

Table 3-2. Summary SRAT Product Data

anions (mg/kg)	GF1	GF2	GF3	GF4	GF5	GF6	GF7	GF8
fluoride	<100	<100	<100	<100	<100	<100	<100	<100
chloride	1085	1040	976	839	1002	1230	890	1210
nitrite	<100	<100	<100	<100	<100	<100	<100	<100
nitrate	25000	51600	55950	53100	59900	42250	59900	56250
sulfate	1920	1680	1765	2120	3275	2565	3280	3485
glycolate	<100	53950	55400	56850	114500	65050	161500	118500
oxalate	296	649	2405	3910	2775	3395	1645	4680
formate	12900	2555	<100	<100	824	776	3750	<100
phosphate	<100	<100	<100	<100	<100	<100	<100	<100
wt% total solids	17.53%	21.77%	21.79%	22.32%	24.03%	25.59%	21.75%	24.62%
wt% calcined solids	12.19%	11.37%	11.36%	11.86%	12.02%	14.13%	10.20%	12.47%
wt% insoluble solids	11.01%	8.76%	8.98%	8.84%	10.23%	11.20%	5.96%	10.83%
wt% soluble solids	6.53%	13.01%	12.80%	13.48%	13.80%	14.39%	15.79%	13.80%
density (g/mL)	1.084	1.163	1.158	1.161	1.166	1.187	1.138	1.178
pH at 25°C	4.24	4.01	3.99	4.07	3.17	5.04	3.01	3.02

The oxalate results are of particular interest. The starting sludge contains about 800 mg/kg oxalate, which is generally assumed to be at least partially destroyed during the SRAT cycle. In the glycolic/formic flowsheet runs, however, oxalate is being created. As postulated earlier in this report, it is possible that glycolic acid is oxidized to glyoxylic acid by nitrite or MnO_2 , which is further oxidized to oxalic acid by the reduction of mercury. This also would explain the lack of oxalate generation in the run without mercury, GF-2.

These runs represent the first time that glycolate ion measurements were performed on actual SRAT/SME products, as opposed to spiked samples and simple solutions. A separate report has been drafted detailing the glycolate IC method development.⁸ It appears from the data presented here that the second set of runs (GF-5-8) may be biased high in glycolate. The 65050 mg/kg measured for GF6 represents 99.6% of the total moles of glycolate added during the SRAT. This is unrealistically high, especially if the proposed pathway for oxalate formation is correct. The results for GF-5,-7, and -8 show more glycolate in the SRAT product than was added. Resolving this issue so that reliable glycolate data is available will be especially important for refining the REDOX model as flowsheet development continues.

Anion balance data for nitrite, nitrate, formate and glycolate are presented in the table below.