CSAP Omnibus Review 2017

Real Data – Real Results

CSAP Professional Development Webinar – March 16, 2017

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Webinar Information

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  - Phone Number **1-855-747-8824**
  - PASSWORD **728369.**
- Questions should be typed in in the chat box and will be answered by the presenters at the end of the presentation.

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Webinar Presenters

Bob Symington, M.Sc., P.Geo.	Gandalf Consulting Ltd.	Moderator
Michael Sloan, M.Sc., P.Eng.	SLR Consulting (Canada) Ltd.	Webinar Lead
Colin Dunwoody, P.Eng.	SNC-Lavalin Inc.	Guest Speaker
Chuck Jochems, P.Eng. **Peter Reid, P.Eng.**	Hemmera Envirochem Inc.	Guest Speaker
Dan Walker, Ph.D.	Golder Associates	Guest Speaker
Dr. Glyn Fox, LRS SCI - Science & Standards	BC Ministry of Environment	Guest Speaker

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Background

- Stage 10 (Omnibus) Amendments to the CSR updated more than 8,500 environmental quality standards that will come into effect November 1, 2017
- Errata have already been produced for noted changes to lead, aluminum, iron, sulfur, and zirconium
- How will the Omnibus updates affect applications for Certificates of Compliance or other instruments after October 31?
- The CSAP Technical Review Committee provided funding to support member firms' to poll their analytical databases and pool the results for the benefit of the wider membership, regulators, and industry

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Objectives

- Summarize and clarify impacts for APs, practitioners and property owners
- Aid BC Environment in identifying potential errors
- Highlight priorities for attention

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Limitations

- The Stage 10 amendments encompass many changes including addition of new substances, some of which have very low standards
- This project and this webinar address only the potential impacts from changes to a selection of currently regulated substances
  - Examples of substances not included:
  - Low volatility Polycyclic Aromatic Hydrocarbons (PAHs) with new matrix standards under Omnibus
  - Emerging substances not currently listed in the CSR
- APs should consider the overall Omnibus changes when advising their clients, based on their review

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Contributors & Sources

- Received data analyses & assistance from
  - Advisian (Worley Parsons Group)
  - Golder Associates
  - Hemmera Envirochem Inc.
  - SLR Consulting (Canada) Ltd.
  - SNC-Lavalin Inc.
- Obtained consent from major industry clients

Chevron Canada Limited	Husky Energy Inc.
Imperial Oil Limited	BC Ministry of Transportation and Infrastructure
Parkland Fuel Corporation	Shell Canada Limited
Suncor Energy Inc.	Teck Metals Ltd.

- Client- and site-specific data were not shared

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Scope of Work

- Organic substances listed in CSAP Vapour Guidance
  - Including concentrations in soil and groundwater
- Inorganic substances listed in general metals scan
- Evaluated key land and water uses
  - Urban Park (PL)
  - Residential (RL) vs. Residential Low-Density (RL_{LD})
  - Commercial & Industrial (CL/IL)
  - Drinking Water (DW)
  - Freshwater (FW)
  - Marine Water (MW)
- Detection limits, attenuation factors not considered
- Both investigation and confirmatory data included
- Results generated before Errata 2 (January 27, 2017)

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Percent Exceedance Difference

- Calculated number of exceedances under current CSR vs. number of exceedances under Omnibus standards
- Used %Exceedance statistic due to different dataset sizes

  %X = # of Exceedances / # of Samples

- %Exceedance Difference = %X>Omnibus - %X>CSR
- Positive %XDiff means relatively more samples exceed Omnibus standards
- Negative %XDiff = fewer exceedances under Omnibus
- Summarized results into substance categories
  - Gas Station Sites
  - Drycleaner Sites
  - Inorganics

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Example

Summary of Percentage Difference in E

Negative % denotes more exceedances currer

Groundwater Standards

			benzene
Dataset 1	Groundwater	Count	19,298
	DW	% difference 2017/2016	na
	FW	% difference 2017/2016	5%
	MW	% difference 2017/2016	na
Dataset 2	Groundwater	Count	1,001
	DW	% difference 2017/2016	0%
	FW	% difference 2017/2016	6%
	MW	% difference 2017/2016	0%
Dataset 3	Groundwater	Count	5,176
	DW	% difference 2017/2016	0%
	FW	% difference 2017/2016	11%
	MW	% difference 2017/2016	0%
Dataset 4	Groundwater	Count	10,827
	DW	% difference 2017/2016	0%
	FW	% difference 2017/2016	3%
	MW	% difference 2017/2016	0%
Dataset 5	Groundwater	Count	41
	DW	% difference 2017/2016	0%
	FW	% difference 2017/2016	0%
	MW	% difference 2017/2016	0%
	DW	*CSR | Omnibus*	*5 | 5*
	FW	*CSR | Omnibus*	*4000 | 400*
	MW	*CSR | Omnibus*	*1000 | 1000*
	Typical Decrease (10th Percentile)		0%
	Typical Increase (90th Percentile)		6%
	95% Confidence Threshold (average)		0.5%

			benzene	ethylbenzene	toluene	xylenes	VPH
Dataset 1	Groundwater	Count	19,298	19,280	19,232	19,213	na
	DW	% difference 2017/2016	na	-14%	-2%	na	na
	FW	% difference 2017/2016	5%	na	11%	9%	na
	MW	% difference 2017/2016	na	na	na	9%	na
Dataset 2	Groundwater	Count	1,001	1,001	1,001	1,003	998
	DW	% difference 2017/2016	0%	-11%	-3%	2%	NA
	FW	% difference 2017/2016	6%	0%	15%	NA	0%
	MW	% difference 2017/2016	0%	0%	0%	NA	0%
Dataset 3	Groundwater	Count	5,176	5,177	5,176	5,176	4,571
	DW	% difference 2017/2016	0%	-28%	-5%	6%	0%
	FW	% difference 2017/2016	11%	0%	27%	25%	0%
	MW	% difference 2017/2016	0%	0%	1%	25%	0%
Dataset 4	Groundwater	Count	10,827	10,845	10,861	10,801	na
	DW	% difference 2017/2016	0%	-12%	-2%	3%	na
	FW	% difference 2017/2016	3%	0%	9%	10%	na
	MW	% difference 2017/2016	0%	0%	0%	10%	na
Dataset 5	Groundwater	Count	41	41	41	39	35
	DW	% difference 2017/2016	0%	0%	0%	0%	na
	FW	% difference 2017/2016	0%	0%	0%	0%	0%
	MW	% difference 2017/2016	0%	0%	0%	0%	0%
	DW	*CSR | Omnibus*	*5 | 5*	*2.4 | 140*	*24 | 60*	*300 | 90*	*ns | ns*
	FW	*CSR | Omnibus*	*4000 | 400*	*2000 | 2000*	*390 | 5*	*ns | 300*	*1500 | 1500*
	MW	*CSR | Omnibus*	*1000 | 1000*	*2500 | 2500*	*3300 | 2000*	*ns | 300*	*1500 | 1500*
	Typical Decrease (10th Percentile)		0%	-14%	-3%	0%	0%
	Typical Increase (90th Percentile)		6%	0%	14%	24%	0%
	95% Confidence Threshold (average)		0.5%	0.9%	0.9%	1.0%	0.0%

			2000 | 2000	390 | 5	ns | 300	1500 | 1500	34000 | 34000	10 | 10	ns | ns	ns | ns	ns | ns	ns | ns
			2500 | 2500	3300 | 2000	ns | 300	1500 | 1500	4400 | 4400	10 | 10	ns | ns	ns | ns	ns | ns	ns | ns
	Typical Decrease (10th Percentile)		-14%	-3%	0%	0%	-6%	0%	0%	0%	0%	0%
	Typical Increase (90th Percentile)		0%	14%	24%	0%	0%	5%	98%	100%	0%	7%
	95% Confidence Threshold (average)		0.9%	0.9%	1.0%	0.0%	0.6%	0.6%	1.1%	0.8%	0.0%	3.8%

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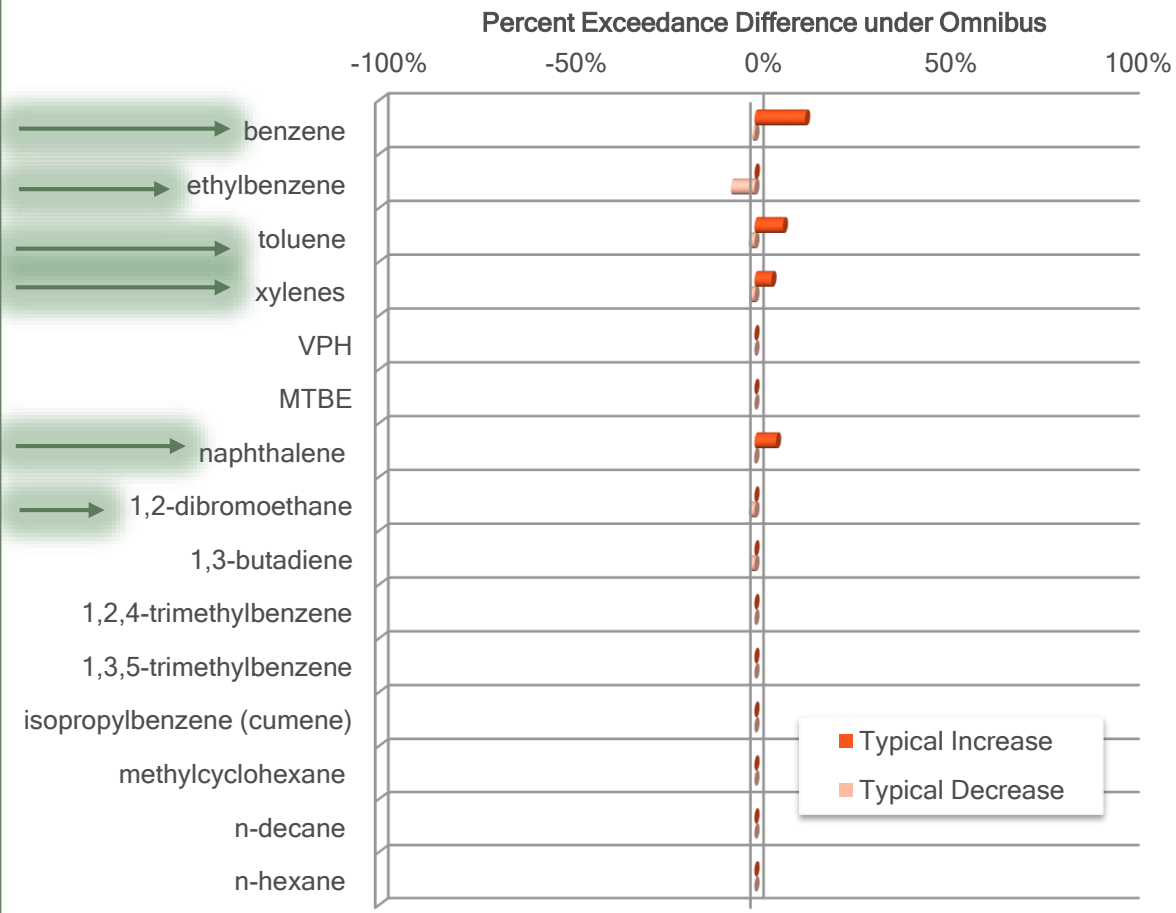
Gas Station Sites - Soil

Organics in Soil - Gas Station Sites



Benzene	CSR	Omnibus
Drinking	0.04	**0.03**
Fresh	10	**2.5**
Marine	**2.5**	5.5

Ethyl-benzene	CSR	Omnibus
RL DW	**1**	10
RL FW	**1**	150
RL MW	**1**	200

Toluene	CSR	Omnibus
RL DW	**1.5**	3.5
RL FW	1.5	**0.3**
RL MW	**1.5**	100

Xylenes	CSR	Omnibus
CL DW	20	**4.5**
RL FW	**5**	15
CL MW	50	**15**

Napth-thalene	CSR	Omnibus
RL DW	5	**0.6**
RL FW	5	**0.6**
RL MW	5	**0.6**

1,2-dibromo	CSR	Omnibus
CL DW	**0.73**	3
CL FW	**0.73**	3
CL MW	**0.73**	3

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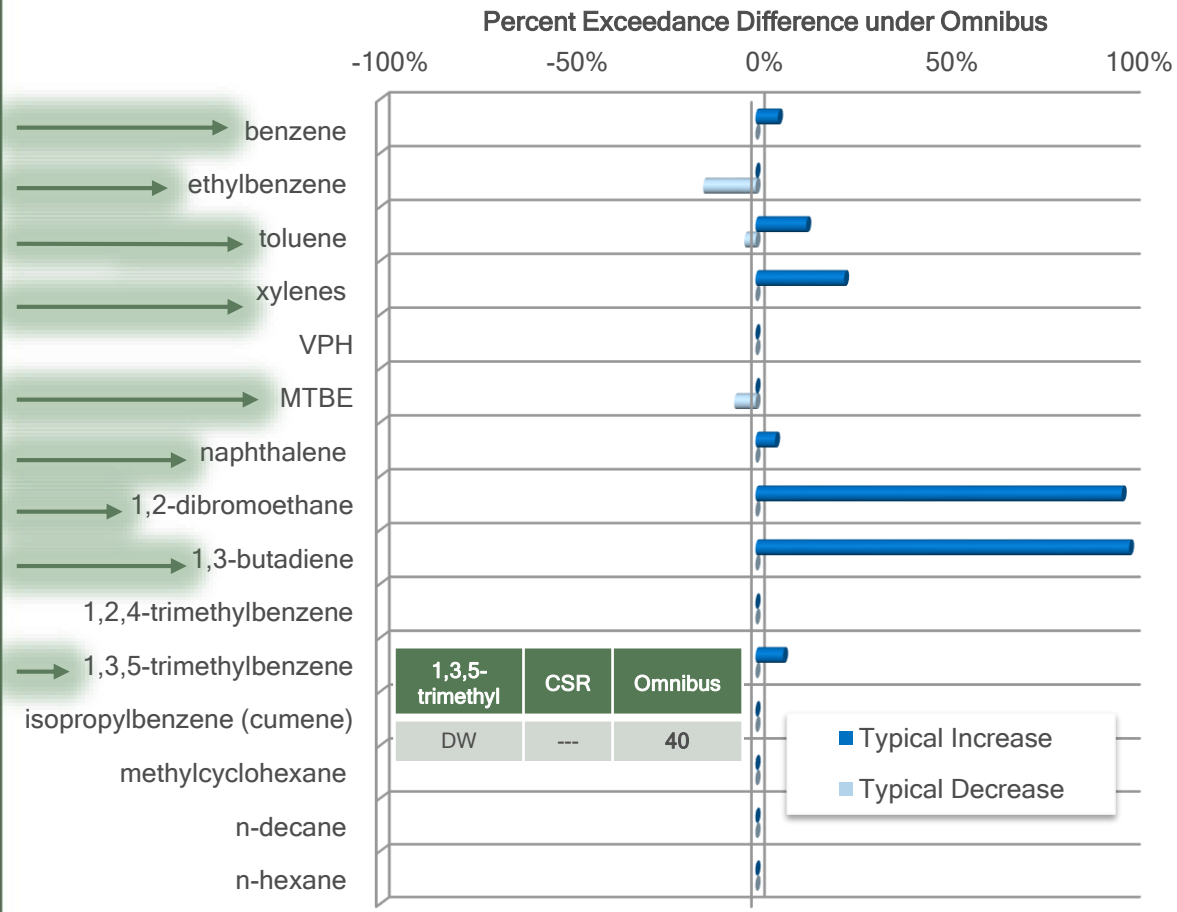
Gas Station Sites - Groundwater

Organics in Groundwater - Gas Station Sites



1,3,5-trimethyl	CSR	Omnibus
DW	---	40

Benzene	CSR	Omnibus
Drinking	5	5
Fresh	4000	400
Marine	1000	1000

Ethyl-benzene	CSR	Omnibus
DW	2.4	140
FW	2000	2000
MW	2500	2500

Toluene	CSR	Omnibus
DW	24	60
FW	390	5
MW	3300	2000

Xylenes	CSR	Omnibus
DW	300	90
FW	---	300
MW	---	300

MTBE	CSR	Omnibus
DW	15	95
FW	34000	34000
MW	4400	4400

Napth-thalene	CSR	Omnibus
DW	---	80
FW	10	10
MW	10	10

1,2-dibromo	CSR	Omnibus
DW	0.34	0.08

1,3-butadi	CSR	Omnibus
DW	6.1	0.045

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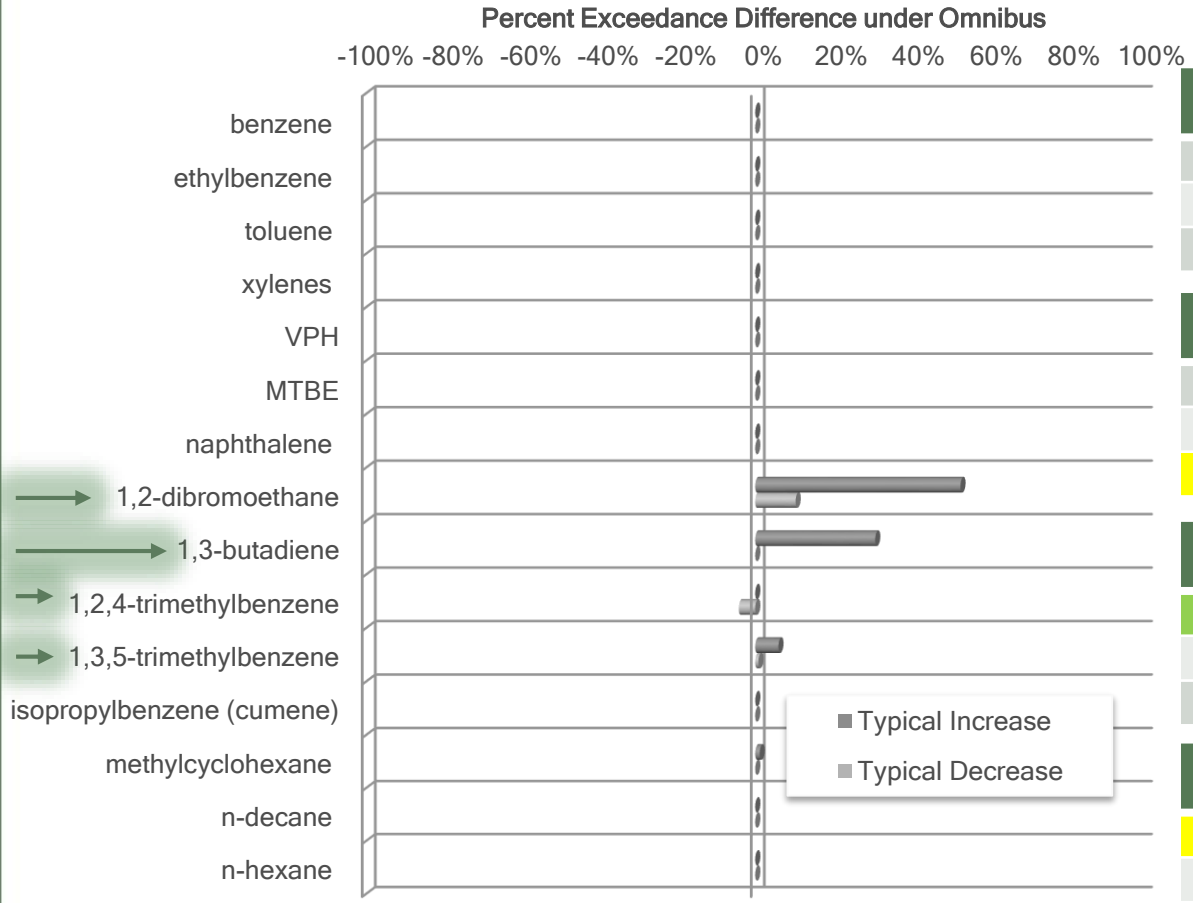
Gas Station Sites - Vapour

Organics in Vapour - Gas Station Sites



1,2-dibromo	CSR	Omnibus
AL/PL/RL	1	**0.5**
CL	1	**0.5**
IL	1	**0.5**

1,3-butadiene	CSR	Omnibus
AL/PL/RL	2	2
CL	6	**2**
IL	20	**3**

1,2,4-trimethyl	CSR	Omnibus
AL/PL/RL	**6**	7
CL	20	20
IL	**55**	65

1,3,5-trimethyl	CSR	Omnibus
AL/PL/RL	6	**4.5**
CL	20	**15**
IL	55	**45**

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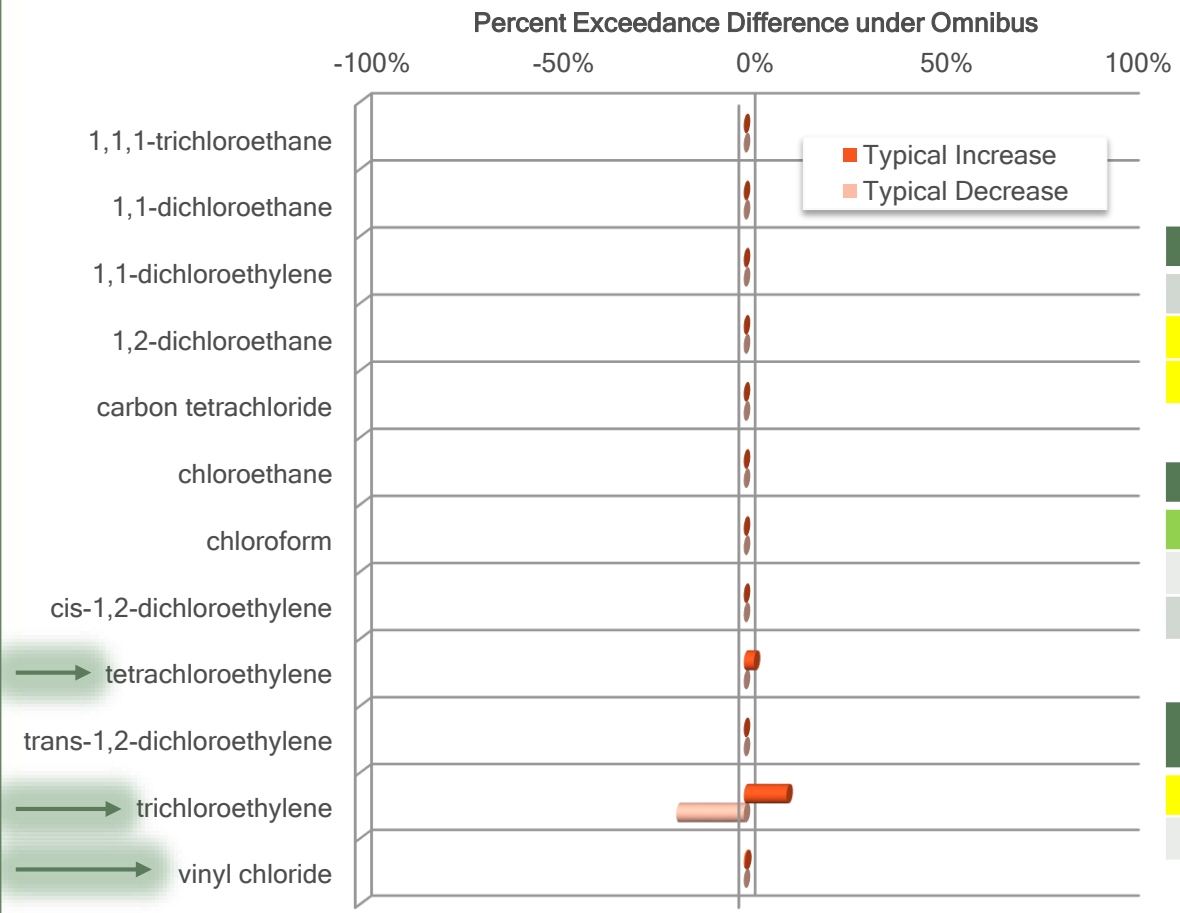
Drycleaner Sites - Soil

Organics in Soil - Drycleaner Sites



PERC	CSR	Omnibus
PL/RL DW	**5**	15
CL/IL FW	5	**2.5**
CL/IL MW	5	**2.5**

TCE	CSR	Omnibus
PL/RL DW	**0.015**	15
CL/IL FW	0.65	**0.3**
CL/IL MW	0.65	**0.3**

Vinyl Chloride	CSR	Omnibus
PL/RL	0.79	**0.2**
CL/IL	**7.5**	9

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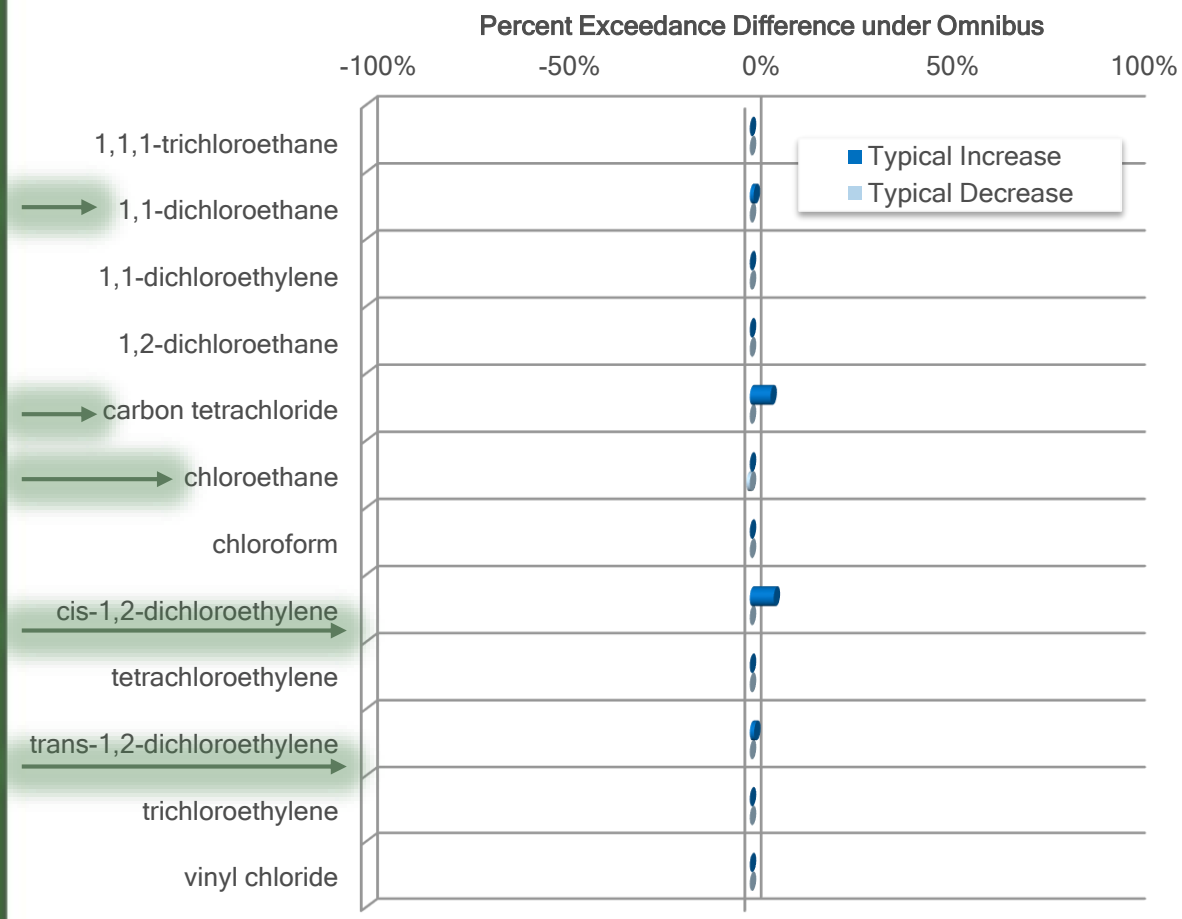
Drycleaner Sites - Groundwater

Organics in Groundwater - Drycleaner Sites



1,1-dcethane	CSR	Omnibus
DW	3700	30

Carbon Tetrachlo	CSR	Omnibus
DW	5	2
FW	130	130
MW	130	130

Chloro-ethane	CSR	Omnibus
DW	46	---

Cis-1,2-dichlor	CSR	Omnibus
DW	370	8

Trans-1,2-dichl	CSR	Omnibus
DW	730	80

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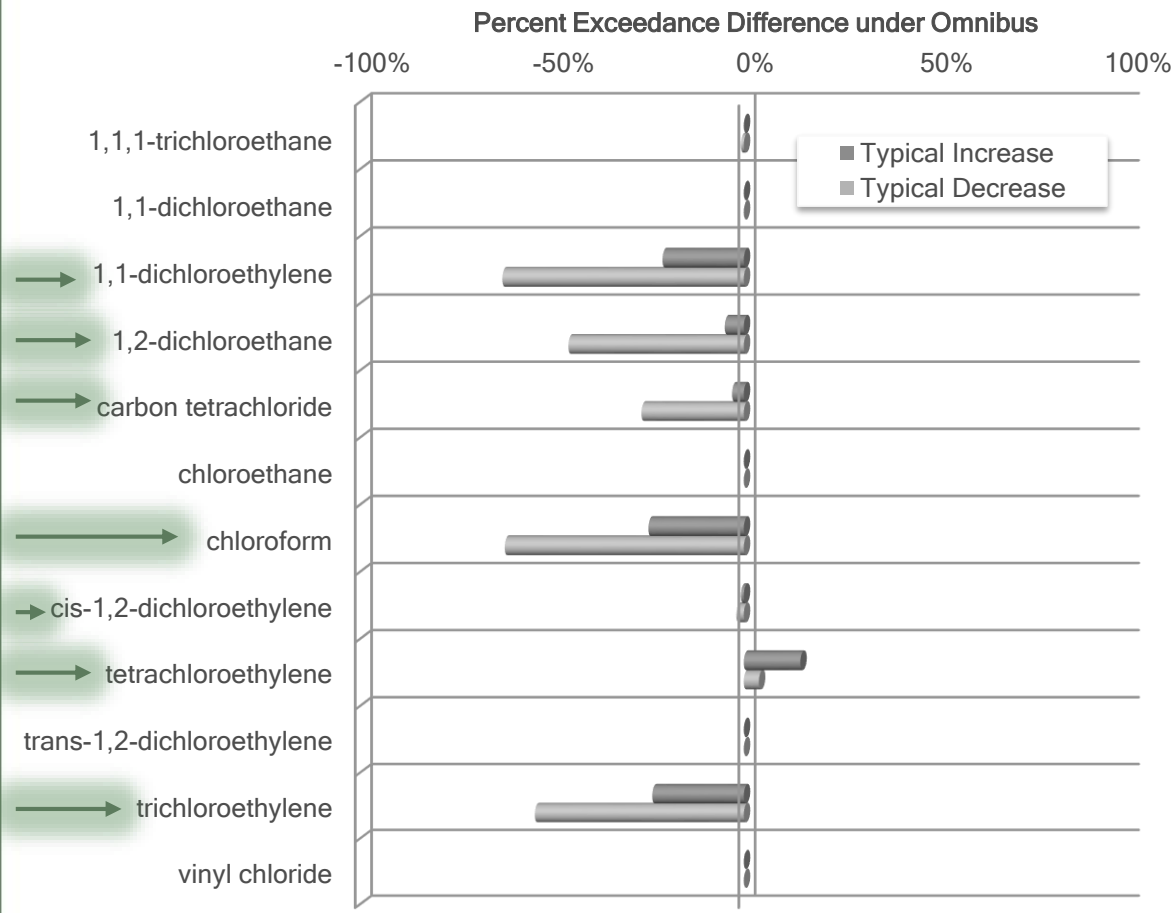
Drycleaner Sites - Vapour

Organics in Vapour - Drycleaner Sites



1,1-DCE	CSR	Omnibus
AL/PL/RL	1	200
CL	1	600
IL	2	2000

EDC	CSR	Omnibus
AL/PL/RL	0.4	5
CL	1	15
IL	3.5	45

Carbon Tetrachlor	CSR	Omnibus
AL/PL/RL	0.65	1.5
CL	2	5
IL	6	15

Chloro-form	CSR	Omnibus
AL/PL/RL	1	100
CL	1.5	300
IL	4	900

Cis-1,2-DCE	CSR	Omnibus
AL/PL/RL	20	60
CL	60	200
IL	200	550

PERC	CSR	Omnibus
AL/PL/RL	600	40
CL	2000	100
IL	5500	350

TCE	CSR	Omnibus
AL/PL/RL	0.5	2
CL	0.5	6
IL	1	20

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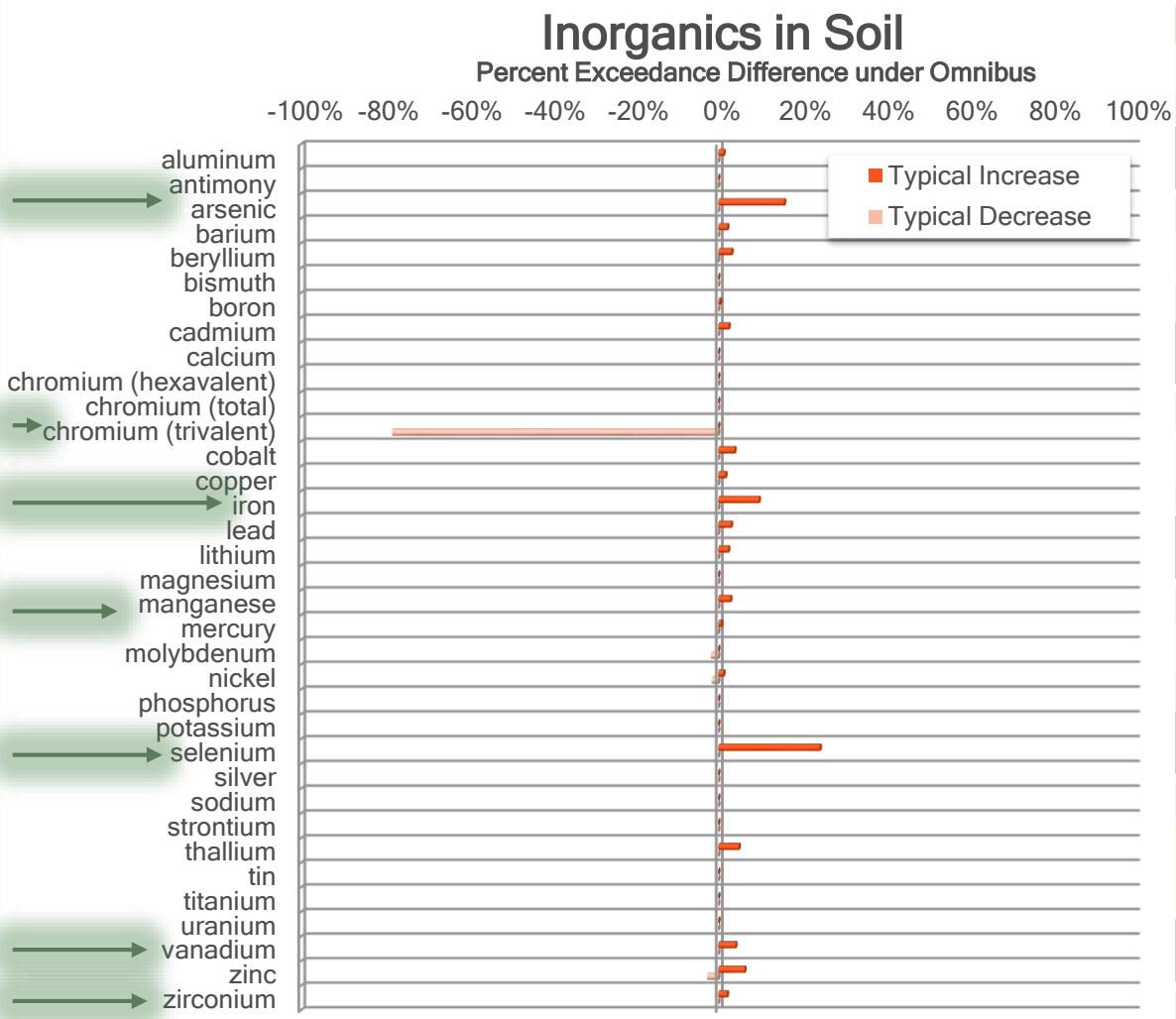
Inorganic Sites - Soil



Arsenic	CSR	Omnibus
DW	15	10
FW	20	10
MW	25	10

Trivalent Cr(+3)	CSR	Omnibus
CL DW	60	250
CL FW	65	250
IL MW	95	250

Iron	CSR	Omnibus
P/RL DW	---	35,000
P/RL FW	---	35,000
P/RL MW	---	35,000

Mn	CSR	Omnibus
CL DW	19,000	1500
CL FW	19,000	1500
CL MW	19,000	1500

Selenium	CSR	Omnibus
CL DW	10	1
CL FW	10	1
CL MW	10	1

Vanadium	CSR	Omnibus
RL DW	200	100
CL FW	---	300
CL MW	---	300

Zirconium	CSR	Omnibus
RL DW	---	15
RL FW	---	15
RL MW	---	15

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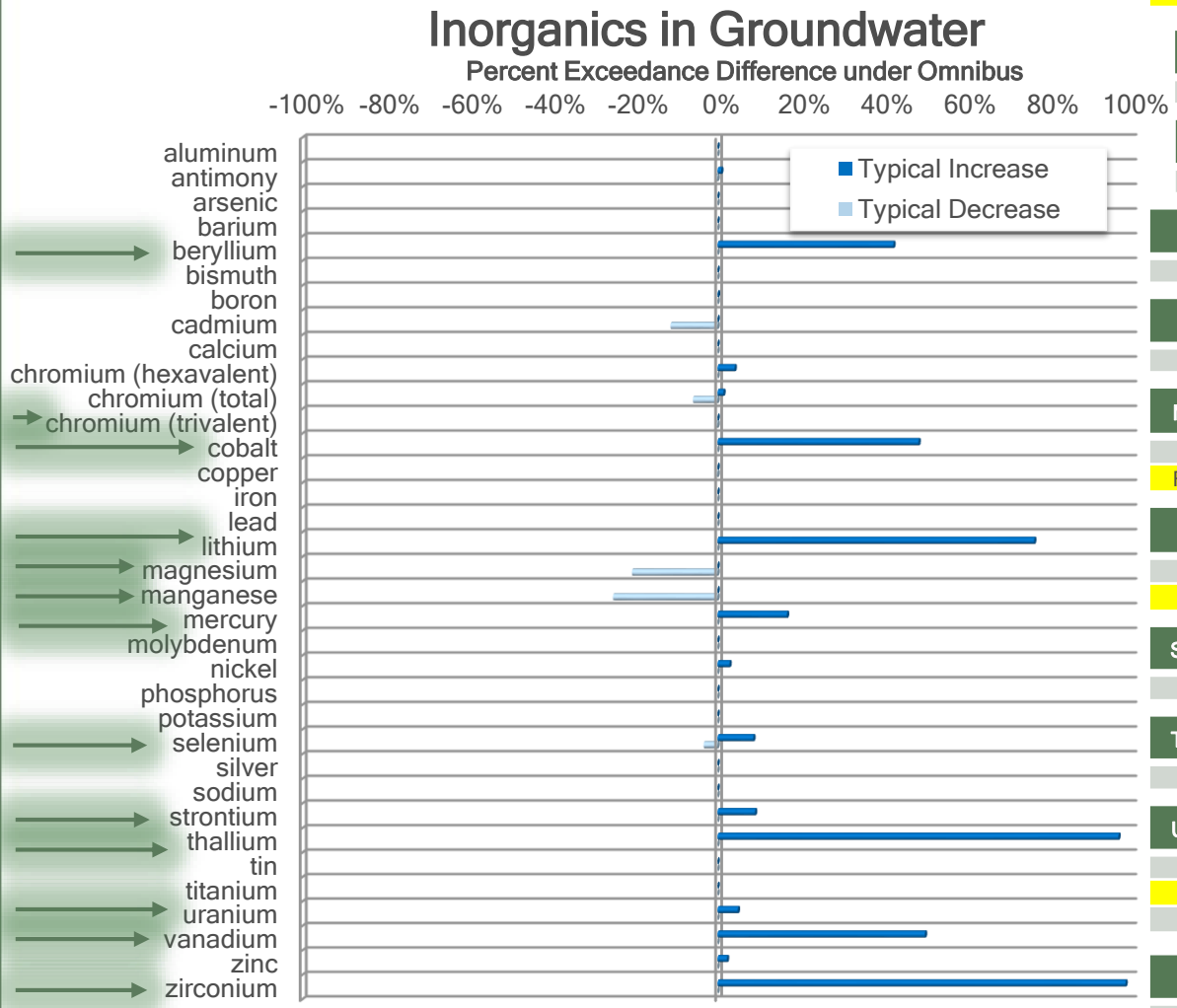
Inorganic Sites - Groundwater



Beryllium	CSR	Omnibus
DW	---	8
FW	53	1.5

Cr (DW)	CSR	Omnibus
Total	50	---
Cr(+3)	---	6000
Cr(+6)	---	50

Cobalt	CSR	Omnibus
DW	---	1

Lithium	CSR	Omnibus
DW	730	8

Mg	CSR	Omnibus
DW	100,000	---

Mn	CSR	Omnibus
DW	550	1500

Mercury	CSR	Omnibus
DW	1	1
FW/MW	1	0.25

Selenium	CSR	Omnibus
FW	10	20
MW	540	20

Strontium	CSR	Omnibus
DW	22,000	2500

Thallium	CSR	Omnibus
DW	---	0.04

Uranium	CSR	Omnibus
DW	20	20
FW	3000	85
MW	1000	85

Vanadium	CSR	Omnibus
DW	---	20

Zirconium	CSR	Omnibus
DW	---	0.3

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Summary

- *Remember*: this review represents only one aspect of the changes in the Stage 10 standards
- In soil there are exceedance increases and decreases
  - Benzene standards are more stringent where DW, FW applies
  - TCE standard less stringent for CL/IL sites
- Groundwater has the most significant increases
  - 1,2-dibromoethane; 1,3-butadiene and several metals more stringent
  - speciation of Total Chromium may decrease exceedances under Omnibus if Cr+3 is dominant
  - many of the increased exceedances are related to applicability of DW standards
- Vapour increases: 1,2-dibromoethane and 1,3-butadiene
  - less stringent standards for drycleaner VOCs

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