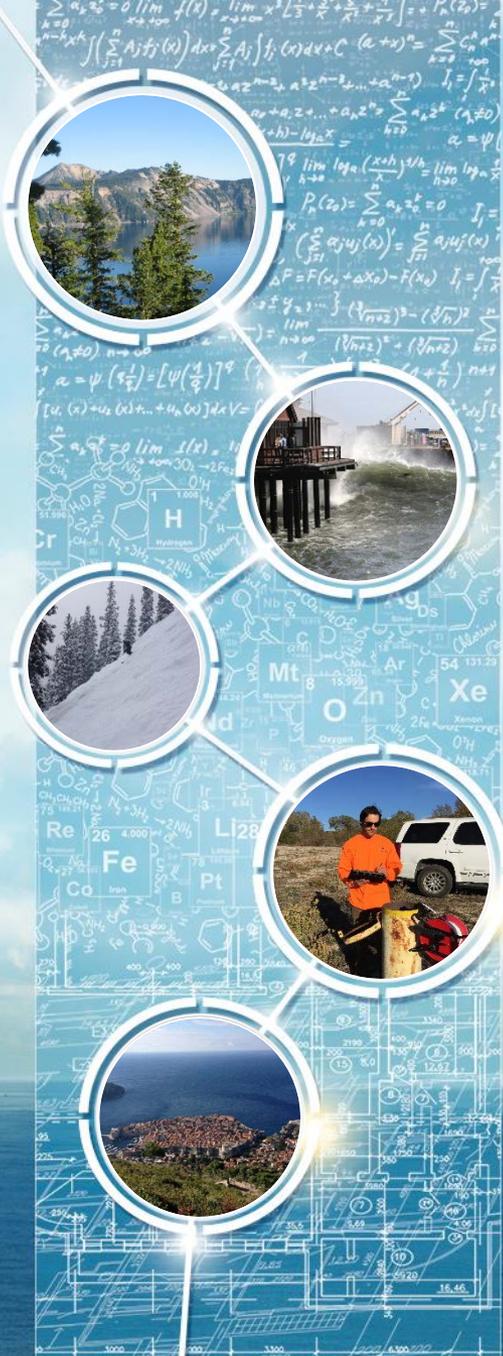




The Value of Trip Blanks: A Review of 19 Years of Environmental Sampling Data

EMDQ
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Introduction

- Trip blanks are a default requirement
- Prepared by lab with reagent-grade water
- Monitor cross-contamination during “trip” to the lab
- Analyzed for the same target list as field samples
- Pre-supposes diffusion of analytes into VOA vial
- TB results are applied during data validation



Data set

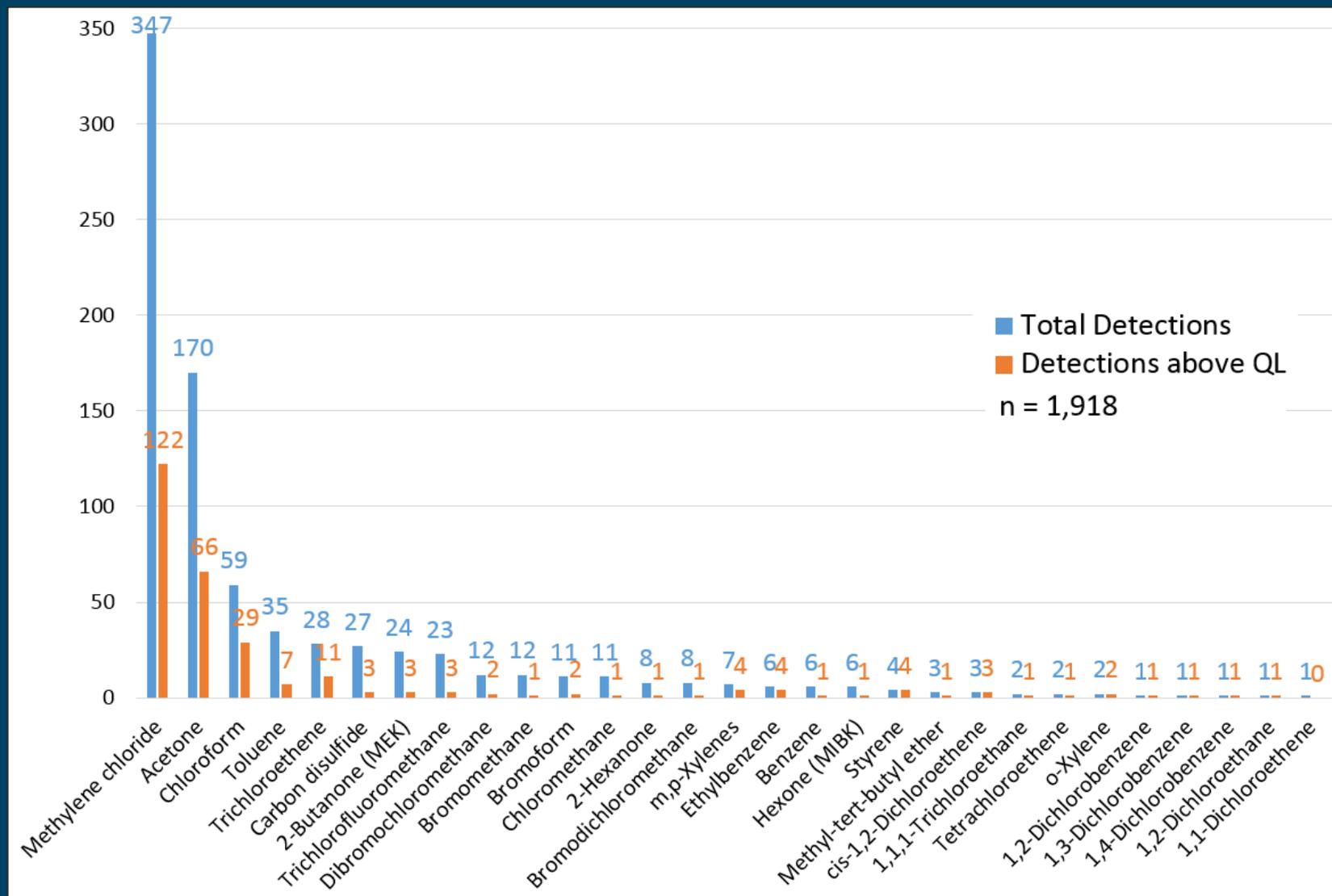
- Data from 1996 through 2014
- Vandenberg and Edwards AFBs
- 1,918 trip blanks
- 41 common analytes
- ~78,000 records
- Cost: Any guesses?

	B	C	D	E	F	G	H	I	J	M	N	O	P	Q	R	S
1	SITE	SPLDESC	LOGDATE	Year	UTMCO	ANMCO	COMPNAME	PARVQ	RESULT	LABDL	PQLEVEL	SACODE	MATRIX	FLDLOT	PROJECT	SDG
33	31	V31TB280	6/6/2000	2000	ug/L	SW8260B	o-Xylene	ND	0.5	0.50	1.0	TB	W	001A	K507	1033586
35	31	V31TB280	6/6/2000	2000	ug/L	SW8260B	Tetrachloroethene	ND	0.5	0.50	1.0	TB	W	001A	K507	1033586
36	31	V31TB280	6/6/2000	2000	ug/L	SW8260B	Toluene	ND	0.5	0.50	1.0	TB	W	001A	K507	1033586
37	31	V31TB280	6/6/2000	2000	ug/L	SW8260B	trans-1,2-Dichloroethene	ND	0.5	0.50	1.0	TB	W	001A	K507	1033586
39	31	V31TB280	6/6/2000	2000	ug/L	SW8260B	Trichloroethene	ND	0.5	0.50	1.0	TB	W	001A	K507	1033586
42	31	V31TB280	6/6/2000	2000	ug/L	SW8260B	Vinyl chloride	ND	0.5	0.50	1.0	TB	W	001A	K507	1033586
49	25C	V25TB283	6/8/2000	2000	ug/L	SW8260B	1,2-Dichloroethane	ND	0.5	0.50	1.0	TB	W	001A	K507	1033591
53	25C	V25TB283	6/8/2000	2000	ug/L	SW8260B	2-Butanone	ND	2.5	2.50	5.0	TB	W	001A	K507	1033591
54	25C	V25TB283	6/8/2000	2000	ug/L	SW8260B	2-Hexanone	ND	2.5	2.50	5.0	TB	W	001A	K507	1033591
56	25C	V25TB283	6/8/2000	2000	ug/L	SW8260B	Acetone	ND	2.5	2.50	5.0	TB	W	001A	K507	1033591
57	25C	V25TB283	6/8/2000	2000	ug/L	SW8260B	Benzene	ND	0.5	0.50	1.0	TB	W	001A	K507	1033591
61	25C	V25TB283	6/8/2000	2000	ug/L	SW8260B	Carbon disulfide	ND	0.5	0.50	1.0	TB	W	001A	K507	1033591
62	25C	V25TB283	6/8/2000	2000	ug/L	SW8260B	Carbon tetrachloride	ND	0.5	0.50	1.0	TB	W	001A	K507	1033591
65	25C	V25TB283	6/8/2000	2000	ug/L	SW8260B	Chloroform	ND	0.5	0.50	1.0	TB	W	001A	K507	1033591
67	25C	V25TB283	6/8/2000	2000	ug/L	SW8260B	cis-1,2-Dichloroethene	ND	0.5	0.50	1.0	TB	W	001A	K507	1033591

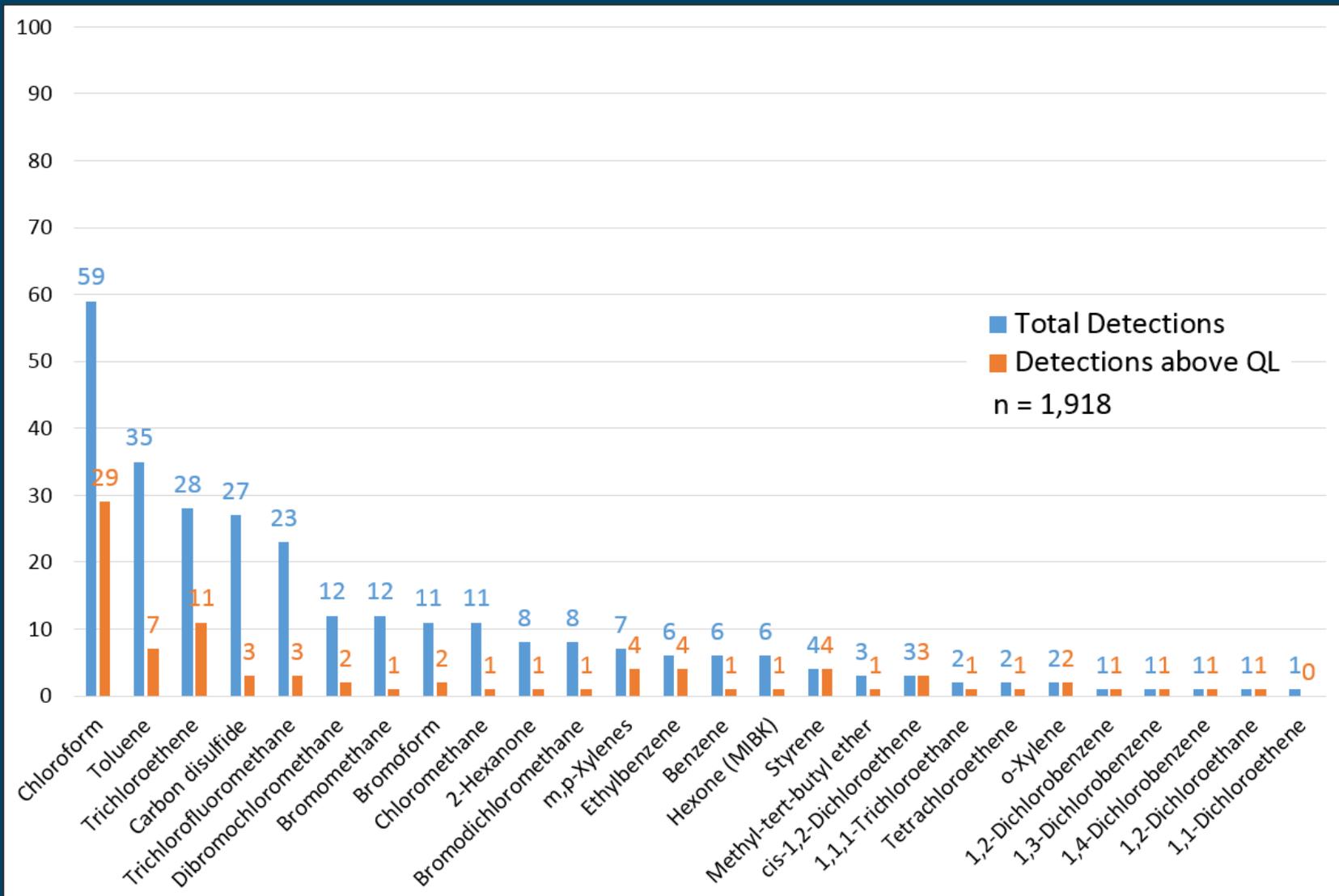
Data set

- ~78,000 records (results)
- 1,918 TBs
- 821 positive results (1.1%)
- 278 results above the quantitation level (QL) (0.36%)
- 280 positive results excluding the common laboratory contaminants (CLCs) (0.39%)
- 87 results above the QL excluding CLCs (0.12%)
- 492 TBs with 1 or more positive results (26%)
- 191 TBs with 1 or more positive results excluding CLCs (10%)
- 29 analytes detected (70%)

Frequency of detection

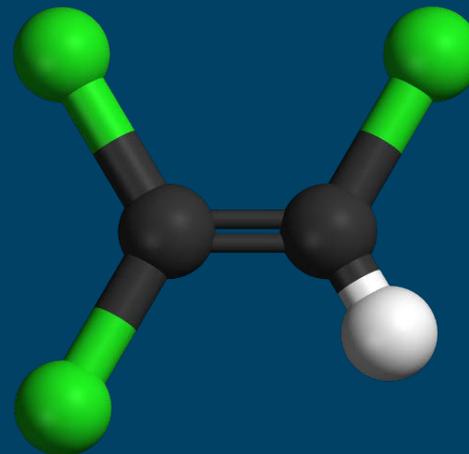


Frequency of detection (no CLCs)



TCE in trip blanks: what was the effect?

- 1,918 TBs
- 28 positive results for TCE (1.5%)
 - 11 above the QL
- 131 associated field samples
- 28 qualified due to TB results (21%)
 - Qualified as estimated but useable for intended purpose
 - 11 would be qualified without TB result due to MB, MS/MSD, or surrogate failures
- 103 not qualified because ND or high concentrations



National Functional Guidelines (2008)

Case	Blank Sample	Field Sample	Qualification
1	Detected	Not detected	None
2	<QL	<QL	U at QL
3	<QL	\geq QL <2xQL	Professional judgement
4	<QL	>2xQL	None
5	\geq QL	<QL	U at QL
6	>QL	\geq QL <Blank[]	U at Blank[] or R
7	\geq QL	\geq QL \geq Blank[]	Professional judgement

- 1993/1999 NFG stated to qualify if sample [] is less than 5x blank []
- Exceptions for common lab contaminants (acetone, methylene chloride, MEK)

Effect under 2008 NFG

Under 2008 NFG

- TCE in 36 of 131 samples qualified due to TB result (27%)
 - 19 under Case 2, 5, or 6 (U at QL/Blank [])
 - 17 under Case 3 or 7 (professional judgement)
 - 8 likely no qualification after professional judgement
- 95 not qualified (Case 1 or 4)



**THIS RESULT
SHALL BE "J"
FLAGGED!**

Summary

- 1,918 TBs with ~78,000 results
- 280 positive results excluding CLCs (<0.4%) and the majority are not site COCs
- 28 TBs with positive results for TCE
- 28 of 131 field samples qualified due to TCE in a TB
 - No changes in reported results (qualified results are estimated but useable)
 - Under 2008 NFG 19 low concentration TCE results would have been qualified U at the QL
- Analytical cost: ?

Summary

- 1,918 TBs with ~78,000 results
- 280 positive results excluding CLCs (<0.4%) and the majority are not site COCs
- 28 TBs with positive results for TCE
- 28 of 131 field samples qualified due to TCE in a TB
 - No changes in reported results (qualified results are estimated but useable)
 - Under 2008 NFG 19 low concentration TCE results would have been qualified U at the QL
- Analytical cost: \$161,575

Questions

- Did we get our money's worth?
- Some things to consider:
 - Unlikely anything is actually diffusing across septum so probably not monitoring cross-contamination in transit
 - Unlike method blanks, TBs are handled like environmental samples, so may be monitoring carry-over or other possible sources of lab contamination
 - TBs protect RPs

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