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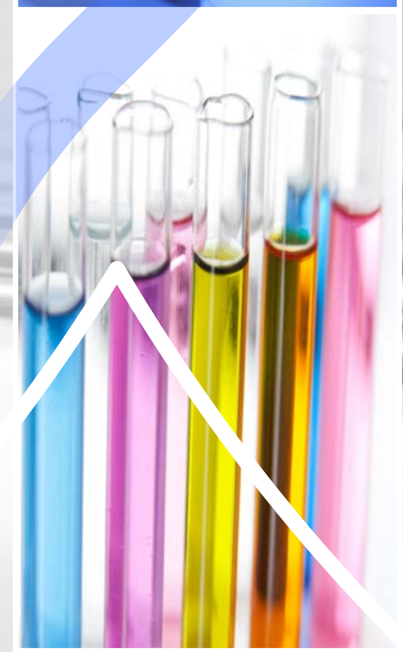

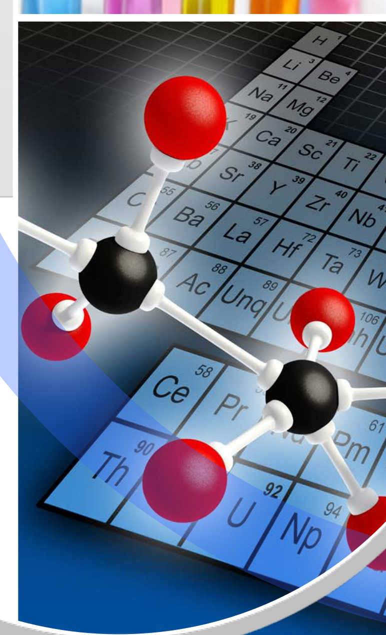

1,2,3-Trichloropropane
(1,2,3-TCP)

The 1,2,3-TCP Experts

- Responsible Party Identification
- GIS and Geomatics
- Contaminant Hydrogeology
- Fate and Transport Modeling
- Risk Assessment
- Remediation Feasibility Studies
- Soil and Groundwater Remediation
- Natural Resource Damage Assessment
- Water Resources Assessment
- Source Water Assessment and Protection
- Drinking Water Treatment
- Environmental Risk Management
- Litigation Support/Expert Witness
- Forensic Engineering
- Stakeholder/Public Participation
- Regulatory Strategy

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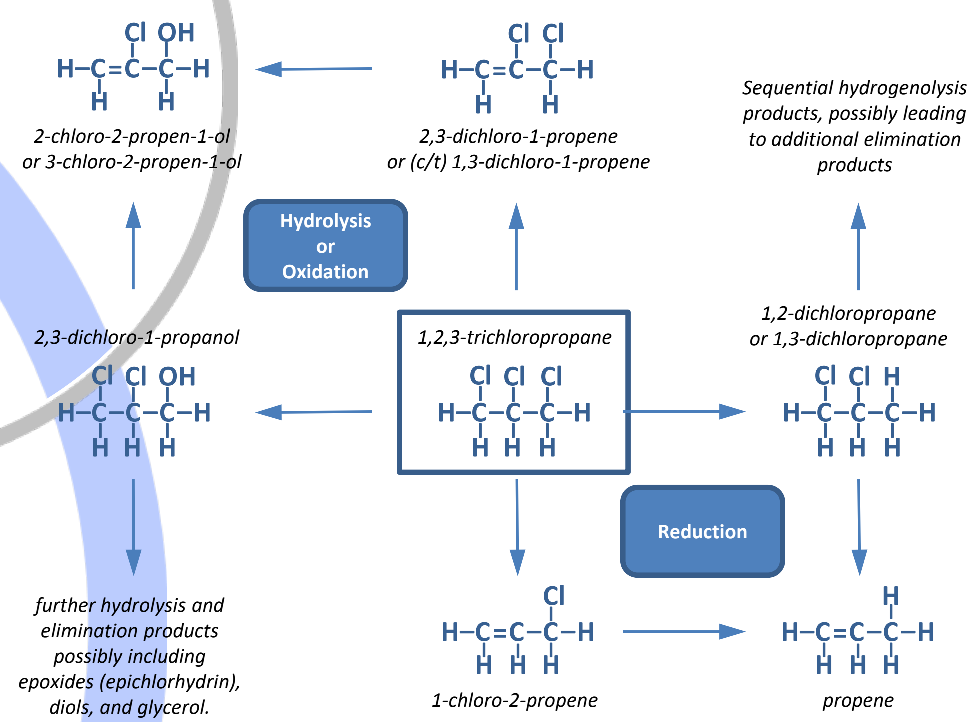
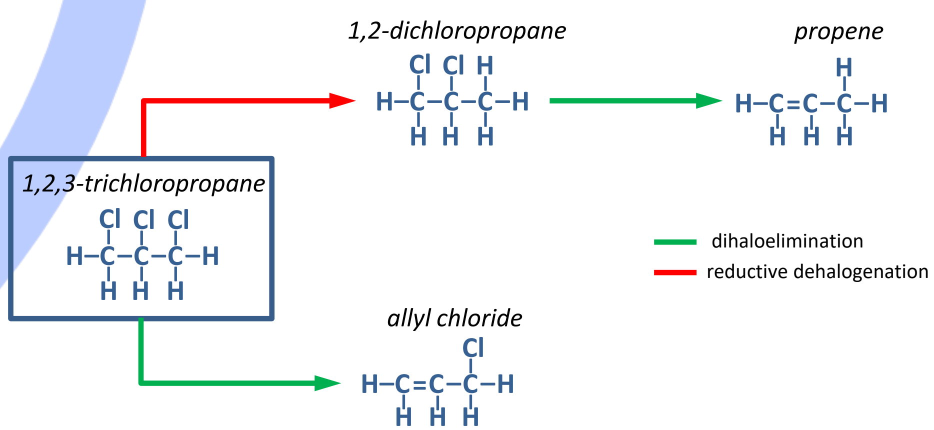
What is 1,2,3-TCP?

1,2,3-trichloropropane (1,2,3-TCP) was used historically as a paint and varnish remover, a cleaning and degreasing agent, a cleaning and manufacturing solvent, and was a common component of soil fumigants previously used widely in agriculture. 1,2,3-TCP is characteristically mobile in the subsurface and resistant to natural attenuation, and its persistence has resulted in impacts to more than 500 water sources in California alone. Currently, there is no federal maximum contaminant level (MCL) for 1,2,3-TCP. In the absence of a federal standard, California adopted its own drinking water MCL for 1,2,3-TCP of 5 parts per trillion (ppt) on December 14, 2017.

Common Reactions for In-Situ Remediation[1]



Anaerobic Biotransformation of 1,2,3-TCP[2]

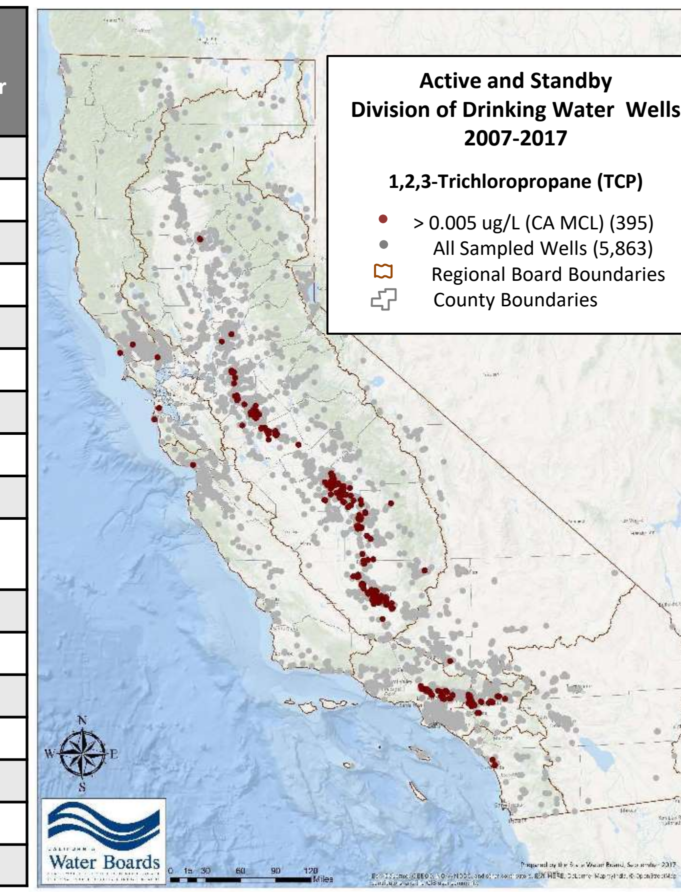


1,2,3-TCP Property Comparison[3,4]

Compound	Molecular Weight	Density	Solubility	K_h	log K_{ow}	log K_{oc}	PHG[5]	MCL (CA)[5]
	g/mol	g/cm^3 at 20-25°C	mg/L at 20-25°C	unitless	unitless	unitless	ug/L	ug/L
1,2,3-TCP	147.43	1.38	1,900	0.016	2.50	2.59	0.0007	0.005
TCE	131.39	1.46	1,100	0.43	2.47	1.97	1.7	5
DBCP	236.33	2.08	1,000	0.0083	2.68	2.23	0.0017	0.2

Affected California Drinking Water Sources and Systems[6]

County	Number of Affected Sources	>0.005 – 0.050 (ug/L)	>0.050 – 0.50 (ug/L)	>0.50 (ug/L)	Number of Affected Public Water Systems
Butte	1	1	0	0	1
Fresno	69	54	13	2	10
Kern	151	76	71	4	20
Los Angeles	155	95	19	41	15
Madera	1	1	0	0	1
Merced	26	7	12	7	11
Monterey	1	1	0	0	1
Riverside	22	20	2	0	4
Sacramento	2	1	1	0	2
San Bernardino	24	18	3	3	6
San Diego	13	7	4	2	1
San Joaquin	19	12	7	0	4
San Mateo	11	9	2	0	3
Santa Cruz	1	1	0	0	1
Stanislaus	17	9	8	0	5
Tulare	49	37	10	2	9
Total	**562**	**349**	**152**	**61**	**94**



Active and standby public drinking water wells that had at least one detection of TCP above the MCL, 2007-2017, 395 wells. (Source: Public supply well data in GeoTracker-GAMA.)

Sources:

1. Tratnyek, P.G. (2008). Fate and Remediation of 1,2,3-Trichloropropane. May.
2. Samin and Janssen. (2011). Transformation and biodegradation of 1,2,3-trichloropropane (TCP).
3. USGS. (2006). Description, Properties, and Degradation of Selected Volatile Organic Compounds Detected in Groundwater – A Review of Selected Literature. Open-File Report 2006-1338.
4. ATSDR. (2014). Retrieved from: http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=883&tid=173
5. SWRCB. (2017). MCLs, DLRs, and PHGs for Regulated Drinking Water Contaminants. September 29.
6. SWRCB. (2017). 1,2,3-Trichloropropane. Retrieved from: https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/123TCP.shtml. December 27.

Notes:

K_h = Henry's Law Constant
K_{ow} = Octanol-Water Partition Coefficient
K_{oc} = Organic Carbon Partition Coefficient

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