene			0.12	0.04	0.18
3-Methyl-1-Pentene			0.02	0.01	0.03
3-Methylfuran			0.00	0.00	0.00
3-Methylheptane	Texas	3500	0.33	0.07	0.20

3-Methylhexane	Texas	3070	1.18	0.24	0.66
3-Methylpentane	Texas	3500	0.81	0.75	1.35
4-Ethyltoluene			0.15	0.06	0.19
4-Methyl-1-Pentene	Texas	1000	0.02	0.01	0.02
4-Methylheptane	Texas	3500	0.13	0.03	0.08
Acetaldehyde	Alberta	90	4.99	3.33	7.22
Acetone	Alberta	5900	7.08	4.81	18.18
Acetonitrile	Texas	340	0.25	0.20	0.46
Acrolein (2-Propenal)	Ontario	4.5	1.69	1.31	2.92
Acrylonitrile (2-Propennitrile)	Alberta	43	0.00	0.00	0.00
a-Pinene	Texas	60	10.39	3.75	23.33
Benzaldehyde	Texas	22	0.49	0.26	0.22
Benzene	Alberta	30	1.03	0.75	1.10
Benzyl Chloride	Texas	50	0.00	0.01	0.01
b-Pinene	Texas	64	6.09	1.96	12.62
Bromodichloromethane	Texas	700	0.00	0.00	0.00
Bromoform	Texas	50	0.01	0.01	0.01
Bromomethane (methyl bromide)	Texas	120	0.04	0.05	0.04
Bromotrichloromethane			0.00	0.00	0.00
Butane	Texas	23750	6.35	9.54	4.84
Butylacetate	Ontario	15000	0.06	0.03	0.00
Butylaldehyde (Butanal)	Texas	14	0.80	0.71	0.88
c-1,2-Dichloroethene (1,2-dichloroethylene)	Texas	7900	0.00	0.00	0.00
c-1,2-Dimethylcyclohexane	Texas	3500	0.03	0.01	0.01
c-1,3-Dichloropropene	Texas	45	0.00	0.00	0.00
c-1,3-Dimethylcyclohexane			0.09	0.03	0.05
c-1,4/t-1,3-Dimethylcyclohexane	Texas	3500	0.04	0.01	0.02
c-2-Butene	Texas	4800	0.50	0.13	0.41
c-2-Heptene	Texas	16	0.00	0.00	0.00
c-2-Hexene	Texas	70	0.03	0.01	0.04
c-2-Pentene	Texas	7500	0.12	0.03	0.18
c-3-Heptene	Texas	16	0.00	0.00	0.00
c-3-Methyl-2-Pentene			0.07	0.03	0.10
c-4-Methyl-2-Pentene			0.04	0.01	0.08
Camphene	Texas	50	1.46	0.46	3.42
Carbon Disulfide	Alberta	30	0.18	0.17	0.20
Carbontretrachloride	Texas	130	0.42	0.43	0.40
Chlorobenzene	Texas	460	0.00	0.00	0.00
Chloroethane	Texas	500	0.02	0.02	0.02
Chloroform	Texas	100	0.20	0.12	0.28

Chloromethane (methyl chloride)	Texas	1030	1.18	1.21	1.16
Cyclohexane	Texas	3400	0.31	0.34	0.61
Cyclohexanone	Texas	480	0.03	0.02	0.00
Cyclohexene	Texas	600	0.02	0.01	0.00
Cyclopentane	Texas	3400	0.16	0.26	0.25
Cyclopentanone	Texas	1700	0.05	0.00	0.00
Cyclopentene	Texas	8100	0.03	0.01	0.05
Decane	Ontario	60000	0.59	0.38	0.20
Dibromochloromethane	Texas	20	0.00	0.00	0.00
Dibromomethane (methylene bromide)	Texas	1320	0.00	0.03	0.03
Dichloromethane	Texas	260	0.32	0.28	0.27
Dodecane	Texas	3500	0.49	0.26	0.22
Ethanol (ethyl alcohol)	Ontario	19000	5.41	3.16	5.30
Ethylacetate	Ontario	19000	0.05	0.03	0.06
Ethylbenzene	Texas	740	0.39	0.21	0.53
Ethylbromide (bromoethane)	Texas	220	0.00	0.00	0.00
Ethylene oxide	Ontario	15	0.00	0.00	0.00
Freon 11 (Trichlorofluoromethane)	Texas	28000	1.35	1.34	1.23
Freon 113 (1,1,2-Trichlorotrifluoroethane	Texas	38000	0.52	0.53	0.48
Freon 114 (1,2-Dichlorotetrafluoroethane	Texas	70000	0.11	0.11	0.10
Freon 12 (Dichlorodifluoromethane)	Texas	49500	2.36	2.37	2.17
Freon 22 (Chlorodifluoromethane)	Texas	18000	0.67	0.65	0.61
Heptane	Texas	3500	1.82	0.30	0.54
Hexachlorobutadiene	Texas	2	0.00	0.00	0.00
Hexanal	Texas	80	4.55	5.32	1.12
Hexane	Alberta	21000	1.29	0.95	1.58
Hexylbenzene	Texas	1250	0.01	0.00	0.00
Indan (2,3-Dihydroindene) (indane)	Texas	480	0.20	0.10	0.08
Isobutane (2-Methylpropane)	Texas	4800	4.70	4.05	2.22
Isobutylacetate	Texas	630	0.00	0.00	0.00
Isobutylalcohol	Texas	1520	0.00	0.00	0.00
iso-Butylbenzene	Texas	2740	0.04	0.02	0.01
Isoprene (2-Methyl-1,3-Butadiene)	Texas	14	0.08	0.02	0.11
Isopropyl Alcohol	Texas	4920	0.50	0.21	0.49
Isopropylacetate	Texas	3760	0.00	0.00	0.00
iso-Propylbenzene (cumene)	Alberta	500	0.03	0.02	0.03

Limonene			3.15	1.21	2.53
m,p-Xylene	Alberta	2300	1.56	0.81	2.13
MAC (2-Methyl-2-propenal)			0.12	0.12	0.23
MEK (methyl ethyl ketone)	Texas	1300	0.83	0.65	1.11
Methanol (methyl alcohol)	Alberta	2600	36.29	13.90	75.75
Methyl Acetate	Texas	6000	0.24	0.08	0.11
Methylcyclohexane	Texas	600	0.41	0.16	0.23
Methylcyclopentane	Texas	3500	0.47	0.42	0.88
Methyl-t-Butyl Ether (MTBE)	Texas	450	0.00	0.00	0.00
MIBK (methyl isobutyl ketone)	Texas	820	0.08	0.03	0.07
MVK (methyl vinyl ketone)	Texas	6	0.75	0.00	0.00
Naphthalene	Texas	440	0.12	0.06	0.05
n-Butylbenzene	Texas	2740	0.04	0.00	0.00
Nonane	Texas	10500	0.65	0.29	0.14
n-Propylbenzene	Texas	1250	0.09	0.04	0.09
Octane	Texas	3500	0.68	0.16	0.22
o-Xylene	Alberta	2300	0.53	0.27	0.69
p-Cymene (1-Methyl-4-Isopropylbenzene)	Texas	2750	2.04	0.76	6.20
Pentanal (valeraldehyde)	Texas	100	0.00	0.00	0.00
Pentane	Texas	3500	2.12	2.92	2.27
Propane	Texas *	18000	3.67	2.82	1.50
Propene (propylene)	Texas *	8750	2.90	0.94	1.34
Propionaldehyde	Texas	20	0.00	0.00	0.00
Propyl alcohol (1-Propanol)	Texas	2460	0.16	0.14	0.09
Propylene Oxide	Alberta	480	0.00	0.00	0.00
Propyne	Texas	16400	0.14	0.05	0.12
sec-Butylbenzene	Texas	2740	0.02	0.01	0.01
Styrene (vinyl benzene)	Alberta	215	0.09	0.02	0.09
t-1,2-Dichloroethene			0.00	0.00	0.00
t-1,2-Dimethylcyclohexane	Texas	3500	0.08	0.03	0.03
t-1,3-Dichloropropene	Texas	45	0.00	0.00	0.00
t-1,4-Dimethylcyclohexane			0.04	0.01	0.02
t-2-Butene	Texas	4800	0.74	0.23	0.61
t-2-Heptene	Texas	16	0.01	0.00	0.02
t-2-Hexene			0.05	0.01	0.08
t-2-Octene	Texas *	100	0.00	0.00	0.00
t-2-Pentene	Texas	7500	0.24	0.07	0.39
t-3-Heptene	Texas	16	0.01	0.00	0.02
t-3-Methyl-2-Pentene			0.02	0.01	0.04
t-4-Methyl-2-Pentene			0.01	0.00	0.01
tert-Butylbenzene	Texas	2740	0.00	0.00	0.00

Tetrachloroethene (tetrachloroethylene)	Texas	2000	0.22	0.03	0.05
Toluene	Alberta	1880	2.40	1.12	3.66
Trichloroethene			0.29	0.12	0.72
Undecane	Texas	3500	0.53	0.42	0.26
Vinylchloride (Chloroethene)	Alberta	130	0.01	0.00	0.00

* No 2010 numerical Texas ESL available, so 2009 value was used