

# 9

## Appendix

### 3. Reverse Osmosis Operation Log

#### 9-4. Conversion of Concentration Units of Ionic Species

Compound	Fomular	Ionic Weight	Equiv. Weight	Conversion to	
				g CaCO <sub>3</sub> /L	Eq/L
<b>Neutral</b>					
Ammonia	NH <sub>3</sub>	17.0	17.0	2.94	0.0588
Carbon dioxide	CO <sub>2</sub>	44.0	44.0	1.14	0.0227
Silica	SiO <sub>2</sub>	60.0	60.0	0.83	0.0167
<b>Positive ions</b>					
Aluminum	Al <sup>+++</sup>	27.0	9.0	5.56	0.1111
Ammonium	NH <sub>4</sub> <sup>+</sup>	18.0	18.0	2.78	0.0556
Barium	Ba <sup>++</sup>	137.4	68.7	0.73	0.0146
Calcium	Ca <sup>++</sup>	40.1	20.0	2.50	0.0500
Copper	Cu <sup>++</sup>	63.6	31.8	1.57	0.0314
Ferrous Iron	Fe <sup>++</sup>	55.8	27.9	1.79	0.0358
Ferric Iron	Fe <sup>+++</sup>	55.8	18.6	2.69	0.0538
Hydrogen	H <sup>+</sup>	1.0	1.0	50.0	1.0000
Magnesium	Mg <sup>++</sup>	24.3	12.2	4.10	0.0820
Manganese	Mn <sup>++</sup>	54.9	27.5	1.82	0.0364
Potassium	K <sup>+</sup>	39.1	39.1	1.28	0.0256
Sodium	Na <sup>+</sup>	23.0	23.0	2.18	0.0435
<b>Negative ions</b>					
Bicarbonate	HCO <sub>3</sub> <sup>-</sup>	61.0	61.0	0.82	0.0164
Carbonate	CO <sub>3</sub> <sup>--</sup>	60.0	30.0	1.67	0.3333
Chloride	Cl <sup>-</sup>	35.5	35.5	1.41	0.0282
Fluoride	F <sup>-</sup>	19.0	19.0	2.63	0.0526
Hydroxide	OH <sup>-</sup>	17.0	17.0	2.94	0.0588
Iodide	I <sup>-</sup>	126.9	126.9	0.39	0.0079
Nitrate	NO <sub>3</sub> <sup>-</sup>	62.0	62.0	0.81	0.0161
Phosphate(tri-basic)	PO <sub>4</sub> <sup>---</sup>	95.0	31.7	1.58	0.0315
Phosphate(di-basic)	HPO <sub>4</sub> <sup>--</sup>	96.0	48.0	1.04	0.0208
Phosphate(mono-basic)	H <sub>2</sub> PO <sub>4</sub> <sup>-</sup>	97.0	97.0	0.52	0.0103
Sulfate	SO <sub>4</sub> <sup>--</sup>	96.1	48.0	1.04	0.0208
Bisulfate	HSO <sub>4</sub> <sup>-</sup>	97.1	97.1	0.52	0.0103
Sulfite	SO <sub>3</sub> <sup>--</sup>	80.1	40.0	1.25	0.0250
Bisulfite	HSO <sub>3</sub> <sup>-</sup>	81.1	81.1	0.62	0.0123
Sulfide	S <sup>--</sup>	32.1	16.0	3.13	0.0625
Silica	SiO <sub>2</sub>	60.0	60.0	0.83	0.0167