



McCAMPBELL ANALYTICAL INC.

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**Analytical Capabilities for McCampbell Analytical Inc, 2011**

Method	Analysis
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**ORGANICS**

**Drinking Water – Chromatography**

502.2	VOCs by P&T and GC-ELCD-PID or GC-MS
502.2 – TTHMs only	TTHMs (Total Trihalomethanes) by P&T and GC-ELCD or GC-MS
504.1	EDB, DBCP & 1,2,3-TCP by L-LE and GC-ECD
505	Regulated OC Pesticides and PCBs by L-LE and GC-ECD
507	Regulated ON/P Pesticides by L-LE and GC-NPD
508	Regulated OC Pesticides and PCBs by L-LE & GC-ECD
515.3	Regulated OC Acidic Herbicides by L-LE, Derivatization & GC-ECD
524.2	Regulated VOCs by P&T and GC-MS
524.2	VOCs by P&T and GC-MS (full method target list + 5oxys + 113Freon)
524.2 – TTHMs only	TTHMs (Total Trihalomethanes) by P&T and GC-MS
524m / SRL 123-TCPA	1,2,3-TCPA ± EDB, DBCP, 1,2-DCA by GC-MS SIM Mode
524m Chloral Hydrate	Chloral Hydrate by GC-MS SIM Mode
524m Cyanogen Chloride	Cyanogen Chloride by GC-MS SIM Mode
524m 1,4-Dioxane	1,4-Dioxane by GC-MS SIM Mode
525.2	Regulated SVOCs by L-SE and GC-MS
525.2m T&O	Geosmin & MIB (2-Methylisoborneol) by GC-MS (5ppt RL)
526	Regulated SVOCs by L-SE and GC-MS
528	Regulated Phenols by L-SE and GC-MS
531.1	Carbamates by HPLC w/ Derivatization
532	Phenyl Ureas by SPE and HPLC
547	Glyphosate by HPLC w/ Derivatization
548.1	Endothall by GC-ECD
549.2	Diquat and Paraquat by LSE and HPLC
550	PNAs by L-LE and HPLC
550.1	PNAs by SPE and HPLC
550.1m	'Nonylphenol' by SPE and HPLC
552.1	HAAs by LSE and GC-ECD
552.2	HAAs by LLE and GC-ECD
554	Aldehydes / Carbonyls by HPLC w/ Derivatization
554 Acrolein & 3-HPA	Acrolein & 3-Hydroxypropanal by HPLC w/ Field Derivatization (SFEI 108)

**Effluent – Chromatography**

601m	HVOCs by P&T and GC-MS
601m-602m	HVOCs and Aromatics by P&T and GC-MS
602	Aromatic VOCs by P&T and GC-PID
608	OC Pesticides and PCBs by L-LE and GC-ECD
608	PCBs only by L-LE and GC-ECD (low level, 0.02 ug/L RL)
610	PNAs by L-LE and HPLC
613	2378-TCDD only (5ppq RL)
613m	Full list + congener groups (5ppq RL for 2378-TCDD)
624	VOCs by P&T and GC-MS excluding Acrolein & 2-CEVE
624	Acrolein, Acrylonitrile & 2-CEVE by P&T and GC-MS
625	SVOCs by L-LE and GC-MS
1630	Methyl mercury
1660 / PWG	Pyrethrins & Pyrethroids (aqueous or solids) /PWG
1694 (also see Special MS & Pharma Sections)	Pharmaceuticals & Personal Care Products (PPCPs) by LC-MS-MS
BAAQMD 33	CS <sub>2</sub> Extractable C8-C14 Compounds by GC-FID



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Method	Analysis
<b>Hazardous Waste , Soils, Groundwater- Chromatography</b>	
7580	Elemental Phosphorous by GC-NPD
8010Bm	HVOCs by P&T and GC-MS
8010Bm-8021Bm	HVOCs and MBTEX by P&T and GC-MS
8011	EDB & DBCP GC-ECD
8015B	Fuel Fingerprint / Multi-Range TPH(g,d,mo)
8015B	TPH(d, mo, k, jf, bo) by Direct Injection GC-FID
8015 B	TPH(g, ss, ag) by P & T and GC-FID
8015 B MA DEP VPH0504	Volatile Aromatic, Aliphatic & Total HCs in Specified Carbon Ranges
8015 B MA DEP EPH0504	Extractable Aromatic, Aliphatic & Total HCs in Specified Carbon Ranges
8015 B - TPHCWG	Determination of Aromatic, Aliphatic & Total HCs in Specified Carbon Ranges
8015 B -8021B	TPH(g)-MBTEX by P & T and GC-FID-PID
8021B	MBTEX by GC-PID
8021B	HVOCs and Aromatics by P&T and GC-ELCD-PID or GC-MS
8032A m	Acrylamide by Derivatization & GC-MS
8041 m	Phenols by GC-MS
8081A	OC Pesticides by GC-ECD
8081A LL	OC Pesticides by GC-ECD with lowest detection limits for ESLs
8081A / 8082	OC Pesticides + PCBs by GC-ECD
8081A / 8082	Appendix IX / Appendix II OC Pesticides + PCBs by GC-ECD
8082	PCB Aroclors Only by GC-ECD
8082	PCB Aroclors in Waste Oil by GC-ECD w/ Clean Up (2 mg/L RL)
8082	PCB Aroclors and 19 Congeners by GC-ECD
8082m	PBBs, Hexa- & Octa-, Polybrominated Biphenyls by GC-ECD
8082m	PBDEs, 8 Congeners (25ppt RL) – Polybrominated Diphenyl Ethers
8082m	PBDEs, 8 Congeners (1ppt RL) – Polybrominated Diphenyl Ethers
8082m	PBDEs, >8 Congeners – Polybrominated Diphenyl Ethers
8100 mod.	PNAs / PAHs by GC-MS
8141A	ON/P Pesticides by GC-NPD
8141A	Appendix IX / Appendix II ON/P Pesticides by GC-NPD
8151A	OC Acidic Herbicides by GC-ECD
8260B	VOCs ± Oxygenates Excluding Acrolein & 2CEVE by P&T and GC-MS
8260B	Acrolein, Acrylonitrile & 2CEVE by P&T and GC-MS
8260B	VOCs ± Oxygenates + TPHgas by P&T and GC-MS
8260B	Oxygenates ± EDB-12DCA by P&T and GC-MS
8260B	MTBE + BTEX by P&T and GC-MS
8260B	MBTEX + TPHgas by P&T and GC-MS
8260B	MTBE Only by GC-MS
8260B	Appendix IX / Appendix II Volatiles
8260Bm	1,4-Dioxane (2ppb RL) ± EDB, DBCP by GC-MS
8260Bm / SRL 123-TCPA	1,2,3-TCPA ± EDB, DBCP, 1,2-DCA by GC-MS SIM Mode (10ppt RL)
8270C	SVOCs by GC-MS
8270C LL	SVOCs by GC-MS with lowest detection limits to meet more ESLs
8270C	SVOCs (basic list) + PCBs by GC-MS
8270C	Phenols Only by GC-MS SIM Mode
8270C	PNAs / PAHs Only by GC-MS SIM Mode
8270C	Methamphetamine by GC-MS
8270C	Morphine by GC-MS
8270C	Appendix IX / Appendix II Semivolatiles
8270C SIP	SIP SVOCs by L-LE and GC-MS
8270Cm	PDBEs, PBBs or PCBs by GC-MS-MS
8280Am	2378-TCDD only (5ppq RL for 2378-TCDD in water) by GC-MS-MS
8280Am	Full list + congener groups (5ppq RL for 2378-TCDD in water) by GC-MS-MS
8310	PNAs / PAHs by HPLC
8310m / SM 10200	Chlorophyll a & b by HPLC



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Method	Analysis
8315A	Carbonyls by HPLC
8315A Acrolein & 3-HPA	Acrolein & 3-Hydroxypropanal by HPLC w/ Field Derivatization (SFEI 108)
8316	Acrylamide, Acrylonitrile and Acrolein by HPLC
8318	Carbamates by HPLC
8330	Nitroaromatics and Nitramines by HPLC
8332	Nitroglycerin by HPLC
MAI-Alcohols	Alcohols by Derivatization & HPLC (X to XX ppb sensitivity)
MAI-Amines	Amines & Protonatable Nitrogenous Compounds by CIC
MAI-Epichlorohydrin	Epichlorohydrin by Derivatization & HPLC (XX ppb sensitivity)
MAI-EthyleneGlycol	Ethylene Glycol by Derivatization & HPLC (X to XX ppb sensitivity)
MAI-Organic Acids	Various Organic Acids by HPLC-UV; also see Volatile Fatty Acids
MAI-Organic Lead	Tetramethyl & Tetraethyl Lead by GC (5ppb soil / 250 ppt water)
MAI-Organic Tin	Mono-, Di-, Tri- & Tetra-Butyl Tin by GC-MS
MAI-Volatile Fatty Acids	See Anions
PWG-Pyrethrins	Pyrethrins by NCI-GC-MS (Pyrethrin Working Group)

<b>Special GC-MS-MS, LC-IT &amp; LC-MS-MS for Environmental Contaminants Requiring Best Sensitivity / Selectivity</b>	
ASTM D7485	LC-MS-MS for Alkylphenols in Water
ASTM D7574	LC-MS-MS for BisPhenol A (BPA) in Water
ASTM D7597	LC-MS-MS for Simple Organic Phosphates & Methylphosphonic Acids
ASTM D7598	LC-MS-MS for Thiodiglycol in Water
ASTM D7599	LC-MS-MS for Alkanolamines in Water
ASTM D7600	LC-MS-MS for Carbamates in Water
GC-NCI-MS or GC-NCI-MS-MS	EPA Ombudsman Report 2006-P-00007; Toxaphene Breakdown Products
GC-NCI-MS or GC-NCI-MS-MS	Pyrethrin Working Group; Pyrethrins in Water & Solids
GC-MS-MS	E 1653m for Chlorinated Phenolics
GC-MS-MS	E 8270m for Co-planar PCBs
GC-MS-MS	E 8280m for Dioxins & Dibenzofurans using E1613 criteria
GC-MS-MS	E 8270m for Selected Organo-ChlorinePesticides
GC-MS-MS	E 8270m for PBDEs & PBBs
GC-MS-MS	E 8270m for Selected PNAs
LC-MS-MS	E 535 Chloroacetanilide & Acetamide Herbicides & Degradates
LC-MS-MS	E 6860 for Perchlorate in Water and Soil by LC-MS-MS
LC-MS-MS	E 1694m for Thiourea in Waste Water
LC-IT or LC-MS-MS	Diquat & Paraquat Herbicides
LC-IT or LC-MS-MS	Glyphosate & AMPA Herbicides
LC-IT or LC-MS-MS	E 1694 or E 536m for Selected N/P Pesticides
LC-IT or LC-MS-MS	E 1694m for Organochlorine Herbicides
LC-IT or LC-MS-MS	E 1694 for Selected Pharmaceuticals, Nutraceuticals & Personal Care Products
LC-IT or LC-MS-MS	Perfluorooctanoic Acid (PFOA) & Perfluorooctane Sulfonate (PFOS)
LC-IT or LC-MS-MS	Phenyl Urea & Carbamate Pesticides & Herbicides

<b>Organics – Oil &amp; Grease</b>	
413.1	Total Recoverable O&G ± Silica Gel Clean Up
413.2	Total Recoverable O&G by IR Spectrometry ± S.G. Clean Up
418.1	Total Recoverable Hydrocarbons by IR Spectrometry ± S.G. Clean Up
418.1 to constant value	TRPH wo SG, followed by w SG clean up to constant value
5520B,E±F	O&G ± Silica Gel Clean Up
5520C±F	O&G by IR Spectrometry ± Silica Gel Clean Up
9070A	Total Recoverable O&G ± Silica Gel Clean Up
9071B	Total Recoverable O&G ± Silica Gel Clean Up
1664A	n-Hexane Extractable Material by Gravimetry ± S.G. Clean Up
MAI 418m	Quantitative analysis of 'vegetable' & 'petroleum' O&G fractions using IR spectr.
MAI FAME	Quantitative analysis of 'vegetable' & 'petroleum' O&G fractions by GC-FID



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Method	Analysis
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### METALS

**Metals –200.8 / 6020A (ICP-MS) or 200.7 / 6010C (ICP), 200.9 / 7010 (GFAA), 245.2 / 7470 (CV Hg) or 245.7 / 1631E (CVAF Hg); NIOSH**

#### Groups

CAM17	Ag, As, Ba, Be, Cd, Co, Cr, Cu, Hg, Mo, Ni, Pb, Sb, Se, Tl, V, Zn
PP13	Ag, As, Be, Cd, Cr, Cu, Hg, Ni, Pb, Sb, Se, Tl, Zn
RCRA8	Ag, As, Ba, Cd, Cr, Hg, Pb, Se
LUFT5	Cd, Cr, Ni, Pb, Zn
Major Elements as Oxides	Major Elements as Oxides after Alumino-silicate solids / Whole Rock Dissolution
Individual Elements	
ICP / ICP-MS, Common Metal	Ex, Al, Ag... ; generally, extraction cost is extra except TTLC – see Extractions
ICP / ICP-MS, Uncommon Metal	Ex, Au, S, P... ; generally, extraction cost is extra except TTLC – see Extractions
Hydrides by ICP-MS	As, Se ± Sb, Bi, Sn, Te, S, P
GFAA Metal	As, Pb, Se, Sb, Tl... ; generally, extraction cost is extra except TTLC – see Extractions
Special Metals	
Chromium VI	218.6, 7199 (IC); soil prices are for DI STLC or 3060A TTLC
Ferrous Iron	SM 3500Fe B4c
Hg by CVAF	Hg (245.7 / 1631E) – ultra low RL
Hg by CVAA	Hg (245.2, 245.5, 7470, 7471)
Hg, organic (Methyl Hg)	See Organics, Chromatography, Effluent, EPA 1630
Lead, organic, total	HML 939-M; CA Title 22, Chapter 11, Appendix 11 (unspeciated)
Lead, organic, speciated	See Organics, Chromatography, MAI-Organic Lead
Phosphorous, elemental	See Organics, Chromatography, 7580
Tin, organic, speciated	See Organics, Chromatography, MAI-Organic Tin

### ANIONS

218.6	Hexachrome by IC; soil prices are for DI STLC or 3060A TTLC
300.1 / 300.0 –Water	Common Anions: Cl <sup>-</sup> , Br <sup>-</sup> , SO <sub>4</sub> <sup>-2</sup> , F <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> as N, NO <sub>2</sub> <sup>-</sup> as N, PO <sub>4</sub> <sup>-3</sup> as P
300.1 / 300.0-Water	Uncommon Inorganic Anions: I <sup>-</sup> , S <sub>2</sub> O <sub>3</sub> <sup>-2</sup> , SCN <sup>-</sup> , IO <sub>3</sub> <sup>-</sup> , SO <sub>3</sub> <sup>-2</sup> , etc.
300.1– Water, Disinf. ByP.	ClO <sub>2</sub> <sup>-</sup> (Chlorite), ClO <sub>3</sub> <sup>-</sup> (Chlorate), BrO <sub>3</sub> <sup>-</sup> (Bromate w/ 1-2ppb RL), Br <sup>-</sup>
300.1m –Volatile Fatty acids	Volatile Fatty Acids: acetic, butyric, formic, hexanoic, iso-hexanoic, lactic, pentanoic, iso-pentanoic, propionic, pyruvic.
300.1-Water, Organic acids, individuals	Water Soluble Organic Anions / Acids: acetate, formate, oxalate, maleic acid, oxamic acid, tartaric acid, etc.
300.0 – Soil, CalTrans	Common Anions: Cl <sup>-</sup> , Br <sup>-</sup> , SO <sub>4</sub> <sup>-2</sup> , NO <sub>3</sub> <sup>-</sup> as N, NO <sub>2</sub> <sup>-</sup> as N; CalTrans Extr.
300.0 – Soil, DISTLC	Common Anions: Cl <sup>-</sup> , Br <sup>-</sup> , SO <sub>4</sub> <sup>-2</sup> , NO <sub>3</sub> <sup>-</sup> as N, NO <sub>2</sub> <sup>-</sup> as N; DISTLC Extr.
314.0	ClO <sub>4</sub> <sup>-</sup> (Perchlorate, 0.5 ppb RL)
317.0	BrO <sub>3</sub> <sup>-</sup> (Bromate w/ 0.5ppb RL)
6860	Perchlorate by HPLC / IC -MS-MS
9056	Cl <sup>-</sup> , Br <sup>-</sup> , SO <sub>4</sub> <sup>-2</sup> , F <sup>-</sup> , NO <sub>3</sub> <sup>-</sup> as N, NO <sub>2</sub> <sup>-</sup> as N, PO <sub>4</sub> <sup>-3</sup> as P
9058	ClO <sub>4</sub> <sup>-</sup> (Perchlorate)

### WET CHEMISTRY

Acidity	305.1 / SM2310 B
AGP	Acid Generating Potential, EPA 600/2-78-054
ANP	Acid Neutralizing Potential, EPA 600/2-78-054
AGP, AGPmax, ANP, NNP, NNPmin	EPA 600/2-78-054
Alkalinity, total	310.1 / SM2320 B
Alkalinity, speciated	310.1 / SM2320 B
Ammonia as N, Colorimetry	350.1, 350.2 / SM4500-NH <sub>3</sub> BFG – SM4500-N <sub>org</sub> C; AOAC
Ammonia as N, ISE	350.3 / SM4500-NH <sub>3</sub> D (includes conductivity)
Ammonia, unionized	350.1, 350.2 / SM4500-NH <sub>3</sub> BFG – SM4500-N <sub>org</sub> C; 350.3 / SM4500-NH <sub>3</sub> D (includes pH)
Bench Testing / Pilot Studies	Customized bench studies to evaluate pilot processes
BOD <sub>5d</sub> / cBOD <sub>5d</sub>	405.1 / SM5210 B; Biochemical Oxygen Demand, carbonaceous BOD
B S & W, approximate	ASTM D 1796-97; Bottom Sediments & Water as Approximate Vol. Phase Proportions



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Method	Analysis
B S & W, full	ASTM D 1796-97; Bottom Sediments & Water as Vol. Phase Proportions
Carbon, DOC	415.3 / SM5310 B; Dissolved Organic Carbon
Carbon, IC	415.3 / SM5310 B; Inorganic Carbon (= $\Sigma \text{CO}_2\text{,aq} + \text{HCO}_3^- + \text{CO}_3^{2-}$ )
Carbon, POC	415.3 / SM5310 B; Purgeable Organic Carbon
Carbon, TC	415.3, 9060A / SM5310 B; AOAC; Total Carbon
Carbon, TOC	415.3, 9060A / SM5310 B; AOAC; Total Organic Carbon
Carbon dioxide, aq, free	SM2310 B or 415.3; + pH + SM4500-CO <sub>2</sub> D calc. at 25°C
Carbon dioxide, air	415.3 / SM5310 B; CO <sub>2</sub>
Cation Ex. Capacity	see Extractions
CBOD	Biochemical Oxygen Demand (Carbonaceous) 405.1 / SM5210 B
CEC	see Extractions
Chloride, potentiometric	SM4500-Cl <sup>-</sup> D (only for matrices not amenable to IC)
Chlorine, residual / total, specific form incl. ClO <sub>2</sub>	330.2 / SM4500-Cl DE / SM4500-ClO <sub>2</sub> C
Chlorophyll	see Chromatography \ Hazardous Waste \ 8310m - SM10200
Chromium VI	7196A / SM3500Cr B (used when IC is inapplicable)
COD	410.4 / SM5220 D / E / Walkley-Black mod; Chemical Oxygen Demand
Color	110.2 (non-DW) / SM2120 B (DW)
Color, % Transmission	SM5910 Bm / City of Mt. View; 400-800nm %T
Conductivity	120.1 / 9050A / SM2510 B, CalTrans 424, SSSA
Corrosivity toward Steel	1110A
Cyanide, amenable	335.1,9012B / SM 4500-CN <sup>-</sup> G, includes total Cyanide results.
Cyanide, total	335.2, 335.3 / Kelada-01, 335.4 / 9010C-9012B ; SM4500-CN <sup>-</sup> ABCE
Cyanide, total	9010C & 9012B; SM4500-CN <sup>-</sup> ABCE; Total Cyanides in Solids
Cyanide, extractable	9013-9010C & 9012B / 9014; Base Extractable – Acid Distillable Cyanides in Oils / Greases / Floatables / Organic liquids / coarse debris
Cyanide, soluble	SM4500-CN <sup>-</sup> ABCE; DI Extractable – Acid Distillable Cyanides in Solids
Cyanide, WAD	SM4500-CN <sup>-</sup> ABCI; Buffered Weak Acid Distillable Cyanides in Solids
DOC	See Carbon, DOC
Dissolved O <sub>2</sub>	360.1 / SM 4500-O G
Flash point	1010
Fluoride, distilled	SM4500F BD (only if 300.1 inappropriate)
Foaming Agents, anionic	425.1 / SM5540 C; MBAS / Anionic Surfactants
Foaming Agents, cationic	MAI; PBAS / Cationic Surfactants
Foaming Agents, non-ionic	SM5540 BD; CTAS / Non-ionic Surfactants
Free Fatty Acids in Oil	AOAC 940.28
General Mineral, water	Alkalinity (speciated), Ca, Fe, K, Mg, Mn, Na, Cl <sup>-</sup> , SO <sub>4</sub> <sup>2-</sup> , EC, pH, TDS
General Mineral, soil	{Ca, K, Mg, Na, Cl <sup>-</sup> , SO <sub>4</sub> <sup>2-</sup> } using DISTLC extraction, EC, pH, Inorganic Carbon
General Physical	Color, Odor, Turbidity
Hardness	SM2340 B & 200.7
Hexachrome	7196A / SM3500Cr B (used when IC is inapplicable); soil prices are for DI STLC / 3060A TTLC w COD & pH
Hydrogen Peroxide	MAI - colorimetric
Inorganic Carbon	See Carbon, IC
Karl Fischer Water	9000
Langlier Index	SM2330 B; CaCO <sub>3</sub> Saturation Index based on pH, field temperature alkalinity, Ca <sup>+2</sup> & TDS (or EC) / (Mg + Na + K + Cl + SO <sub>4</sub> )
MBAS	See Foaming Agents, anionic
Moisture	ASTM D2216-05
Nitrogen, Ammonia, Colorimetry	350.1, 350.2 / SM4500-NH <sub>3</sub> BFG; AOAC
Nitrogen, Ammonia, ISE	350.3 / SM4500-NH <sub>3</sub> D (includes conductivity)
Nitrogen, Ammonia, unionized	350.1, 350.2 / SM4500-NH <sub>3</sub> BFG; 350.3 / SM4500-NH <sub>3</sub> D (includes pH)
Nitrogen, Nitrate + Nitrite	353.2 / SM4500-NO <sub>3</sub> <sup>-</sup> F; Nitrate + Nitrite as N (used when IC is inapplicable)
Nitrogen, Nitrate	353.2 / SM4500-NO <sub>3</sub> <sup>-</sup> F; Nitrate as N (used when IC is inapplicable)
Nitrogen, Nitrite	353.2 / SM4500-NO <sub>3</sub> <sup>-</sup> F; Nitrite as N (used when IC is inapplicable)



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Method	Analysis
Nitrogen, Organic	351.2 + 350.1 / SM4500-N <sub>org</sub> AD + SM4500-NH <sub>3</sub> FG; Organic Nitrogen as N (= TKN - Ammonia)
Nitrogen, TKN	351.2 / SM4500-N <sub>org</sub> AD; TKN = Total Kjeldahl Nitrogen as N
Nitrogen, total	415.3m; Total Nitrogen by combustion & NO <sub>x</sub> chemiluminescence / TCD
Nitrogen, total	351.2 + 353.2 / 300.1; [= Σ (TKN + NO <sub>3</sub> <sup>-</sup> + NO <sub>2</sub> <sup>-</sup> )]; AOAC
Nitrogen, total	SM4500-N BC (UV / persulfate oxidation)
Odor w/o Dechlorination	140.1 / SM2150 B
Odor after Dechlorination	140.1 / SM2150 B / SM4500-CI DE
ORP	SM2580 B, MAI; Oxidation-Reduction Potential
Ozone	SM4500 O <sub>3</sub> B
Paint Filter Test	9095A
pH	150.1 / 9045C / SM4500H <sup>+</sup> B
Phenolics, Total	420.1, 420.2, 420.4, 9066; SM5530 BCD
Phosphorous, Available	SM4500P E + UCD ANR 340; Available Phosphorous in soil as P
Phosphorous, Dissolved	365.1, 365.3, 365.4; / SM4500-P BEF; Dissolved Phosphorous as P
Phosphorous, Hydrolyzable	365.1, 365.3, 365.4; / SM4500-P BEF; Hydrolyzable Phosphorous as P
Phosphorous, Organic	365.1, 365.3, 365.4; / SM4500-P BEF; Organic (Total - Ortho - Hydrolyzable ) Phosphorous as P
Phosphorous, Ortho	365.1, 365.3, 365.5; SM4500-P BEF; Ortho Phosphorous as P (used when IC is inapplicable)
Phosphorous, total	365.1, 365.3, 365.4; SM4500-P BEF; AOAC; SSSA #3, #5 Total Phosphorous as P
Phosphorous, total	SM4500-P I; Total Phosphorous as P
Physical Properties	API 40RP
Air Filled Void Space	API 40RP
Bulk Density	SSSA #5
TOC / FOC	415.1, SM5310 B, Total Organic Carbon / ASTM-D2974, Fractional Organic Content
Moisture	ASTM D 2216-05
Porosity	SSSA #5
POC	See Carbon, POC
RCI	SW-846, Chapter 7
Resistivity, soil	CTM 643; includes pH, Cl <sup>-</sup> & SO <sub>4</sub> <sup>-2</sup>
Salinity	SSSA V5 Pt3 Chpt14
SAR, SAR <sub>e</sub>	Sodium Adsorption Ratio (includes Na, Ca, Mg analysis)
Settleable Solids	See Solids, Settleable
SI	CaCO <sub>3</sub> Saturation Index, See Langlier Index
Silica, Reactive	SM4500-SiO <sub>2</sub> D
Solids, Dissolved (TDS)	160.1 / SM2540 C
Solids, Fixed Dissolved (FDS)	SM2540 CE
Solids, Settleable	160.5, SM2540 F
Solids, Total (TS)	160.3 / SM2540 B
Solids, Suspended (TSS)	160.2 / SM2540 D
Solids, Volatile (TVS)	160.4 / SM2540 E
Specific Gravity	ASTM, MAI
Substance ID	MAI + tests
Sulfide, aqueous	376.2 / 9034 / SM4500-S <sup>-2</sup> D; SM4500-S <sup>-2</sup> F; SM4500-S <sup>-2</sup> I / distilled
Sulfide, solids	9030B & 9034 / SM4500-S <sup>-2</sup> D Acid Soluble or Acid Insoluble Sulfides
Sulfide, extractable	9030B-9031 & 9034 / 376.2 ; Base Extractable – Acid Distillable Sulfides in Oils / Greases / Floatables / Organic liquids / coarse debris
Sulfite by titration	SM4500-SO <sub>3</sub> <sup>-2</sup> B
Sulfite by IC	300.0, MAI
Sulfur, total	415.1m; Total Sulfur by combustion & TCD (ICP-MS rec. for aqueous)
Surfactant, anionic	See Foaming Agents, anionic



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Method	Analysis
Surfactant, cationic	See Foaming Agents, cationic
Surfactant, non-ionic	See Foaming Agents, non-ionic
Tannin & Lignin	SM5550 B
TDS	See Solids, Dissolved
TKN	See Nitrogen, TKN
TN	See Nitrogen, total
TOC	See Carbon, TOC
TS	See Solids, Total
TSS	See Solids, Suspended
Turbidity	180.1 / SM2130 B
TVS	See Residue, Volatile
UV254	SM5910 B
Water in Solvents	See Karl Fischer Water
VCC of Coatings	EPA D24
VCC for Powder of Coating	SCAQMD 316C

**Air – Chromatography & Other Analytical Techniques (Tedlar, Summa, ST = Sorbent Tube, Filter / Cassette)**

Air Sampling Pump Rentals	Low (<0.2L/min) or high (2-5 L/min) flow
Alcohols	NIOSH 1400 / 2000m by HPLC-FLD (Tedlar bag or ST))
Aldehydes & Ketones	ASTM D 5197-03 by HPLC-UV (ST; also TO-15 from Summa)
Hexachrome, Particulates	NIOSH 7605 by IC-Colorimetry (Filter)
LEED Gases	VOCs + Formaldehyde + 4-PCH + CO from summa
Light Gases, Atmospheric	ASTM D 1946-90 / EPA 3C by GC-PDD / TCD (O <sub>2</sub> , N <sub>2</sub> , CO, CO <sub>2</sub> ) (Tedlar / Summa; Summa same price as Tedlar if TO-15 requested)
Light Gases, Hydrocarbons	ASTM D 1946-90 / EPA 3C by GC- FID (methane, ethane, ethene, actetylene) (Tedlar / Summa; Summa same price as Tedlar if TO-15 requested)
Light Gases, Atmospheric + Hydrocarbons	ASTM D 1946-90 / EPA 3C by GC-PDD / TCD / FID (O <sub>2</sub> , N <sub>2</sub> , CO, CO <sub>2</sub> , methane, ethane, ethane, actetylene) (Tedlar, Summa; Summa same price as Tedlar if TO-15 requested)
Light Gases, Inert	ASTM D 1946-90 / EPA 3C by GC-PDD / TCD (He, Ne, Ar, Kr, Xe) (Tedlar, Summa)
Light Gases, Hydrogen	ASTM D 1946-90 / EPA 3C by GC-PDD (H <sub>2</sub> ) (Tedlar, Summa)
Mercury, vapor	NIOSH 6009 by CVAA or CVAFS (ST)
Metals, Particulates	NIOH 7303 by ICP-MS (Filter)
Methane, Ethane & Ethene in Water	RSK 175 (VOA)
OC & ON Herbicides	NIOSH 5602 (ST, pricing includes tubes)
OP Pesticides	NIOSH 5600 (ST, pricing includes tubes)
Organic Lead	NIOSH 2534m (Tetramethyl & Tetraethyl Lead) by GC (ST)
Particulates, Respirable	NIOSH 0600
Particulates, Total	NIOSH 0500
PCBs	NIOSH 5503 by GC-ECD (ST)
Phenols	NIOSH 2546 by GC-MS SIM mode (ST)
PNAs	NIOSH 5506 by HPLC UV-FLD (ST)
PNAs	TO-17m, PNAs by GC-MS (ST)
Silica	NIOSH 7500, Crystalline Silica by XRD
SVOCs	TO-17m, SVOCs by GC-MS (ST)
TPH (d/o)	NIOSH 1550 by GC-FID (ST)
TPH (d/o)	TO-17m (ST)
TPH(g)	TO-3 by FID (Summa / Tedlar)
TPH(g) Fractionated	MA DEP APH by GC-MS (Summa); ali-aro frac. of vapor phase TPH
VOCs, LEED Gases	VOCs + Formaldehyde + 4-PCH + CO from summa
VOCs +- TPH(g) soil gas	TO-14, TO-15, soil gas by GC-MS (Summa or Tedlar)
VOCs +- TPH(d) soil gas	TO-17, soil gas by GC-MS (ST)
VOCs, IPA only	TO-15, IPA only for soil gas from Tedlar by GC-MS; Client / Lab supplied Tedlar
VOCs +- TPH(g) indoor air	TO-14, TO-15, indoor air by GC-MS, RL= 0.1ppbv (Summa)
VOCs, SIM, indoor air	SIM mode for TO-15 compounds having ESL indoor air limits < 0.1 ppbv

**Microbiology: Bacteria, Fungi & Algae Testing**



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Method	Analysis
Algae Identification	SM 10900 CD (microscope)
Aeromonas hydrophila	SM9260 L (SP, MF, MTF)
Coliforms, Total & E Coli (+/-)	SM9223 B (EST)
Coliforms, Total & E Coli (Enumeration)	SM9223 B (EST – Idexx Colilert); SM9221 B (MTF/MPN); SM9222 B (MF) for Drinking and Natural Waters, 1-2 tray test
Coliforms, Total & E Coli (Enumeration)	SM9223 B (EST – Idexx Colilert); SM9221 B (MTF/MPN); SM9222 B (MF) for Sewage and Bio-Solids, 2-4 tray test
Enterococci	SM9230 B (MTF/MPN); Idexx Enterolert
Fecal Coliform	SM9221 E (MTF/MPN); SM9222 D (MF)
Fecal Streptococci	SM9230 B (MTF/MPN)
Heterotrophs	Idexx SIM (Spread) Plate; SM9215 C (Spread Plate); SM9215 B (Pour Plate) for Drinking and Natural Waters, 1-2 tray test
Heterotrophs	Idexx SIM (Spread) Plate; SM9215 C (Spread Plate); SM9215 B (Pour Plate) for Sewage and Bio-Solids, 2-4 tray test
Hydrocarbon Degraders	ASTM D6974-04 modified
Iron Utilizers	SM9240D (microscope/culture)
Klebsiella	SM9222 F (MF)
Legionella	SM9260 J (MF)
Pseudomonas aeruginosa	SM9213 E (MF or Direct Spread Plate Count)
Salmonella (+/-)	SM9260 B (media culture, presence or absence with serological confirmation)
Salmonella (Enumeration)	SM9260 D (media culture with serological confirmation)
Shigella (+/-)	SM9260 E (MF/Centrifugation)
Staphylococcus aureus	FDA BAM (Direct Spread Plate Count with serological confirmation)
Sulfur Utilizers	SM9240D (microscope/culture)
Yeast and Mold Count, Total Viable	FDA BAM (Direct Spread Plate Count)

### Acute Toxicity Aquatic Bioassay Testing

**Fish** - Prices quoted are for Fathead Minnows. For Sheepshead Minnows or Rainbow Trout add \$60 net30 or \$67 post30.

CA DFG (Polinsi & Miller)	CA Title 22 Hazardous Waste 96h LC <sub>50</sub> Acute Screen
CA DFG (Polinsi & Miller)	CA Title 22 Hazardous Waste 96h LC <sub>50</sub> Acute Definitive
EPA 2000 (821-R-02-012)	96h Static Non-Renewal Acute Screen for Effluent
EPA 2000 (821-R-02-012)	96h Static Non-Renewal Acute Screen for Receiving Water
EPA 2000 (821-R-02-012)	48h Static Non-Renewal Acute Screen for Effluent
EPA 2000 (821-R-02-012)	48h Static Non-Renewal Acute Definitive Test for Effluent
EPA 2000 (821-R-02-012)	96h Static Renewal-1x48h Acute Screen for Effluent
EPA 2000 (821-R-02-012)	96h Static Renewal-3x24h Acute Screen for Effluent
EPA 2000 (821-R-02-012)	96h Static Non-Renewal Acute Definitive Test for Effluent

### Daphnia Magna

EPA-821-R-02-012	24h Static Non-Renewal Acute Screen for Daphnia magna in Fresh or Marine Water
EPA-821-R-02-012	48h Static Non-Renewal Acute Screen for Daphnia magna in Fresh or Marine Water
EPA-821-R-02-012	96h Static Renewal- 1x48h Acute Screen for Daphnia magna in Fresh or Marine Water

### Solids – Special Techniques

Silica in Air by XRD	See Air Matrix
XRD for Solids ID	Crystalline Solids ID using Powder, Micro-focus or High Angle XRD by USGS OFR 01-041

### Food, Produce & Consumer Safety (also see Metals, Anions, Wet Chemistry)

Acrylamide	EPA 8316m / USFDA / AOAC by HPLC-UV or HPLC-MS-MS
Aldehydes & Ketones	EPA 8315m by HPLC-UV
Alfatoxins	FDA / ECC, Alfatoxins in Cereals & Feed
Antibiotics	FDA 4438, DAFSI, Antibiotics in Grain, Tissue, Milk & Honey by LC-MS-MS
Antibiotics, CAP	FDA 4290, 4306, 4303, 4302, 4290, 4281, Cloramphenicol (CAP) in Honey, Crawfish, Shrimp & Crabby LC-MS-MS
Antibiotics, Fluoroquinolones	FDA, Fluoroquinolones in Honey by LC-MS-MS
Antibiotics, Nitrofurans	USDA FSIS CLG-NFUR2.00, Nitrofurans in Seafood, Meat & Chicken by LC-MS-MS
Biogenic Amines	Karovickova & Kohajdova, Speciated Biogenic Amines in Food by LC-IT or LC-MS-MS



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Method	Analysis
Biogenic Amines as TVBN	AOAC; Total Volatile Basic Nitrogen ± TMA in Fish
Carbamates	CDFA PRSM / EPA 8318m by HPLC w/ Derivatization
Dioxins & Furans	EPA 8280m, Analysis of Polychlorinated Dibenzo-p-dioxins & Dibenzofurans by HRGC-MS-MS
Herbicides, OC Acidic	CDFA PRSM / EPA 8151m by GC-ECD w/ Derivatization
Melamine & Related Compounds	FDA 4421, 4422, 4396, Melamine & Cyanuric Acid in Infant Formula, Catfish Tissue & Other Foods by LC-MS-MS
Metals	AOAC Chpt 9, Metals in Food
Metals, Hg	EPA 1631 App A, Hg in Biota
Metals, Pb	CPSC-CH-E1003-09, -E1002-08, -E1001-08, Determination of Pb in Paint & Surface Coatings, in Non-Metal & Metallic Children's Products
Perchlorate	FDA; Perchlorate in Fruits, Vegetables, Milk, Low Moisture Foods, Infant Food & Water by LC-MS-MS
Pesticides, CV & BG	FDA 4363, 4333; Crystal Violet (CV) / Gentian Violet (GV) & Brilliant Green (BG) in Fish by LC-UV or LC-MS-MS
Pesticides, MG & LMG	FDA 4363, 4333; Malachite Green (MG) & Leucomalachite Green (LMG) in Fish & Shrimp & Salmon by LC-FLD or LC-MS-MS
Pesticides, OC	CDFA PRSM / EPA 8081m by GC-ECD
Pesticides, ON/P	CDFA PRSM / EPA 8141m by GC-NPD
Phenols	EPA 8270m by GC-MS SIM mode
Phthalates	CPSC-CH-C1001-09.1; Phthalates in Consumer Products by GC-MS
PNAs	EPA 8270m by GC-MS SIM mode
Sweeteners & Preservatives	Sweeteners, Preservatives & Flavorants, ex. Aspartame, Saccharin by LC-IT or LC-MS
VOCs	EPA 8260m by GC-MS

**Pharmaceuticals, Nutraceuticals, Herbal Extracts, Personal Care Products, Drugs & Stimulants by HPLC /UV /IT /MS-MS**

Antibiotics, Amphenicols	Amphenicol Antibiotics, ex. Thiaphenicol, Florfenicol, by LC-MS-MS
Antibiotics, Beta-Lactam	Beta-Lactam Antibiotics, ex. Amoxicillin, Penicillin, by LC-MS-MS
Antibiotics, Flunixin	Flunixin Antibiotics, ex. Flunixin, by LC-MS-MS
Antibiotics, Fluoroquinolones	Fluoroquinolone Antibiotics, ex. Ciprofloxacin, Enrofloxacin, by LC-MS-MS
Antibiotics, Macrolides	Macrolide Antibiotics, ex. Erythromycin, Tylosin, by LC-MS-MS
Antibiotics, Sulfonamides	Sulfonamide Antibiotics, ex. Sulfamerazine, Sulfanilamide, by LC-MS-MS
Antibiotics, Tetracyclines	Tetracycline Antibiotics, ex. Tetracycline, Chlorotetracycline, by LC-MS-MS
Anti-Convulsants	Anti- Convulsants, ex. Ethsuximide, PEMA, by LC-IT or LC-MS-MS
Anti-Depressants	Anti- Depressants, ex. Diazepam, Lorazepam, by LC-IT or LC-MS-MS
Antiparasitics	Antiparasitics, ex. Clotrimazole, Terbinafine, by LC-IT or LC-MS-MS
Antipsychotics	Antipsychotics, ex. Aripiprazole, Chlorpromazine, by LC-IT or LC-MS-MS
Antivirals	Antivirals, ex. Acyclovir, Tamiflu, by LC-IT or LC-MS-MS
Disinfectants & Preservatives	Disinfectants & Preservatives, ex. Alkyl Parabens, Triclosan, by LC-IT or LC-MS-MS
Drugs of Abuse	Drugs of Abuse, ex. Methamphetamine, Morphine, by LC-IT or LC-MS-MS
Dyes & Pigments	Dyes & Pigments, ex. Toluidine Red, Sudan III, by LC-IT or LC-MS-MS
Herbal Extracts	Herbal Extracts, ex. Ginko, Eucalyptus, by LC-IT or LC-MS-MS
Pain Management Drugs – Non-Prescription	NASAIDS, ex. Ibuprofen, Acetaminophen, by LC-IT or LC-MS-MS
Pain Management Drugs – Prescription	Prescription Pain Management Drugs, ex. Codeine, Lidocane, by LC-IT or LC-MS-MS
Performance Enhancing Drugs & Steroids	PEDs & Steroids, ex. Progesterone, Cimetidine by LC-IT or LC-MS-MS
Sedatives	Sedatives, ex. Secobarbital, Phenytoin, by LC-IT or LC-MS-MS
Steroids	See Performance Enhancing Drugs
Stimulants	Stimulants, ex. Caffeine, Methamphetamine, by LC-IT or LC-MS-MS
Therapeutics	Therapeutics, ex. Propoxyphene, Ephedrine, by LC-IT or LC-MS-MS
Vitamins & Supplements	Vitamins, ex. Ascorbic acid, Niacin, by LC-UV, LC-IT or LC-MS-MS

**Extractions / Preparations^**

Alumina Bench Column Clean Up (EPA 3630C)	Bench Column Clean Up of solvent extracts, cost depends on complexity
Ashing	Thermal combustion preparation for metals or oxide determinations
ASTM C 1580-05	DI Extraction of Soils for Sulfate
Bench Testing / Pilot Studies	Customized bench studies to evaluate pilot processes



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Method	Analysis
Bioavailability	Synthetic stomach acid extraction for metals & organics
Cal Trans 417 / 422	DI Extraction for anions in soil (DI STLC may yield higher values)
CEC, NH <sub>4</sub> Ac	EPA 9080; Cation Exchange Capacity inapplicable to calcareous soils
CEC, NaAc	EPA 9081; Cation Exchange Capacity that is generally applicable
CEC, BaAc	EPA 9081m; Cation Exchange Capacity used by UCD DNR
Cu Clean Up	Cu Clean Up to Remove Sulfur
Compositing	Less than 5:1 free
Ex. Cations, NH <sub>4</sub> Ac	Exchangeable Cations using ammonium acetate
Ex. Cations, Mehlich	Exchangeable Cations & Heavy Metals using Mehlich III solution
Ex. Cations, H & S	Exchangeable Cations & Heavy Metals using Havlin & Soltanpour solution
Filtration	In-house (laboratory) filtration for dissolved metals using 0.45 um filter
Florisil Bench Column Clean Up (EPA 3630C)	Bench Column Clean Up of solvent extracts, cost depends on complexity
GPC Clean-up, EPA 3640A	Gel Permeation Preparative Chromatography, including QC
Metals, Available	Metals available for plant uptake using dilute HCl extraction
Metals, Available	Metals available for plant uptake using dilute HCl & H <sub>2</sub> SO <sub>4</sub> extraction
Metals, Available	Metals available for plant uptake using chelation extraction
Metals Dissolution	Concentrated oxidizing acids dissolution of solid metals
Silica Gel Clean Up, in-a-vial style (EPA 418.1)	Silica Gel Clean Up of solvent extracts, in-a-vial style (free for 418.1)
Silica Gel Bench Column Clean Up (EPA 3630C)	Bench Column Clean Up of solvent extracts, cost depends on complexity
Soil, Saturated Extr.	Just water saturated extraction of soil for EC, pH, solution cations, SAR <sub>e</sub>
Soil, 10:1 Extr.	10ml DI : 1g soil extraction ratio for solution cations, SAR
STLC	California WET Test
DI STLC	California WET Test modified to use DI water
Whole Rock Dissolution	Fusion of rock / alumino-silicate solids
Zemo Diss. HCs ± SG c.u.	Dawn Zemo Methodology for Dissolved HCs ± SG cleanup
EPA 300.0	DI Extraction for anions in soil (Cal Trans 417 / 422 is recommended)
EPA 1311	TCLP; Toxic Characteristic Leaching Procedure
EPA 1311	ZHE TCLP for Volatiles (Zero Head Space Extractor = ZHE)
EPA 1312	SPLP; Synthetic Precipitation Leaching Procedure
EPA 3050B mod	TTLC, Large volume (70g initial sample weight)
EPA 3060A	TTLC Hexachrome (included in price of analysis)

### Miscellaneous

Air Sampling Pump Rentals	Low (0.05 - 0.2L/min) or high (1-5 L/min) flow
Chromatogram Fee	Less than 5 per COC free
EDF Reporting Fee	CA AB 2886
EPA 5035 Handling Fee	EnCore or VOA style
Open Scan Fee	The five most significant unidentified peaks in GC-MS chromatogram
PM10 Monitor	PDR-1000AN Data Logger for continuous PM10 monitoring