

Ground and Surface Water Physico-chemical, Major Ion and Isotope Chemistry, Mount Taylor, Mount Taylor Ranger District, New Mexico

**Explanation for physico-chemical and ion chemistry**

\* Specific conductance (SC) was calculated from conductivity (C) if italicized. For every degree change in water temperature (WT), there is approximately a 2% change in conductivity. To convert raw conductivity measurement to specific conductance, the following equation was used:  $SC=C/1+(0.02*(WT-25))$  (YSI Incorporated, 2009).

\*\* Instrument used 1: Oakton600, 2: YSI Pro Plus 3: YSI Pro DSS

\*\*\* Mass Balance Equation:

$$100 * ((2 * Ca^{++}(mg/l)/40.08) + (2 * Mg^{++}(mg/l)/24.305) + (Na^{+}(mg/l)/22.99) + (K^{+}(mg/l)/39.0983) - (HCO_3^{-}(mg/l)/61) - (Cl^{-}(mg/l)/35.453) - (2 * SO_4^{-}(mg/l)/96.06)) / ((2 * Ca^{++}(mg/l)/40.08) + (2 * Mg^{++}(mg/l)/24.305) + (Na^{+}(mg/l)/22.99) + (K^{+}(mg/l)/39.0983) - (HCO_3^{-}(mg/l)/61) - (Cl^{-}(mg/l)/35.453) - (2 * SO_4^{-}(mg/l)/96.06))$$

**ICP/OES Detection Limits**

Element	IDL (mg/L)	MDL (mg/L)	Wavelength (λ) (nm)
Al	0.0280	0.280	396.153
As	0.0250	0.250	188.979
B	0.0048	0.048	249.772
Ba	0.0013	0.013	455.403
Be	0.0007	0.007	313.107
Ca	0.0100	0.100	317.933
Cd	0.0027	0.027	228.802
Co	0.0070	0.070	228.616
Cr	0.0071	0.071	267.716
Cu	0.0054	0.054	324.752
Fe	0.0062	0.062	259.939
K	0.0500	0.500	766.49
Li	0.0500	0.500	610.362
Mg	0.0030	0.030	280.271

Element	IDL (mg/L)	MDL (mg/L)	Wavelength (λ) (nm)
Mn	0.0014	0.014	257.61
Mo	0.0079	0.079	202.031
Na	0.0690	0.690	589.592
Ni	0.0150	0.150	231.604
Pb	0.0420	0.420	220.353
Se	0.0750	0.750	196.026
Si	0.0120	0.120	251.611
Sr	0.0008	0.008	421.552
V	0.0064	0.064	310.23
Zn	0.0018	0.018	213.857
U	0.3000	0.500	385.958

**IDL = Instrument Detection Limit**  
**MDL = Method Detection Limit**  
**MDL = IDL \* 10**

**IC Detection Limits**

Element	MDL (mg/L)	Retention Time (Approx.)
F	0.01	3.943
Cl	0.05	5.931
NO <sub>2</sub>	0.01	7.052
Br	0.01	8.733
NO <sub>3</sub>	0.01	9.894
PO <sub>4</sub>	0.01	13.845
SO <sub>4</sub>	0.05	16.250

Retention Time Approximation is from averages of 4 standards and ICBV

**Tritium (<sup>3</sup>H) Detection Limit**

Detection Limit, 9.5 x enrichment, 1500 minutes counting 0.5

Explanation of tritium data: The detection limit, 0.5 TU, is calculated as 0 + 2 sigma for low-counting samples, and applies for 10-fold enrichment and 1500 minutes of counting. Lower limits are possible for higher enrichment factors.

A sample with a mean calculated TU value between 0 and 1 sigma, say 0.20 ± 0.35 TU, is reported thus: <0.9 TU (= 0.2 + 2 x 0.35). A sample with a mean calculated TU value between 1 and 2 sigma, say 0.51 ± 0.38, is reported thus: <1.3 (Apparent 0.5), where 1.3 = 0.51 + 2 x 0.38, rounded. Samples with calculated TU values greater than 2 are reported thus: 1.1 ± 0.4 TU.

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Sample ID	Sample Location	Sample Date	Water Temperature °C	pH	Specific Conductivity* $\mu\text{S/cm}$	Dissolved solids mg/l	Dissolved Oxygen mg/l	Instrument**
D1307076	Guadalupe	6/29/2013	17.5	7.40	319	207	9.89	2
D1307077	Ojo De Los Indios	6/29/2013	11.5	7.24	446	290	2.24	2
D1307078	Ojo Del Dado	6/29/2013	18.0	7.20	374	187	n.a.	1
D1307058	Ojo Piedra	5/26/2013	5.7	7.56	61	40	5.54	2
D1307057	San Lucas	5/25/2013	11.8	6.76	178	115	6.2	2

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Sample ID	Sample Location	Ca <sup>++</sup> mg/l	Mg <sup>++</sup> mg/l	Na <sup>+</sup> mg/l	K <sup>+</sup> mg/l	HCO <sub>3</sub> <sup>-</sup> mg/l	SO <sub>4</sub> <sup>--</sup> mg/l	Cl <sup>-</sup> mg/l	Mass Balance*** %
D1307076	Guadalupe	30.88	10.37	12.88	8.72	167.19	4.06	6.40	2.8
D1307077	Ojo De Los Indios	39.47	15.58	23.29	3.04	242.85	13.49	9.96	-2.3
D1307078	Ojo Del Dado	41.27	9.85	3.13	15.03	216.00	b.d.	5.20	-4.2
D1307058	Ojo Piedra	6.47	1.56	3.98	0.82	25.63	5.60	1.98	4.3
D1307057	San Lucas	17.25	6.15	10.27	3.15	112.64	2.03	3.20	-2.2

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Sample ID	Sample Location	Si mg/l	F <sup>-</sup> mg/l	Br <sup>-</sup> mg/l	Fe <sup>++</sup> mg/l	SI Calcite log Q/K	SI Gypsum log Q/K	SI Quartz log Q/K	CO <sub>2</sub> (g) fugacity
D1307076	Guadalupe	6.49	0.86	0.18	b.d.	0.485	0.000	1.474	0.005
D1307077	Ojo De Los Indios	8.82	1.12	0.20	b.d.	0.452	0.002	2.601	0.010
D1307078	Ojo Del Dado	2.81	0.94	b.d.	b.d.	0.502	n.a.	0.626	0.010
D1307058	Ojo Piedra	5.98	0.71	b.d.	b.d.	0.019	0.000	2.295	0.001
D1307057	San Lucas	17.00	0.85	b.d.	b.d.	0.028	0.000	4.948	0.011

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Sample ID	Sample Location	$\delta^{18}\text{O}$ ‰ SMOW	$\delta\text{D}$ ‰ SMOW	d-excess	$^3\text{H}$ TU	$^3\text{H}$ Error	Notes
D1307076	Guadalupe	-6.5	-65.0	-12.8	n.a.	n.a.	
D1307077	Ojo De Los Indios	-11.1	-84.0	4.5	n.a.	n.a.	
D1307078	Ojo Del Dado	9.2	-2.8	-76.2	n.a.	n.a.	
D1307058	Ojo Piedra	-12.2	-83.1	14.2	n.a.	n.a.	
D1307057	San Lucas	-13.2	-89.0	16.2	n.a.	n.a.	