1164240

WSRC-RP-97-207
Revision 0

Technical Assistance Request: HLW/DWPF/TAR-970058

Statistical Review of Data from DWPF's Process Samples for Batches 19 Through 30 (U)

T. B. Edwards

Westinghouse Savannah River Company
Savannah River Technology Center
Aiken, SC 29808

SAFETY • RESPONSIBILITY • SECURITY
SRS
SAVANNAH RIVER SITE

PREPARED FOR THE U.S. DEPARTMENT OF ENERGY UNDER CONTRACT NO. DE-AC09-96SR18500

DISCLAIMER

ABSTRACT

The measurements derived from samples taken during the processing of batches 19 through 30 at the DWPF affords an opportunity for review and comparisons. This report has looked at some of the statistics from these data.

Only the data reported by the DWPF lab (that is, the data provided by the lab as representative of the samples taken) are available for this analysis. In some cases, the sample results reported may be a subset of the sample results generated by the analytical procedures. A thorough assessment of the DWPF lab's analytical procedures would require the complete set of data. Thus, the statistics reported here, specifically, as they relate to analytical uncertainties, are limited to the reported data for these samples.

A feel for the consistency of the incoming slurry is the estimation of the components of variation for the SRAT receipts. In general, for all of the vessels, the data from batches after 21 show smaller batch-to-batch variation than the data from all the batches. The relative contributions of batch-to-batch versus residual, which includes analytical, are presented in these analyses.

A comparison of the results for the SME versus those of the MFT, shows a statistically significant difference (at the 5% level) for

Total Solids (wt%):	SME value > MFT value	(Mean Difference = 1.7 wt%)
Iron (wt%):	SME value > MFT value	(Mean Difference = 0.42 wt%)

A higher Total Solids in the SME versus the MFT is not unexpected since the MFT is not sampled immediately following the transfer from the SME but is sampled somewhat later, potentially, after the MFT pumps have been primed with water.

In addition, the SME values for Aluminum and Copper were statistically different from (i.e., larger than) the MFT values at the 10% significance level. These differences should be tracked over the next several batches to see if these trends continue.

CONTENTS

LIST OF TABLES

LIST OF EXHIBITS

1.0 INTRODUCTION

The Defense Waste Processing Facility (DWPF) has been processing radioactive waste for several months. Batch 19 marked the beginning of radioactive operations, and as this document is being prepared, the DWPF is working on Batch 30. Samples are taken at the Sludge Receipt and Adjustment Tank (SRAT), at the Slurry Mix Evaporator (SME), and at the Melter Feed Tank (MFT) for each batch processed. These samples are analyzed by the DWPF Analytical Facility (DWPF lab) for elemental composition as well as density, total solids, and calcined solids. The data from these analytical measurements for batches 19 through 30 reported by the DWPF lab are the subject of this report; specifically, this will include SRAT Receipt, SRAT Product, SME, MFT results.

A statistical review of these reported data has been conducted with the objectives:

1. Investigate the components of variation (batch-to-batch versus sample-to-sample) for each vessel.
2. Identify possible differences in SME versus MFT sample results.
3. Explore for possible trends in mean level or variation for each vessel over the available sample history.

The JMP® statistical software package from SAS Institute, Inc., was used to generate the statistical analyses presented in this report [1].

2.0 BACKGROUND

The elemental concentrations of samples from the SRAT, SME, and MFT are determined by analytical procedures conducted by the DWPF lab. The SME and MFT concentrations are measured on a vitrified basis; that is, the results provided by the DWPF lab are in terms of grams of element per 100 grams of vitrified material. Analyses of the SRAT material are reported as percentages of total dried solids; that is, the results are provided in grams of element per 100 grams of total solids. For all three vessels, the anions of interest are reported in parts per million (ppm).

Only the data reported by the DWPF lab (that is, the data provided by the lab as representative of the samples taken) are available for this analysis. In some cases, the sample results reported may be a subset of the sample results generated by the analytical procedures. A thorough assessment of the DWPF lab's analytical procedures would require the complete set of data. Thus, the statistics reported here, specifically, as they relate to analytical uncertainties, are limited to the reported data for these samples.

Tables 1-4 in the Appendix provides a listing of the results by sample, batch, and vessel.

3.0 DISCUSSION

As a preliminary step in conducting the statistical analyses discussed in this section, the data were screened for outliers. Summary statistics, including histograms, were prepared to assist in this part of the data review. These results are presented in Exhibits 1-4 in the Appendix. Summary information for each vessel in the form of analyte means, standard deviations, and percent coefficients of variation is presented in Table 5 of the Appendix.

An additional overview of these data is provided by Exhibit 5 in the Appendix. In this exhibit, a chart is displayed for each analyte. This chart provides a look at the sample measurements for each batch for each of the four vessels considered in this study.

Another observation, and one of significance in the subsequent analyses, concerns the results for batches 19, 20, and 21 versus the remainder of the study. For some analytes, these earlier results differ from the latter results due to the composition of the initial heels of the four vessels being different from the actual waste composition received from the tank farm. These initial heel compositions are of the simulated slurry used during the Waste Qualification Runs. Some of the plots of Exhibit 5 display short-lived trends over the initial batches as a consequence of the impact of these heels. In the analyses that follow (where estimating variabilities and their sources are the objective) a separate analysis is conducted excluding these earlier batches to gain a better understanding of these components of variation for the waste stream.

3.1 Sources of Variation By Vessel

The set of measurements on each analyte for each batch at each vessel provides an opportunity to explore the sources of variation in the values. Specifically, for each analyte and vessel, a random effects model such as the following can be fit to the available data:

$$y_{ij} = \mu + a_i + e_{j[i]} \qquad (1)$$

where

i=1, 2, ..., n, (the batch index, corresponding to batches 19, 20, ..., 30),

j=1, 2, ..., m (the sample index, corresponding to sample 1, 2, 3, ...),

y_{ij} is the j^{th} measurement for the given analyte/vessel at batch i , and

μ is the true underlying analyte value for the given vessel over this first set of batches.

a_i is the random effect for batch i (this includes batch-to-batch differences as well as effects due to longer-term differences in the analytical procedures such as instrument calibrations).

$e_{j[i]}$ is the residual random effect (due to sample-to-sample and analytical/measurement errors) attributable with the j^{th} sample for batch i..

For this model, each term present (except for μ) is considered as a random variable (i.e., both batch and residual effects are considered as random effects) with a zero mean and a constant variance. These random variables are assumed to be independent and each is usually assumed to follow a normal probability distribution. Let the variances due to batch and residual variation be denoted by σ_b^2 and σ^2, respectively. The objective of this analysis is to estimate each of the sigmas, the estimates of variability from each of the identified sources. This will also lead to an understanding of the errors associated with estimating μ.

Since variabilities are being explored, two analyses were conducted for each analyte/vessel combination. Initially, model (1) was fit to all SRAT Receipt, SRAT Product, SME, and MFT sample results. Then, batches 19-21 were excluded, and the model fit to the remaining data for each analyte/vessel combination. The results from these latter fits are provided in Exhibits 6 through 9 in the Appendix. Information from these exhibits as well as the corresponding results from the initial fit (i.e., the fit conducted using all the data) has been summarized in Tables 6.1-6.4 of the Appendix.[1]

The columns of these tables that are of primary interest are those showing the components of variation as percentages (batch versus residual) and those showing the percent coefficients of variation for the total, batch, and residual variations. A feel for the consistency of the incoming slurry is provided by the "batch" component in Table 6.1 for the SRAT receipts. In general, for all of the vessels, the data from batches after 21 (the results presented at the bottom of each of the tables) show smaller batch-to-batch variation than the data from all the batches (the top portions of these tables). The relative contributions of batch-to-batch versus residual, which includes analytical, are presented in these tables as well.

[1]Note that some analytes were below the detection limit of their analytical procedures, and that in some instances the detection limits for some analytes (e.g., chloride, fluoride, and sulfate) were the same. Also, for some analytes there were not enough data to conduct some of the statistical procedures.

3.2 Differences Between the SME and MFT Measurements

Exhibit 10 in the Appendix provides a comparison of the SME and MFT. This comparison is in the form of a paired-t test for each analyte common to the two tanks. The averages of the sample measurements for each batch at each vessel are the basis for this comparison.

The following analytes show a statistically significant difference (at the 5% level):

Total Solids (wt%):	SME value > MFT value	(Mean Difference = 1.7 wt%)
Iron (wt%):	SME value > MFT value	(Mean Difference = 0.42 wt%)

A higher Total Solids in the SME versus the MFT is not unexpected since the MFT is not sampled immediately following the transfer from the SME but is sampled somewhat later, potentially, after the MFT pumps have been primed with water.

In addition, the SME values for Aluminum and Copper were statistically different from (i.e., larger than) the MFT values at the 10% significance level. The SME values for the ratio of Iron to Lithium were statistically different from (i.e., larger than) those from the MFT at the 5% significance level (this is probably due to the difference in the Iron noted above). These differences should be tracked over the next several batches to see if these trends continue.

3.3 Correlations Among the Batch Averages by Vessel

The correlations among the analytical results from the latter batches (i.e., batches 22 through 30) have also been investigated. These correlations are measures of the linear relationships among these data. Tables 7.1 - 7.4 in the Appendix provides this information by vessel for batch averages of a portion of the analytes.[2] Exhibit 11 in the Appendix provides scatter plots of these same data.

Recall that linear correlations fall between -1 and 1 (inclusive). Two sets of these average measurements are positively correlated if the direction of changes, increases and/or decreases, of one set follow, in general, the direction of change of the other set over the batches. If the directions of change are opposite for the two sets of average measurements, then the two analytes would be negatively correlated. As expected (for each vessel), there are a number of highly correlated analytes. Those with a (absolute) correlation of 85% or greater are indicated in the following table[3]:

Element	Al	B	Ca	Cr	Cu	Fe	Li	K	Mg	Mn	Na	Ni	Si	Ti	U	Zr
Al			RP			RPSM			R	R	r				RSM	
B																
Ca					M	R			PSM	RM	rSM				R	
Cr												P				
Cu									M	SM	M					
Fe										R	r				RS	
Li													SM			
K													p	M		
Mg										SM	PSM					
Mn											rSM				RP	
Na													M			
Ni																
Si																
Ti																
U																
Zr																

[2]This analysis includes only those analytes which were consistently measured and which were consistently above detection limits.

[3]The absolute correlations for each of the four vessels, SRAT Receipt, SRAT Product, SME, and MFT that are greater than 85% are represented by the letters r, p, s, and m, respectively. A capital letter indicates a positive correlation, a small letter a negative.

3.4 Comparisons Between the Variabilities of These Data and Those Used in PCCS

Table 8 in the Appendix provides an opportunity for comparisons between the SME variabilities demonstrated in batches 22 through 30 and those currently being used in PCCS [2]. The current version of PCCS computes the variance for each constraint two ways, both using the historical relative standard deviations (RSD's). These RSD's are multiplied by the historical means of the elemental concentrations to compute one variance, and they are multiplied by the average concentrations of the current samples to compute the other.[4] The larger of the two is used by PCCS to determine the appropriate Measurement Acceptable Region.

In Table 8, the two approaches used in PCCS are applied only to the extent of computing standard deviations for the sample elemental concentrations. These values appear as the last two columns in the table.

How should the columns of this table be compared? The (historical) sample-to-sample standard deviations used in PCCS were based on the prototypic studies which involved samples taken at the same time being analyzed under different instrument calibrations. For the SME, the samples from each batch were usually analyzed under one instrument calibration. Thus, for the SME results, contributions are made to the batch variability from instrument calibrations, and thus are included in the "Batch" columns of Table 8. The "Residual" columns of the table are pooled estimates of variation that includes sampling methodology and equipment and analytical procedures. Thus, it would not be too surprising if the historical standard deviations are somewhat larger than the "Residual" portion of the SME results.

For most of the analytes, the comparison between the SME and PCCS variations show no anomalies. The exceptions, which involve the average concentrations more than anything else, are chromium (the current average is an order of magnitude larger than historical), potassium (the current average is about one third of the historical), and titanium (the current average is an order of magnitude smaller than the historical average). Chromium is a minor component, and the differences for potassium and titanium are due to sludge-only processing (i.e., no PHA).

4.0 CONCLUDING COMMENTS

The measurements derived from samples taken during the processing of batches 19 through 30 at the DWPF affords an opportunity for review and comparisons. This report has looked at some of the statistics from these data.

Only the data reported by the DWPF lab (that is, the data provided by the lab as representative of the samples taken) are available for this analysis. In some cases, the sample results reported may be a subset of the sample results generated by the analytical procedures. A thorough assessment of the DWPF lab's analytical procedures would require the complete set of data. Thus, the statistics reported here, specifically, as they relate to analytical uncertainties, are limited to the reported data for these samples.

A feel for the consistency of the incoming slurry is the estimation of the components of variation for the SRAT receipts. In general, for all of the vessels, the data from batches after 21 show smaller batch-to-batch variation than the data from all the batches. The relative contributions of batch-to-batch versus residual, which includes analytical, are presented in these analyses.

A comparison of the results for the SME versus those of the MFT, shows a statistically significant difference (at the 5% level) for Total Solids (SME value > MFT value; Mean Difference = 1.7 wt%) and Iron (SME value > MFT value; Mean Difference = 0.42 wt%). A higher Total Solids in the SME versus the MFT is not unexpected since the MFT is not sampled immediately following the transfer from the SME but is sampled somewhat later, potentially, after the MFT pumps have been primed with water.

---

[4] The historical correlations among the analyte measurements are also considered in these variance calculations. They are not considered in this report.

In addition, the SME values for Aluminum and Copper were statistically different from (i.e., larger than) the MFT values at the 10% significance level. These differences should be tracked over the next several batches to see if these trends continue.

5.0 QUALITY ASSURANCE

The statistical analyses completed as part of this study were conducted using JMP®, a statistical software package from SAS Institute [1]. This system is a commercial application software package, and its use in support of these analyses necessitates no special quality assurance justification.

A listing of all data considered in the analyses is provided as well as the results of all of the statistical routines utilized. This allows for complete reproducibility of all results reported herein. No other steps, beyond these, are deemed necessary to comply with the applicable, quality assurance requirements as prescribed in [3] and [4].

REFERENCES

[1] SAS Institute, **JMP®: Statistics and Graphics Guide**, Version 3.0, SAS Institute, Inc., Cary, NC, 1994.

[2] Brown, K. G. and R. L. Postles, "SME Acceptability Determination For DWPF Process Control (U)," WSRC-TR-95-0364, Rev. 3, February 21, 1996.

[3] **Conduct of Engineering and Technical Support Procedure Manual**, E7, "Engineering Calculations (U)," Procedure 2.31, Rev. 0, September 230, 1993.

[4] **Savannah River Technology Center Procedures Manual**, L1, "Software Management and Quality Assurance (U)," Procedure 8.20, Rev. 0, August 10, 1994.

APPENDIX

Table 1: DWPF SRAT Receipt Sample Results for Batches 19 Through 30

Tank	Batch	Sample	Total Solids (wt%)	Calcined Solids (wt%)	Insoluble Solids (wt%)	Density (g/mL)	Total Hydroxide (eq/L)	Formate (ppm)	Chloride (ppm)	Fluoride (ppm)	Nitrate (ppm)	Nitrite (ppm)	Sulfate (ppm)
SRAT Receipt	19	1	15.82	13.60	11.07	1.069	0.156	3640	163	95.2	9510	6610	519
SRAT Receipt	19	2	14.09	12.12	11.19	1.105	.	3730	158	96.4	10300	6780	521
SRAT Receipt	19	3	15.80	13.43	10.97	1.057	.	3940	133	97.2	9640	6970	521
SRAT Receipt	19	4	16.08	13.68	11.09	1.121	.	3700	125	91.9	9740	6550	477
SRAT Receipt	20	1	14.40	12.39	10.70	1.037	0.037	5240	105	105	13700	6080	621
SRAT Receipt	20	2	14.54	12.42	11.31	1.024	.	5240	108	108	12900	6050	591
SRAT Receipt	20	3	14.72	12.65	11.42	1.054	.	5260	102	102	13600	5970	603
SRAT Receipt	20	4	14.55	12.44	11.25	1.008	.	4920	107	107	12500	5800	604
SRAT Receipt	21	1	15.80	11.47	10.30	1.124	0.173	4220	102	102	12400	7210	735
SRAT Receipt	21	2	15.70	11.27	10.40	1.141	0.180	3640	99.1	99.1	11500	7110	713
SRAT Receipt	21	3	15.60	11.67	10.50	1.139	.	3520	101	101	11400	7850	731
SRAT Receipt	21	4	16.10	11.47	10.40	1.138	.	3830	120	120	10700	7560	721
SRAT Receipt	22	1	15.72	13.48	10.78	1.043	0.182	2900	983	983	15300	7110	983
SRAT Receipt	22	2	15.74	13.35	12.69	1.044	0.188	2800	1000	1000	14700	7070	1000
SRAT Receipt	22	3	15.85	13.54	12.84	1.053	.	3020	1140	1140	16000	7420	1140
SRAT Receipt	22	4	15.70	13.11	12.98	1.050	.	2880	1150	1150	15100	7240	1150
SRAT Receipt	23	1	15.69	13.61	12.41	1.082	0.176	3080	1020	1020	16300	6770	1020
SRAT Receipt	23	2	15.74	13.86	12.29	1.070	0.142	2830	1090	1090	15800	7160	1090
SRAT Receipt	23	3	15.94	13.73	12.36	1.100	.	2790	1080	1080	15700	6790	1080
SRAT Receipt	23	4	15.99	.	12.45	1.075	.	2640	1050	1050	15200	6890	1050
SRAT Receipt	24	1	15.42	13.24	11.31	1.040	0.164	3360	1090	1090	14400	6720	1090
SRAT Receipt	24	2	15.18	13.06	11.26	1.050	.	3120	1060	1060	13600	6910	1060
SRAT Receipt	24	3	15.16	13.23	11.83	1.056	.	3330	1070	1070	14100	6620	1070
SRAT Receipt	24	4	15.20	13.07	11.41	1.057	.	3090	1020	1020	13200	6550	1020
SRAT Receipt	25	1	15.93	13.73	12.31	1.102	0.151	3470	863	863	14500	6640	863
SRAT Receipt	25	2	16.15	13.95	12.25	1.084	0.151	3120	866	866	12900	6500	866
SRAT Receipt	25	3	16.06	14.10	12.33	1.117	0.151	3000	991	991	12500	6550	991
SRAT Receipt	25	4	16.08	14.10	12.30	1.091	0.151	3210	955	955	13800	6610	955
SRAT Receipt	26	1	16.51	13.70	.	1.102	0.171	3730	797	797	15000	7290	845
SRAT Receipt	26	2	16.66	13.56	.	1.123	0.171	3760	940	940	15900	7370	940
SRAT Receipt	26	3	16.44	14.27	.	1.123	0.171	3930	1130	1130	15400	7770	1130
SRAT Receipt	26	4	16.40	13.16	.	1.142	0.171	3830	1140	1140	15200	7240	1140
SRAT Receipt	27	1	15.49	13.58	.	1.093	0.146	3570	1080	1080	12600	7110	1080
SRAT Receipt	27	2	15.51	13.99	.	1.087	0.146	3520	1070	1070	12700	7130	1070
SRAT Receipt	27	3	16.90	13.90	.	1.089	0.146	3470	1090	1090	12500	6890	1090
SRAT Receipt	27	4	15.84	13.24	.	1.104	0.146	3500	1100	1100	12700	6870	1100
SRAT Receipt	28	1	15.93	.	.	1.111	0.193	2770	1120	1120	11000	7460	1120
SRAT Receipt	28	2	15.84	.	.	1.125	0.193	2700	995	995	11000	7290	995
SRAT Receipt	28	3	15.39	.	.	1.126	0.193	2690	994	994	11000	7330	994
SRAT Receipt	28	4	15.80	.	.	1.130	0.193	2840	985	985	11000	7340	985
SRAT Receipt	29	1	14.92	12.33	.	1.023	0.174	3180	1050	1050	11500	6610	1020
SRAT Receipt	29	2	14.93	12.89	.	1.081	0.174	3250	1110	1110	11100	6640	1050
SRAT Receipt	29	3	14.99	13.09	.	1.053	0.174	3250	1020	1020	11100	6640	1050
SRAT Receipt	29	4	14.99	12.54	.	1.051	0.174	3220	1050	1050	11300	6790	1110
SRAT Receipt	30	1	16.15	13.89	.	1.109	0.188	3110	676	676	12900	6780	770
SRAT Receipt	30	2	16.13	13.74	.	1.134	0.188	3240	949	949	13300	6980	892
SRAT Receipt	30	3	16.12	14.02	.	1.088	0.188	3390	1100	1100	13900	7340	949
SRAT Receipt	30	4	16.14	13.70	.	1.124	0.188	3280	892	892	13400	6920	1100

Table 1: DWPF SRAT Receipt Sample Results for Batches 19 Through 30
(Continued)

Tank	Batch	Sample	Aluminum (wt%)	Boron (wt%)	Calcium (wt%)	Chromium (wt%)	Copper (wt%)	Iron (wt%)	Potassium (wt%)	Lithium (wt%)	Magnesium (wt%)
SRAT Receipt	19	1	5.715	0.127	2.398	0.038	0.227	27.149	0.329	.	1.168
SRAT Receipt	19	2	6.006	0.106	2.568	0.037	0.242	28.908	0.277	.	1.217
SRAT Receipt	19	3	5.979	0.159	2.542	0.047	0.239	28.765	0.295	.	1.213
SRAT Receipt	19	4	6.115	0.123	2.677	0.044	0.256	29.469	0.337	.	1.267
SRAT Receipt	20	1	5.991	0.066	2.332	0.115	0.282	24.673	0.086	.	1.126
SRAT Receipt	20	2	5.954	0.073	2.311	0.113	0.281	24.542	0.112	.	1.143
SRAT Receipt	20	3	5.246	0.065	2.071	0.100	0.248	21.835	0.076	.	1.016
SRAT Receipt	20	4	6.275	0.077	2.459	0.115	0.300	26.165	0.094	.	1.218
SRAT Receipt	21	1	6.481	.	2.354	0.154	0.273	25.118	0.030	.	1.279
SRAT Receipt	21	2	6.789	.	2.523	0.158	0.294	26.503	0.041	.	1.343
SRAT Receipt	21	3	6.743	.	2.630	0.161	0.286	26.358	0.029	.	1.353
SRAT Receipt	21	4	6.162	.	2.239	0.149	0.284	24.223	0.025	.	1.193
SRAT Receipt	22	1	6.950	.	2.635	0.174	0.279	26.766	0.052	.	1.345
SRAT Receipt	22	2	6.926	.	2.643	0.173	0.294	26.780	0.147	.	1.328
SRAT Receipt	22	3	6.785	.	2.573	0.172	0.282	26.195	0.102	.	1.319
SRAT Receipt	22	4	6.852	.	2.606	0.174	0.275	26.319	0.061	.	1.326
SRAT Receipt	23	1	6.983	.	2.684	0.171	0.290	27.634	0.043	.	1.282
SRAT Receipt	23	2	6.724	.	2.559	0.178	0.278	26.780	0.034	.	1.260
SRAT Receipt	23	3	6.906	.	2.624	0.180	0.284	26.973	0.018	.	1.275
SRAT Receipt	23	4	6.815	.	2.599	0.185	0.285	27.324	0.044	.	1.290
SRAT Receipt	24	1	6.921	.	2.505	0.171	0.286	26.193	0.032	.	1.360
SRAT Receipt	24	2	7.082	.	2.552	0.173	0.293	27.184	0.038	.	1.350
SRAT Receipt	24	3	7.090	.	2.633	0.184	0.296	26.934	0.034	.	1.370
SRAT Receipt	24	4	6.966	.	2.580	0.178	0.287	26.446	0.033	.	1.390
SRAT Receipt	25	1	6.661	.	2.454	0.184	0.273	25.445	0.076	.	1.250
SRAT Receipt	25	2	6.825	.	2.610	0.175	0.279	25.779	0.055	.	1.275
SRAT Receipt	25	3	6.871	.	2.647	0.181	0.293	26.250	0.060	.	1.294
SRAT Receipt	25	4	6.831	.	2.635	0.173	0.280	25.547	0.058	.	1.262
SRAT Receipt	26	1	6.733	.	2.435	0.174	0.259	25.054	0.036	.	1.309
SRAT Receipt	26	2	6.449	.	2.380	0.168	0.248	24.042	0.044	.	1.259
SRAT Receipt	26	3	6.509	.	2.193	0.177	0.255	24.738	0.044	.	1.241
SRAT Receipt	26	4	6.387	.	2.250	0.175	0.249	24.218	0.038	.	1.217
SRAT Receipt	27	1	6.726	.	2.497	0.161	0.293	25.928	0.025	.	1.292
SRAT Receipt	27	2	6.766	.	2.556	0.162	0.290	25.810	0.023	.	1.314
SRAT Receipt	27	3	6.853	.	2.597	0.178	0.296	26.361	0.015	.	1.325
SRAT Receipt	27	4	6.792	.	2.548	0.169	0.289	25.725	0.015	.	1.323
SRAT Receipt	28	1	6.775	.	2.525	0.169	0.228	26.115	0.015	.	1.288
SRAT Receipt	28	2	7.078	.	2.683	0.196	0.239	27.163	0.012	.	1.322
SRAT Receipt	28	3	6.879	.	2.616	0.179	0.231	26.497	0.012	.	1.321
SRAT Receipt	28	4	6.984	.	2.665	0.176	0.238	27.070	0.011	.	1.357
SRAT Receipt	29	1	6.374	.	2.258	0.162	0.235	24.322	0.036	.	1.141
SRAT Receipt	29	2	6.236	.	2.273	0.175	0.241	24.675	0.036	.	1.039
SRAT Receipt	29	3	6.405	.	2.292	0.166	0.234	24.214	0.041	.	1.185
SRAT Receipt	29	4	6.582	.	2.370	0.174	0.242	25.002	0.037	.	1.206
SRAT Receipt	30	1	6.564	.	2.335	0.168	0.273	24.749	0.036	.	1.239
SRAT Receipt	30	2	6.272	.	2.304	0.163	0.259	23.516	0.045	.	1.180
SRAT Receipt	30	3	6.607	.	2.406	0.171	0.278	24.895	0.038	.	1.235
SRAT Receipt	30	4	6.733	.	2.479	0.172	0.301	25.701	0.030	.	1.315

Table 1: DWPF SRAT Receipt Sample Results for Batches 19 Through 30
(Continued)

Tank	Batch	Sample	Manganese (wt%)	Sodium (wt%)	Nickel (wt%)	Silicon (wt%)	Titanium (wt%)	Uranium (wt%)	Zirconium (wt%)	TIC (ppm)
SRAT Receipt	19	1	3.016	7.607	0.272	0.992	0.054	0.347	0.095	1130
SRAT Receipt	19	2	3.202	6.840	0.290	0.931	0.057	0.376	0.102	.
SRAT Receipt	19	3	3.165	7.130	0.289	1.055	0.060	0.374	0.101	.
SRAT Receipt	19	4	3.262	8.262	0.299	1.081	0.059	0.387	0.111	.
SRAT Receipt	20	1	2.647	5.966	0.258	0.578	0.030	1.742	0.042	797
SRAT Receipt	20	2	2.647	7.435	0.260	0.760	0.029	1.749	0.038	.
SRAT Receipt	20	3	2.344	5.020	0.231	0.548	0.025	1.550	0.035	.
SRAT Receipt	20	4	2.806	6.451	0.276	0.682	0.030	1.849	0.040	.
SRAT Receipt	21	1	2.666	5.847	0.283	0.848	0.029	2.494	0.024	1810
SRAT Receipt	21	2	2.829	5.379	0.306	1.132	0.031	2.628	0.023	.
SRAT Receipt	21	3	2.805	5.765	0.300	1.020	0.022	2.636	0.025	.
SRAT Receipt	21	4	2.568	5.693	0.284	0.985	0.020	2.318	0.024	.
SRAT Receipt	22	1	2.832	5.708	0.311	1.790	0.018	2.858	0.020	1020
SRAT Receipt	22	2	2.846	5.259	0.339	1.882	0.033	2.818	0.022	.
SRAT Receipt	22	3	2.776	6.038	0.320	1.801	0.026	2.779	0.024	.
SRAT Receipt	22	4	2.784	5.569	0.301	1.748	0.018	2.830	0.020	.
SRAT Receipt	23	1	2.863	5.081	0.288	0.744	0.014	2.984	0.021	896
SRAT Receipt	23	2	2.773	5.745	0.287	0.713	0.014	2.872	0.027	.
SRAT Receipt	23	3	2.788	5.327	0.285	0.753	0.013	2.912	0.027	.
SRAT Receipt	23	4	2.824	6.977	0.289	0.781	0.014	2.936	0.022	.
SRAT Receipt	24	1	2.797	5.961	0.293	0.719	0.013	2.906	0.099	586
SRAT Receipt	24	2	2.882	6.249	0.305	0.808	0.013	2.996	0.088	.
SRAT Receipt	24	3	2.866	5.970	0.314	0.918	0.013	2.974	0.085	.
SRAT Receipt	24	4	2.811	6.257	0.307	0.980	0.013	2.915	0.153	.
SRAT Receipt	25	1	2.668	7.216	0.288	0.795	0.015	2.844	0.040	1010
SRAT Receipt	25	2	2.733	6.568	0.292	0.875	0.023	2.896	0.035	1010
SRAT Receipt	25	3	2.776	5.917	0.300	0.726	0.017	2.953	0.035	1010
SRAT Receipt	25	4	2.737	6.159	0.293	0.680	0.014	2.906	0.021	1010
SRAT Receipt	26	1	2.656	7.917	0.280	0.879	0.014	2.791	0.015	876
SRAT Receipt	26	2	2.546	7.763	0.266	0.871	0.021	2.667	0.014	876
SRAT Receipt	26	3	2.600	8.230	0.281	0.778	0.015	2.752	0.013	876
SRAT Receipt	26	4	2.550	8.101	0.275	0.786	0.015	2.687	0.014	876
SRAT Receipt	27	1	2.753	6.112	0.295	0.760	0.013	2.800	0.019	715
SRAT Receipt	27	2	2.737	6.366	0.292	0.696	0.012	2.804	0.016	.
SRAT Receipt	27	3	2.794	5.618	0.297	0.674	0.012	2.855	0.015	.
SRAT Receipt	27	4	2.733	5.974	0.290	0.512	0.012	2.816	0.016	.
SRAT Receipt	28	1	2.762	6.020	0.298	0.693	0.014	2.880	0.023	903
SRAT Receipt	28	2	2.847	6.143	0.309	0.924	0.017	2.957	0.018	.
SRAT Receipt	28	3	2.797	5.652	0.301	0.637	0.015	2.924	0.015	.
SRAT Receipt	28	4	2.855	5.767	0.307	0.775	0.018	2.986	0.017	.
SRAT Receipt	29	1	2.583	7.350	0.272	0.649	0.013	2.716	0.013	727
SRAT Receipt	29	2	2.607	7.385	0.284	0.638	0.014	2.791	0.013	727
SRAT Receipt	29	3	2.562	7.303	0.283	0.696	0.013	2.704	0.013	727
SRAT Receipt	29	4	2.636	7.549	0.291	0.618	0.014	2.780	0.014	727
SRAT Receipt	30	1	2.613	8.218	0.276	0.758	0.039	2.735	0.016	640
SRAT Receipt	30	2	2.484	9.480	0.263	0.839	0.028	2.595	0.014	640
SRAT Receipt	30	3	2.618	7.957	0.280	1.114	0.023	2.696	0.014	640
SRAT Receipt	30	4	2.695	5.919	0.290	2.513	0.067	2.780	0.018	640

Table 2: DWPF SRAT Product Sample Results for Batches 19 Through 30

Tank	Batch	Sample	Total Solids (wt%)	Calcined Solids (wt%)	Insoluble Solids (wt%)	Density (g/mL)	Formate (ppm)	Chloride (ppm)	Fluoride (ppm)	Nitrate (ppm)	Nitrite (ppm)	Phosphate (ppm)	Sulfate (ppm)
SRAT Prod	19	1	23.71	19.28	15.33	1.195	27700	115	96.1	40500	687	96.1	379
SRAT Prod	19	2	23.72	19.22	14.10	1.165	27800	114	99.3	44100	697	99.3	367
SRAT Prod	19	3	23.72	19.09	14.84	1.175	26300	117	95	41400	717	95	366
SRAT Prod	19	4	22.92	21.51	15.19	1.167	27900	118	115	36700	704	115	409
SRAT Prod	20	1	18.90	13.61	.	1.152	15800	82.8	82.8	34600	82.8	82.8	658
SRAT Prod	20	2	18.35	12.63	.	1.152	16200	105	105	34900	105	105	658
SRAT Prod	20	3	21.59	16.55	.	1.143	16400	101	101	33900	101	101	657
SRAT Prod	20	4	24.75	19.19	.	1.149	19200	126	126	31400	126	126	735
SRAT Prod	21	1	22.68	18.02	11.84	1.157	16000	1090	1090	61900	1090	1320	1630
SRAT Prod	21	2	22.61	17.02	12.63	1.166	14400	1110	1110	55300	1110	1090	1730
SRAT Prod	21	3	22.57	17.36	12.63	1.184	14300	1090	1090	62100	1090	1090	1210
SRAT Prod	21	4	22.65	17.43	12.74	1.157	14500	1200	1200	57200	1200	1200	1110
SRAT Prod	21	5	.	.	.	.	15800	8700	8700	54300	8700	8700	8700
SRAT Prod	22	1	23.55	19.00	15.50	1.124	13200	1060	1060	54700	1060	1060	1060
SRAT Prod	22	2	23.64	19.26	14.96	1.147	12800	1070	1070	53400	1070	1070	1070
SRAT Prod	22	3	23.50	18.94	16.19	1.172	12900	1080	1080	55800	1080	1080	1080
SRAT Prod	22	4	23.49	19.18	15.01	1.168	12900	1050	1050	53400	1050	1050	1050
SRAT Prod	23	1	23.31	18.82	16.75	1.171	14600	946	946	46900	946	946	946
SRAT Prod	23	2	23.33	18.69	21.41	1.153	13900	1020	1020	50600	1020	1020	1020
SRAT Prod	23	3	24.04	19.77	17.22	1.206	16100	1180	1180	45700	1180	1180	1180
SRAT Prod	23	4	23.50	19.02	17.27	1.181	14200	1290	1290	46900	1290	1290	1290
SRAT Prod	24	1	22.69	18.15	14.53	1.150	14000	1020	1020	38000	1020	1020	1020
SRAT Prod	24	2	22.59	18.62	14.78	1.169	13800	1020	1020	38600	1020	1020	1020
SRAT Prod	24	3	22.74	18.69	14.77	1.166	14200	1110	1110	37700	1110	1110	1110
SRAT Prod	24	4	22.69	18.56	15.19	1.160	13900	1050	1050	37600	1050	1050	1050
SRAT Prod	25	1	25.13	20.97	15.58	1.148	14600	979	979	42500	979	.	1220
SRAT Prod	25	2	22.69	18.84	14.97	1.153	14200	1090	1090	41500	1090	.	1180
SRAT Prod	25	3	22.63	18.53	14.79	1.172	13900	1060	1060	46500	1060	.	1190
SRAT Prod	25	4	22.69	18.41	14.82	1.164	13400	1060	1060	42600	1060	.	1100
SRAT Prod	26	1	23.45	17.29	14.08	1.156	16700	1110	1110	39100	1110	1110	1110
SRAT Prod	26	2	23.20	18.01	13.94	1.153	16900	1370	1370	39900	1370	1370	1370
SRAT Prod	26	3	21.52	15.04	14.15	1.154	16200	1230	1230	38000	1230	1230	1230
SRAT Prod	26	4	21.50	15.62	14.01	1.132	16700	1480	1480	38800	1480	1480	1480
SRAT Prod	27	1	22.83	18.33	12.67	1.134	17400	1120	1120	40300	1120	1120	1170
SRAT Prod	27	2	18.66	14.95	11.56	1.141	18000	1090	1090	40700	1090	1090	1150
SRAT Prod	27	3	22.78	18.68	12.99	1.180	17400	1070	1070	40000	1070	1070	1160
SRAT Prod	27	4	22.82	18.07	12.53	1.159	17800	1170	1170	39400	1170	1170	1170
SRAT Prod	28	1	20.61	16.78	14.82	1.108	14600	745	745	35300	745	.	894
SRAT Prod	28	2	20.58	16.47	14.06	1.115	14800	873	873	37800	873	.	969
SRAT Prod	28	3	20.59	16.38	14.28	1.123	14600	1060	1060	34600	1060	.	1000
SRAT Prod	28	4	20.67	16.38	14.24	1.113	14600	945	945	33000	945	.	1060
SRAT Prod	29	1	21.59	17.51	14.07	1.118	13800	1040	1040	34700	1040	1040	1040
SRAT Prod	29	2	21.75	17.87	14.08	1.139	14000	972	972	35200	972	972	972
SRAT Prod	29	3	21.61	18.12	14.05	1.128	13700	1090	1090	34500	1090	1090	1090
SRAT Prod	29	4	21.70	17.10	14.06	1.165	13900	1450	1450	33400	1450	1450	1450
SRAT Prod	30	1	22.66	18.40	18.27	1.147	14100	1010	1010	36400	2410	1010	1010
SRAT Prod	30	2	22.71	18.35	17.51	1.142	14500	1270	1270	35900	2460	1270	1270
SRAT Prod	30	3	22.69	18.61	18.32	1.140	14300	1200	1200	35400	2410	1200	1200
SRAT Prod	30	4	22.73	18.48	17.82	1.139	14500	1180	1180	35100	2390	1180	1180

Table 2: DWPF SRAT Product Sample Results for Batches 19 Through 30
(Continued)

Tank	Batch	Sample	Aluminum (wt%)	Boron (wt%)	Calcium (wt%)	Chromium (wt%)	Copper (wt%)	Iron (wt%)	Potassium (wt%)	Lithium (wt%)	Magnesium (wt%)
SRAT Prod	19	1	5.558	0.156	1.806	0.106	0.878	26.269	0.270	.	0.871
SRAT Prod	19	2	5.281	0.104	1.945	0.100	0.838	25.007	0.274	.	0.900
SRAT Prod	19	3	5.655	0.075	1.782	0.117	0.891	26.476	0.249	.	0.857
SRAT Prod	19	4	5.257	0.090	2.035	0.089	0.832	24.848	0.304	.	0.935
SRAT Prod	20	1	5.537	0.059	2.046	0.111	1.039	22.735	0.136	.	0.995
SRAT Prod	20	2	5.545	0.107	2.034	0.111	1.042	22.843	0.129	.	0.997
SRAT Prod	20	3	5.570	0.054	2.001	0.118	1.044	22.932	0.126	.	0.978
SRAT Prod	20	4	5.790	0.103	1.884	0.120	1.086	23.826	0.118	.	0.964
SRAT Prod	21	1	5.534	.	1.786	0.136	0.901	21.393	0.053	.	0.905
SRAT Prod	21	2	5.331	.	1.737	0.137	0.899	21.243	0.049	.	0.837
SRAT Prod	21	3	5.472	.	1.814	0.134	0.880	21.070	0.058	.	0.934
SRAT Prod	21	4	5.439	.	1.789	0.132	0.885	21.086	0.049	.	0.915
SRAT Prod	21	5	.	.	.	.	.	.	.	.	.
SRAT Prod	22	1	6.096	.	1.898	0.156	0.916	22.710	0.036	.	0.918
SRAT Prod	22	2	6.094	.	1.898	0.154	0.919	22.711	0.042	.	0.910
SRAT Prod	22	3	6.125	.	1.886	0.158	0.927	23.324	0.063	.	0.905
SRAT Prod	22	4	6.137	.	1.871	0.155	0.920	23.130	0.043	.	0.937
SRAT Prod	23	1	6.441	.	1.864	0.167	1.004	24.303	0.025	.	0.833
SRAT Prod	23	2	6.286	.	1.943	0.165	0.967	23.624	0.031	.	0.923
SRAT Prod	23	3	6.135	.	1.917	0.162	0.991	24.022	0.031	.	0.831
SRAT Prod	23	4	6.431	.	1.943	0.162	0.997	24.247	0.035	.	0.912
SRAT Prod	24	1	6.379	.	2.009	0.168	0.964	23.753	0.028	.	0.954
SRAT Prod	24	2	6.257	.	2.011	0.169	0.904	23.518	0.026	.	0.992
SRAT Prod	24	3	6.259	.	2.015	0.171	0.940	23.490	0.022	.	0.994
SRAT Prod	24	4	6.213	.	1.983	0.166	0.939	23.417	0.040	.	0.961
SRAT Prod	25	1	6.397	.	1.803	0.168	0.879	23.521	0.033	.	0.844
SRAT Prod	25	2	6.405	.	1.919	0.164	0.854	23.580	0.032	.	0.939
SRAT Prod	25	3	5.420	.	1.772	0.166	0.811	22.085	0.033	.	0.812
SRAT Prod	25	4	6.048	.	2.058	0.156	0.817	22.932	0.021	.	0.935
SRAT Prod	26	1	.	.	.	.	.	.	.	.	.
SRAT Prod	26	2	.	.	.	.	.	.	.	.	.
SRAT Prod	26	3	.	.	.	.	.	.	.	.	.
SRAT Prod	26	4	.	.	.	.	.	.	.	.	.
SRAT Prod	27	1	.	.	.	.	.	.	.	.	.
SRAT Prod	27	2	.	.	.	.	.	.	.	.	.
SRAT Prod	27	3	.	.	.	.	.	.	.	.	.
SRAT Prod	27	4	.	.	.	.	.	.	.	.	.
SRAT Prod	28	1	.	.	.	.	.	.	.	.	.
SRAT Prod	28	2	.	.	.	.	.	.	.	.	.
SRAT Prod	28	3	.	.	.	.	.	.	.	.	.
SRAT Prod	28	4	.	.	.	.	.	.	.	.	.
SRAT Prod	29	1	5.751	.	1.770	0.170	0.989	23.003	0.063	.	0.709
SRAT Prod	29	2	6.193	.	1.713	0.165	0.952	22.528	0.070	.	0.787
SRAT Prod	29	3	5.866	.	1.821	0.169	0.986	23.078	0.082	.	0.740
SRAT Prod	29	4	5.979	.	1.723	0.175	1.014	23.678	0.059	.	0.631
SRAT Prod	30	1	6.622	.	2.165	0.167	0.880	23.908	0.062	.	1.035
SRAT Prod	30	2	6.604	.	2.168	0.168	0.878	23.843	0.051	.	1.033
SRAT Prod	30	3	6.814	.	2.119	0.167	0.906	24.025	0.044	.	0.989
SRAT Prod	30	4	6.713	.	2.160	0.169	0.893	24.327	0.049	.	1.024

Table 2: DWPF SRAT Product Sample Results for Batches 19 Through 30
(Continued)

Tank	Batch	Sample	Manganese (wt%)	Sodium (wt%)	Nickel (wt%)	Silicon (wt%)	Titanium (wt%)	Uranium (wt%)	Zirconium (wt%)
SRAT Prod	19	1	2.883	6.210	0.307	0.912	0.058	.	0.103
SRAT Prod	19	2	2.755	6.526	0.249	0.933	0.051	.	0.094
SRAT Prod	19	3	2.890	5.958	0.269	0.976	0.063	.	0.107
SRAT Prod	19	4	2.743	7.046	0.259	0.812	0.052	.	0.096
SRAT Prod	20	1	2.404	7.628	0.247	1.258	0.027	1.615	0.040
SRAT Prod	20	2	2.409	7.574	0.242	1.123	0.027	1.634	0.039
SRAT Prod	20	3	2.404	7.370	0.244	0.995	0.027	1.629	0.038
SRAT Prod	20	4	2.459	7.139	0.254	1.099	0.027	1.697	0.042
SRAT Prod	21	1	2.100	6.700	0.240	0.808	0.043	2.194	0.019
SRAT Prod	21	2	2.070	6.404	0.239	0.764	0.044	2.192	0.019
SRAT Prod	21	3	2.106	6.760	0.234	0.788	0.030	2.130	0.020
SRAT Prod	21	4	2.096	6.688	0.239	0.696	0.026	2.142	0.019
SRAT Prod	21	5	.	.	.	.	.	.	.
SRAT Prod	22	1	2.259	6.741	0.257	1.011	0.014	2.435	0.020
SRAT Prod	22	2	2.247	6.712	0.252	0.933	0.013	2.424	0.020
SRAT Prod	22	3	2.271	6.753	0.247	0.807	0.013	2.492	0.025
SRAT Prod	22	4	2.257	6.640	0.248	0.839	0.013	2.534	0.023
SRAT Prod	23	1	2.527	6.191	0.272	0.828	0.012	2.676	0.079
SRAT Prod	23	2	2.455	6.471	0.263	0.945	0.013	2.567	0.083
SRAT Prod	23	3	2.499	6.421	0.271	0.873	0.013	2.634	0.073
SRAT Prod	23	4	2.524	6.648	0.275	0.825	0.013	2.652	0.086
SRAT Prod	24	1	2.501	6.615	0.270	0.822	0.110	2.591	0.050
SRAT Prod	24	2	2.480	6.430	0.264	1.085	0.110	2.580	0.053
SRAT Prod	24	3	2.468	6.870	0.294	0.874	0.120	2.562	0.056
SRAT Prod	24	4	2.457	6.835	0.267	1.074	0.170	2.548	0.107
SRAT Prod	25	1	2.539	5.983	0.266	0.976	0.012	2.755	0.022
SRAT Prod	25	2	2.512	6.493	0.265	1.037	0.011	2.667	0.027
SRAT Prod	25	3	2.360	6.592	0.246	0.992	0.011	2.520	0.022
SRAT Prod	25	4	2.417	6.958	0.251	0.858	0.012	2.537	0.019
SRAT Prod	26	1	.	.	.	.	.	.	.
SRAT Prod	26	2	.	.	.	.	.	.	.
SRAT Prod	26	3	.	.	.	.	.	.	.
SRAT Prod	26	4	.	.	.	.	.	.	.
SRAT Prod	27	1	.	.	.	.	.	.	.
SRAT Prod	27	2	.	.	.	.	.	.	.
SRAT Prod	27	3	.	.	.	.	.	.	.
SRAT Prod	27	4	.	.	.	.	.	.	.
SRAT Prod	28	1	.	.	.	.	.	.	.
SRAT Prod	28	2	.	.	.	.	.	.	.
SRAT Prod	28	3	.	.	.	.	.	.	.
SRAT Prod	28	4	.	.	.	.	.	.	.
SRAT Prod	29	1	2.452	5.445	0.266	0.625	0.018	2.709	0.015
SRAT Prod	29	2	2.388	4.839	0.268	0.656	0.016	2.606	0.015
SRAT Prod	29	3	2.452	5.836	0.265	0.708	0.016	2.713	0.015
SRAT Prod	29	4	2.510	5.295	0.280	0.675	0.015	2.726	0.015
SRAT Prod	30	1	2.615	7.091	0.273	0.769	0.012	2.785	0.014
SRAT Prod	30	2	2.609	7.177	0.274	0.800	0.012	2.769	0.014
SRAT Prod	30	3	2.666	6.353	0.281	0.735	0.012	2.856	0.014
SRAT Prod	30	4	2.650	6.843	0.277	0.777	0.012	2.819	0.014

Table 3: DWPF SME Sample Results for Batches 19 Through 30

Tank	Batch	Sample	Total Solids (wt%)	Calcined Solids (wt%)	Insoluble Solids (wt%)	Density (g/mL)	Formate (ppm)	Chloride (ppm)	Fluoride (ppm)	Nitrate (ppm)	Nitrite (ppm)	Phosphate (ppm)	Sulfate (ppm)
SME	19	1	55.48	50.39	.	1.367	36700	267	106	22900	106	106	851
SME	19	2	49.70	47.35	.	1.341	37100	269	103	22300	103	103	868
SME	19	3	49.98	43.04	.	1.396	38300	268	104	20800	104	104	766
SME	19	4	52.89	47.04	.	1.397	33300	241	108	21700	108	108	703
SME	19	5	.	.	.	.	.	.	.	.	.	.	.
SME	19	6	.	.	.	.	.	.	.	.	.	.	.
SME	20	1	48.86	43.26	38.08	1.389	30500	838	838	27000	838	2360	1950
SME	20	2	47.83	42.33	35.70	1.396	31600	971	971	28600	971	964	1250
SME	20	3	47.45	41.75	36.91	1.405	30400	1120	1120	26300	1120	1120	971
SME	20	4	47.32	41.69	36.51	1.417	31000	1190	1190	26300	1190	971	1190
SME	21	1	47.73	42.55	39.55	1.407	33600	592	592	39200	592	592	592
SME	21	2	48.31	42.33	39.69	1.456	36100	808	808	40400	808	808	808
SME	21	3	48.99	43.02	39.35	1.499	37200	948	948	42700	948	948	948
SME	21	4	48.14	42.37	39.54	1.545	38200	1070	1070	42300	1070	1070	1070
SME	22	1	49.16	43.43	43.98	1.436	30200	1120	1120	35000	1120	1120	1120
SME	22	2	48.65	42.60	43.94	1.456	30900	1030	1030	36200	1030	1030	1030
SME	22	3	48.24	42.95	43.94	1.453	30000	1060	1060	35100	1060	1060	1060
SME	22	4	47.81	42.93	43.88	1.447	30800	1170	1170	35600	1170	1170	1170
SME	23	1	52.13	46.21	44.95	1.579	33300	1010	1010	24700	1010	1010	1010
SME	23	2	52.00	46.42	43.72	1.529	30400	969	969	24200	969	969	969
SME	23	3	52.17	46.17	43.73	1.512	35900	1130	1130	27000	1130	1130	1130
SME	23	4	52.34	46.41	43.48	1.517	33400	1240	1240	26800	1240	1240	1240
SME	23	5	.	.	.	.	.	.	.	.	.	.	.
SME	24	1	49.37	41.75	38.75	1.455	29800	102	102	26500	102	102	102
SME	24	2	49.42	42.14	39.03	1.428	32100	1070	1070	27000	1070	1070	1070
SME	24	3	48.51	42.03	39.39	1.426	30000	1080	1080	26600	1080	1080	1080
SME	24	4	49.68	42.96	39.40	1.447	29900	966	966	23600	966	966	966
SME	25	1	48.23	42.95	39.72	1.403	30800	975	975	28600	975	975	975
SME	25	2	48.31	42.78	39.67	1.396	33600	1070	1070	26200	1070	1070	1070
SME	25	3	46.82	41.14	39.92	1.401	32500	1160	1160	26200	1160	1160	1160
SME	25	4	50.54	41.06	39.95	1.407	32400	1140	1140	24100	1140	1140	1140
SME	26	1	50.59	44.81	43.09	1.450	35100	1110	1110	27100	1110	1110	1110
SME	26	2	51.12	45.52	42.98	1.428	33700	1050	1050	27000	1050	1050	1050
SME	26	3	51.19	44.17	42.80	1.451	33200	956	956	26100	956	956	956
SME	26	4	50.07	44.38	42.94	1.430	30600	1080	1080	24200	1080	1080	1080
SME	27	1	53.09	47.68	44.97	1.505	35700	1240	1240	28900	1240	1240	1240
SME	27	2	51.95	46.34	44.95	1.521	37200	1270	1270	26000	1270	1270	1270
SME	27	3	53.11	47.52	41.85	1.505	38200	1250	1250	26500	1250	1250	1250
SME	27	4	53.62	48.59	45.30	1.545	38500	1180	1180	26100	1180	1180	1180
SME	28	1	49.56	43.68	41.07	1.430	28800	894	894	30900	894	894	894
SME	28	2	50.26	43.91	41.05	1.421	37800	1060	1060	34700	1060	1060	1060
SME	28	3	49.54	43.61	40.04	1.419	38700	1080	1080	29400	1080	1080	1080
SME	28	4	50.67	44.54	40.05	1.418	34500	954	954	27000	954	954	954
SME	29	1	45.88	40.48	39.72	1.427	22200	1100	1100	22600	1100	1100	1100
SME	29	2	48.33	43.02	39.59	1.412	29800	1180	1180	19800	1180	1180	1180
SME	29	3	48.01	43.39	39.61	1.441	28600	1130	1130	18500	1130	1130	1130
SME	29	4	46.40	41.10	39.52	1.398	26200	1130	1130	19300	1130	1130	1130

Table 3: DWPF SME Sample Results for Batches 19 Through 30
(Continued)

Tank	Batch	Sample	Aluminum (wt%)	Boron (wt%)	Calcium (wt%)	Chromium (wt%)	Copper (wt%)	Iron (wt%)	Potassium (wt%)	Lithium (wt%)	Magnesium (wt%)
SME	19	1	1.932	2.882	0.760	0.075	0.316	8.636	0.449	1.691	1.115
SME	19	2	2.192	2.653	0.915	0.092	0.323	8.957	0.482	1.660	1.228
SME	19	3	2.246	2.767	0.900	0.088	0.329	8.955	0.462	1.777	1.299
SME	19	4	2.038	2.816	0.852	0.084	0.304	8.455	0.453	1.722	1.223
SME	19	5	2.106	2.879	0.884	0.076	0.317	8.580	0.488	1.742	1.246
SME	19	6	2.022	2.474	0.819	0.075	0.301	8.216	0.462	1.708	1.209
SME	20	1	2.264	2.771	0.732	0.057	0.378	8.936	0.139	1.759	1.219
SME	20	2	2.227	2.874	0.763	0.055	0.390	8.585	0.158	1.801	1.237
SME	20	3	2.154	2.823	0.744	0.058	0.356	8.544	0.124	1.797	1.296
SME	20	4	2.242	2.697	0.808	0.051	0.371	8.912	0.172	1.783	1.318
SME	21	1	2.131	2.838	0.704	0.086	0.314	7.841	0.131	1.753	1.229
SME	21	2	2.333	2.835	0.856	0.064	0.354	8.574	0.095	1.713	1.307
SME	21	3	2.357	2.701	0.861	0.072	0.355	8.713	0.097	1.833	1.376
SME	21	4	2.297	2.619	0.836	0.068	0.353	8.545	0.076	1.692	1.274
SME	22	1	2.204	2.872	0.775	0.057	0.322	7.742	0.128	1.788	1.330
SME	22	2	2.274	2.904	0.754	0.052	0.331	8.008	0.093	1.750	1.303
SME	22	3	2.326	2.861	0.831	0.060	0.342	8.251	0.081	1.711	1.332
SME	22	4	2.176	2.847	0.741	0.074	0.326	7.821	0.070	1.771	1.286
SME	23	1	2.316	2.732	0.765	0.076	0.299	8.229	0.118	1.828	1.229
SME	23	2	2.440	2.911	0.844	0.129	0.315	8.883	0.115	1.834	1.249
SME	23	3	2.311	2.924	0.836	0.077	0.298	8.325	0.114	1.763	1.217
SME	23	4	2.384	2.802	0.720	0.100	0.299	8.761	0.067	1.803	1.206
SME	23	5	2.313	2.894	0.800	0.081	0.301	8.469	0.055	1.761	1.202
SME	24	1	2.357	2.763	0.737	0.083	0.310	8.345	0.092	1.856	1.251
SME	24	2	2.369	2.810	0.739	0.083	0.313	8.488	0.092	1.799	1.214
SME	24	3	2.296	2.821	0.754	0.081	0.331	8.440	0.106	1.733	1.197
SME	24	4	2.439	2.779	0.824	0.101	0.331	8.633	0.086	1.775	1.255
SME	25	1	2.818	2.944	1.046	0.084	0.376	10.081	0.031	1.840	1.440
SME	25	2	2.638	2.849	1.011	0.113	0.353	9.394	0.051	1.744	1.369
SME	25	3	2.560	2.702	0.970	0.073	0.342	9.131	0.069	1.729	1.346
SME	25	4	2.571	2.656	0.968	0.104	0.337	9.163	0.065	1.883	1.429
SME	26	1	2.405	2.589	0.905	0.073	0.357	8.555	0.062	1.793	1.322
SME	26	2	2.496	2.773	0.890	0.059	0.360	8.755	0.092	1.740	1.308
SME	26	3	2.423	2.848	0.886	0.067	0.331	8.542	0.066	1.797	1.312
SME	26	4	2.454	2.692	0.947	0.082	0.376	8.763	0.109	1.843	1.394
SME	27	1	2.202	2.415	0.767	0.057	0.318	7.869	0.025	1.746	1.277
SME	27	2	2.241	2.740	0.795	0.062	0.324	8.105	0.159	1.778	1.291
SME	27	3	1.980	2.775	0.780	0.047	0.330	7.619	0.031	1.782	1.211
SME	27	4	2.102	2.581	0.764	0.049	0.311	7.804	0.045	1.836	1.241
SME	28	1	2.590	2.582	0.865	0.075	0.364	9.202	0.023	1.782	1.378
SME	28	2	2.458	2.666	0.654	0.070	0.323	8.323	0.031	1.726	1.206
SME	28	3	2.358	2.529	0.774	0.067	0.352	8.860	0.051	1.714	1.226
SME	28	4	2.497	2.692	0.814	0.067	0.328	8.723	0.024	1.722	1.314
SME	29	1	2.291	2.379	0.730	0.082	0.333	8.193	0.033	1.688	1.222
SME	29	2	2.102	2.073	0.817	0.068	0.319	7.738	0.039	1.530	1.174
SME	29	3	2.147	2.579	0.812	0.067	0.332	7.699	0.036	1.737	1.304
SME	29	4	2.344	2.710	0.757	0.084	0.341	8.493	0.026	1.614	1.178

Table 3: DWPF SME Sample Results for Batches 19 Through 30
(Continued)

Tank	Batch	Sample	Manganese (wt%)	Sodium (wt%)	Nickel (wt%)	Silicon (wt%)	Titanium (wt%)	Uranium (wt%)	Zirconium (wt%)	TIC (ppm)
SME	19	1	1.067	8.017	0.164	23.241	0.052	.	0.115	9050
SME	19	2	1.099	8.653	0.180	22.670	0.065	.	0.112	.
SME	19	3	1.102	9.284	0.182	23.947	0.053	.	0.125	.
SME	19	4	1.033	8.622	0.173	23.369	0.053	.	0.110	.
SME	19	5	1.051	8.694	0.167	23.829	0.055	.	0.109	.
SME	19	6	1.006	8.514	0.160	23.200	0.048	.	0.104	.
SME	20	1	0.942	8.648	0.125	24.074	0.029	0.324	0.055	8540
SME	20	2	0.905	8.842	0.118	24.232	0.028	0.307	0.050	.
SME	20	3	0.944	9.045	0.138	23.938	0.027	0.205	0.051	.
SME	20	4	0.985	9.280	0.117	23.779	0.026	0.168	0.050	.
SME	21	1	0.793	8.639	0.113	24.103	0.021	0.588	0.043	7610
SME	21	2	0.920	8.835	0.104	23.436	0.017	0.781	0.038	.
SME	21	3	0.927	9.237	0.106	25.001	0.019	0.745	0.037	.
SME	21	4	0.908	8.771	0.108	23.054	0.017	0.693	0.170	.
SME	22	1	0.792	8.901	0.093	24.207	0.045	0.888	0.017	12900
SME	22	2	0.794	8.750	0.093	23.733	0.047	0.884	0.018	.
SME	22	3	0.860	8.750	0.102	23.278	0.111	0.920	0.015	.
SME	22	4	0.778	8.692	0.111	24.052	0.034	0.828	0.019	.
SME	23	1	0.744	8.737	0.089	24.815	0.014	1.022	0.038	9450
SME	23	2	0.775	8.970	0.151	25.083	0.016	1.032	0.025	.
SME	23	3	0.738	8.647	0.114	24.169	0.015	0.936	0.050	.
SME	23	4	0.746	8.647	0.127	24.661	0.014	0.953	0.048	.
SME	23	5	0.748	8.676	0.105	24.523	0.015	0.942	0.023	.
SME	24	1	0.732	8.738	0.107	25.740	0.016	1.182	0.010	7900
SME	24	2	0.742	8.436	0.110	24.921	0.016	1.178	0.021	.
SME	24	3	0.792	8.551	0.107	24.053	0.018	1.198	0.010	.
SME	24	4	0.802	8.758	0.125	24.676	0.020	1.190	0.020	.
SME	25	1	1.029	9.803	0.127	25.125	0.018	1.278	0.019	9720
SME	25	2	0.970	9.444	0.130	23.521	0.016	1.234	0.016	.
SME	25	3	0.951	9.281	0.115	23.618	0.017	1.245	0.018	.
SME	25	4	0.937	9.813	0.119	25.293	0.016	1.228	0.020	.
SME	26	1	0.873	9.352	0.102	24.816	0.013	1.113	0.012	8980
SME	26	2	0.865	9.323	0.104	23.654	0.014	1.139	0.012	.
SME	26	3	0.861	9.219	0.111	24.211	0.014	1.144	0.011	.
SME	26	4	0.908	9.736	0.111	25.671	0.015	1.239	0.013	.
SME	27	1	0.781	8.768	0.096	23.834	0.010	0.868	0.008	9370
SME	27	2	0.789	9.085	0.101	24.833	0.010	0.919	0.006	.
SME	27	3	0.805	9.025	0.101	24.428	0.010	0.913	0.006	.
SME	27	4	0.787	8.728	0.092	24.323	0.011	0.950	0.005	.
SME	28	1	0.942	9.393	0.108	23.951	0.013	1.104	0.001	.
SME	28	2	0.813	9.086	0.102	24.333	0.019	0.991	0.008	.
SME	28	3	0.919	9.097	0.106	23.740	0.017	1.115	0.009	.
SME	28	4	0.876	9.172	0.103	23.658	0.029	1.084	0.008	.
SME	29	1	0.794	8.722	0.089	23.214	0.010	0.926	0.006	8180
SME	29	2	0.843	8.409	0.098	21.043	0.010	0.879	0.006	.
SME	29	3	0.812	9.015	0.091	24.109	0.010	0.834	0.006	.
SME	29	4	0.824	8.544	0.101	22.296	0.011	0.882	0.009	.

Table 4: DWPF MFT Sample Results for Batches 19 Through 30

Tank	Batch	Sample	Total Solids (wt%)	Calcined Solids (wt%)	Insoluble Solids (wt%)	Density (g/mL)	Total Hydroxide (eq/L)	Formate (ppm)	Chloride (ppm)	Fluoride (ppm)	Nitrate (ppm)	Sulfate (ppm)
MFT	19	1	48.00	43.00	39.00	1.389	.	21800	395	96.7	22900	588
MFT	19	2	.	.	.	.	.	22500	393	100	22700	566
MFT	19	3	.	.	.	.	.	.	.	.	.	.
MFT	19	4	.	.	.	.	.	.	.	.	.	.
MFT	20	1	49.33	43.73	39.06	1.433	.	28700	1090	1090	24480	1770
MFT	20	2	47.61	41.63	40.04	.	.	28100	1140	1140	24170	1410
MFT	20	3	48.42	43.00	40.36	.	.	.	.	.	.	.
MFT	20	4	47.63	42.22	40.57	.	.	.	.	.	.	.
MFT	21	1	42.53	44.00	43.00	1.456	.	28900	946	946	34500	946
MFT	21	2	43.09	.	.	.	.	27100	987	987	30100	987
MFT	21	3	42.80	.	.	.	.	.	.	.	.	.
MFT	21	4	43.03	.	.	.	.	.	.	.	.	.
MFT	22	1	51.00	45.00	41.97	1.467	.	29900	1080	1080	26300	1080
MFT	22	2	.	.	40.94	.	.	28100	1010	1010	24700	1010
MFT	22	3	.	.	41.97	.	.	.	.	.	.	.
MFT	22	4	.	.	41.57	.	.	.	.	.	.	.
MFT	22	5	.	.	.	.	.	.	.	.	.	.
MFT	22	6	.	.	.	.	.	.	.	.	.	.
MFT	23	1	50.00	45.00	41.22	1.460	.	32500	1130	1130	26500	1130
MFT	23	2	.	.	40.09	.	.	30600	1120	1120	25900	1120
MFT	23	3	.	.	40.01	.	.	.	.	.	.	.
MFT	23	4	.	.	40.69	.	.	.	.	.	.	.
MFT	24	1	48.00	42.00	39.47	1.457	.	35800	1070	1070	35400	1070
MFT	24	2	.	.	38.82	.	.	34600	1080	1080	32300	1080
MFT	24	3	.	.	39.46	.	.	.	.	.	.	.
MFT	24	4	.	.	40.04	.	.	.	.	.	.	.
MFT	25	1	45.00	39.00	37.62	1.337	.	31200	1040	1040	22900	1040
MFT	25	2	.	.	35.38	.	.	30400	1170	1170	23000	1170
MFT	25	3	.	.	36.28	.	.	.	.	.	.	.
MFT	25	4	.	.	36.46	.	.	.	.	.	.	.
MFT	26	1	51.00	44.00	43.01	1.413	.	37100	1110	1110	26800	1110
MFT	26	2	.	.	42.96	.	.	33700	1100	1100	24300	1100
MFT	26	3	.	.	7.01	.	.	.	.	.	.	.
MFT	26	4	.	.	43.63	.	.	.	.	.	.	.
MFT	27	1	51.00	47.00	44.47	1.443	.	31600	961	961	22400	961
MFT	27	2	.	.	43.70	.	.	31600	974	974	25000	974
MFT	27	3	.	.	44.79	.	.	32500	1070	1070	20200	1070
MFT	27	4	.	.	44.64	.	.	32000	1030	1030	23700	1030
MFT	28	1	47.00	41.00	38.70	1.435	.	31200	1100	1100	27000	1100
MFT	28	2	.	.	38.61	.	.	31000	1030	1030	24900	1030
MFT	28	3	.	.	38.68	.	.	.	.	.	.	.
MFT	28	4	.	.	38.66	.	.	.	.	.	.	.
MFT	28	5	.	.	.	.	.	.	.	.	.	.
MFT	28	6	.	.	.	.	.	.	.	.	.	.

Table 4: DWPF MFT Sample Results for Batches 19 Through 30
(Continued)

Tank	Batch	Sample	Aluminum (wt%)	Boron (wt%)	Calcium (wt%)	Chromium (wt%)	Copper (wt%)	Iron (wt%)	Potassium (wt%)	Lithium (wt%)	Magnesium (wt%)
MFT	19	1	2.121	2.772	0.787	0.074	0.285	7.875	0.817	1.779	1.288
MFT	19	2	2.112	2.381	0.776	0.068	0.281	7.795	0.768	1.775	1.229
MFT	19	3	2.147	2.732	0.746	0.078	0.312	7.909	0.712	1.777	1.193
MFT	19	4	2.078	2.707	0.752	0.072	0.281	7.698	0.744	1.861	1.272
MFT	20	1	2.013	2.784	0.575	0.065	0.287	7.854	0.267	1.856	1.204
MFT	20	2	1.855	3.010	0.521	0.053	0.266	7.044	0.251	1.815	1.160
MFT	20	3	2.071	2.891	0.682	0.058	0.317	7.973	0.286	1.752	1.180
MFT	20	4	1.780	2.775	0.504	0.055	0.256	6.776	0.249	1.720	1.100
MFT	21	1	2.318	2.661	0.933	0.090	0.365	8.639	0.208	1.701	1.287
MFT	21	2	2.271	2.668	0.924	0.067	0.354	8.475	0.172	1.671	1.254
MFT	21	3	2.261	2.476	0.824	0.092	0.330	8.349	0.163	1.690	1.230
MFT	21	4	2.243	2.669	0.864	0.081	0.336	8.357	0.195	1.725	1.255
MFT	22	1	2.201	2.824	0.803	0.043	0.325	7.952	0.194	1.780	1.250
MFT	22	2	2.224	2.730	0.730	0.043	0.300	8.074	0.135	1.810	1.236
MFT	22	3	2.351	3.007	0.921	0.040	0.365	8.651	0.132	1.773	1.312
MFT	22	4	2.061	2.830	0.794	0.047	0.327	7.804	0.109	1.784	1.215
MFT	22	5	2.255	2.618	0.856	0.053	0.337	8.201	0.141	1.792	1.266
MFT	22	6	1.927	2.708	0.651	0.049	0.268	7.019	0.114	1.902	1.220
MFT	23	1	2.277	2.656	0.852	0.094	0.326	8.246	0.164	1.752	1.276
MFT	23	2	2.234	2.656	0.823	0.083	0.320	8.014	0.143	1.712	1.249
MFT	23	3	2.269	2.778	0.846	0.085	0.327	8.116	0.153	1.735	1.251
MFT	23	4	2.231	2.783	0.823	0.070	0.320	8.056	0.135	1.719	1.261
MFT	24	1	2.243	2.852	0.735	0.074	0.285	8.022	0.100	1.716	1.198
MFT	24	2	2.225	2.656	0.766	0.060	0.304	8.076	0.119	1.728	1.233
MFT	24	3	2.408	2.569	0.789	0.076	0.327	8.651	0.051	1.670	1.192
MFT	24	4	1.922	2.740	0.584	0.072	0.256	6.785	0.078	1.822	1.178
MFT	25	1	2.402	2.488	0.831	0.072	0.320	8.499	-0.017	1.708	1.252
MFT	25	2	2.248	2.410	0.621	0.102	0.278	8.012	0.080	1.823	1.214
MFT	25	3	2.762	2.174	1.015	0.088	0.384	9.854	-0.010	1.725	1.351
MFT	25	4	2.469	2.766	0.882	0.064	0.328	8.705	-0.008	1.790	1.286
MFT	26	1	2.469	2.813	0.863	0.104	0.373	8.758	0.109	1.892	1.319
MFT	26	2	2.467	2.728	0.893	0.100	0.357	8.714	0.101	1.983	1.393
MFT	26	3	2.585	2.763	0.952	0.080	0.369	9.010	0.071	1.930	1.364
MFT	26	4	2.348	2.806	0.879	0.067	0.348	8.447	0.122	1.809	1.255
MFT	27	1	2.469	2.896	0.910	0.079	0.353	8.808	0.079	1.829	1.380
MFT	27	2	2.222	2.879	0.748	0.067	0.290	7.818	0.068	1.786	1.263
MFT	27	3	2.298	2.993	0.866	0.083	0.336	8.240	0.113	1.752	1.307
MFT	27	4	2.306	2.902	0.862	0.086	0.326	8.191	0.105	1.751	1.318
MFT	28	1	2.364	2.506	0.771	0.073	0.313	8.246	0.055	1.684	1.228
MFT	28	2	2.230	2.599	0.722	0.063	0.303	7.850	0.081	1.708	1.246
MFT	28	3	2.120	2.712	0.682	0.064	0.298	7.469	0.049	1.683	1.238
MFT	28	4	2.347	2.650	0.795	0.109	0.351	8.602	0.048	1.670	1.257
MFT	28	5	.	2.669	.	.	.	.	.	.	.
MFT	28	6	.	2.628	.	.	.	.	.	.	.

Table 4: DWPF MFT Sample Results for Batches 19 Through 30 (Continued)

Tank	Batch	Sample	Manganese (wt%)	Sodium (wt%)	Nickel (wt%)	Silicon (wt%)	Titanium (wt%)	Uranium (wt%)	Zirconium (wt%)
MFT	19	1	1.107	8.929	0.222	23.600	0.076	0.255	0.216
MFT	19	2	1.101	8.825	0.212	23.506	0.080	0.234	0.210
MFT	19	3	1.062	8.499	0.220	23.925	0.078	0.287	0.212
MFT	19	4	1.073	8.937	0.222	24.979	0.076	0.233	0.212
MFT	20	1	0.762	8.349	0.140	25.720	0.044	0.390	0.096
MFT	20	2	0.689	8.119	0.120	24.844	0.048	0.315	0.078
MFT	20	3	0.913	9.022	0.313	23.782	0.051	0.372	0.088
MFT	20	4	0.660	7.755	0.112	23.718	0.047	0.320	0.076
MFT	21	1	0.960	8.860	0.167	22.772	0.069	0.813	0.049
MFT	21	2	0.928	8.554	0.127	22.375	0.058	0.781	0.061
MFT	21	3	0.843	8.315	0.142	23.043	0.087	0.755	0.050
MFT	21	4	0.863	8.568	0.129	23.397	0.054	0.735	0.052
MFT	22	1	0.803	9.334	0.093	24.506	0.019	0.858	0.042
MFT	22	2	0.766	8.872	0.086	24.559	0.018	0.808	0.036
MFT	22	3	0.926	9.206	0.104	24.313	0.019	0.853	0.033
MFT	22	4	0.831	8.692	0.088	24.332	0.017	0.793	0.100
MFT	22	5	0.863	8.942	0.094	24.311	0.018	0.826	0.030
MFT	22	6	0.676	8.597	0.081	26.050	0.017	0.668	0.034
MFT	23	1	0.839	8.777	0.122	23.624	0.018	1.033	0.057
MFT	23	2	0.826	8.594	0.119	23.166	0.019	1.000	0.032
MFT	23	3	0.824	8.735	0.102	23.658	0.022	0.982	0.033
MFT	23	4	0.819	8.659	0.102	23.503	0.021	0.943	0.041
MFT	24	1	0.721	8.216	0.116	23.086	0.014	0.964	0.014
MFT	24	2	0.746	8.365	0.112	23.635	0.013	0.959	0.012
MFT	24	3	0.791	8.315	0.114	22.860	0.013	0.933	0.020
MFT	24	4	0.583	8.207	0.087	25.085	0.012	0.760	0.011
MFT	25	1	0.822	8.777	0.096	24.193	0.009	1.003	0.008
MFT	25	2	0.670	8.629	0.104	26.097	0.009	0.892	0.007
MFT	25	3	0.985	9.420	0.121	23.901	0.008	1.289	0.007
MFT	25	4	0.839	9.215	0.099	24.643	0.009	1.067	0.014
MFT	26	1	0.837	9.468	0.105	25.557	0.017	1.317	0.016
MFT	26	2	0.862	9.892	0.103	26.331	0.020	1.277	0.013
MFT	26	3	0.912	9.858	0.107	26.077	0.015	1.298	0.013
MFT	26	4	0.854	9.223	0.111	24.446	0.014	1.236	0.012
MFT	27	1	0.904	9.515	0.099	25.112	0.012	1.115	0.011
MFT	27	2	0.738	9.134	0.080	24.902	0.013	0.972	0.008
MFT	27	3	0.840	9.126	0.087	24.276	0.012	1.080	0.009
MFT	27	4	0.833	9.119	0.091	24.065	0.011	1.044	0.009
MFT	28	1	0.790	8.505	0.093	22.934	0.013	1.040	0.009
MFT	28	2	0.747	8.696	0.104	23.814	0.012	1.012	0.011
MFT	28	3	0.720	8.700	0.084	23.964	0.013	0.916	0.009
MFT	28	4	0.816	8.720	0.116	22.865	0.012	0.974	0.009
MFT	28	5	.	.	.	.	.	.	.
MFT	28	6	.	.	.	.	.	.	.

Table 5.1: SRAT Receipt and SRAT Product Means, Standard Deviations, and Percent Coefficients of Variation Across All Samples

	SRAT Receipt			SRAT Product		
Analyte	Average	Standard Deviation	% Coeff. of Variation	Average	Standard Deviation	% Coeff. of Variation
Total Solids (wt%)	15.663	0.603	3.8	22.438	1.402	6.3
Calcined Solids (wt%)	13.195	0.774	5.9	17.933	1.644	9.2
Insoluble Solids (wt%)	11.586	0.814	7	14.876	1.904	12.8
Density (g/mL)	1.086	0.036	3.3	1.153	0.021	1.8
Total Hydroxide (eq/L)	0.17	0.017	9.9	.	.	.
Formate (ppm)	3453.125	643.502	18.6	15987.755	3740.746	23.4
Chloride (ppm)	794.565	404.496	50.9	1094.465	1175.836	107.4
Fluoride (ppm)	790.433	411.425	52.1	1093.269	1176.861	107.6
Nitrate (ppm)	13031.042	1874.3	14.4	42004.082	8105.424	19.3
Nitrite (ppm)	6914.167	438.119	6.3	1244.486	1198.948	96.3
Phosphate (ppm)	.	.	.	1121.176	1287.353	114.8
Sulfate (ppm)	921.146	201.692	21.9	1207.551	1130.233	93.6
Aluminum (wt%)	6.591	0.395	6	5.99	0.442	7.4
Boron (wt%)	0.099	0.035	34.8	0.094	0.033	34.8
Calcium (wt%)	2.486	0.153	6.2	1.919	0.13	6.8
Chromium (wt%)	0.156	0.04	25.5	0.149	0.025	16.5
Copper (wt%)	0.27	0.023	8.5	0.93	0.069	7.4
Iron (wt%)	25.918	1.425	5.5	23.402	1.206	5.2
Potassium (wt%)	0.067	0.079	118.4	0.079	0.076	97.1
Lithium (wt%)	.	.	.	.	.	.
Magnesium (wt%)	1.263	0.081	6.5	0.907	0.091	10.1
Manganese (wt%)	2.753	0.171	6.2	2.457	0.201	8.2
Sodium (wt%)	6.546	1.027	15.7	6.562	0.587	8.9
Nickel (wt%)	0.289	0.018	6.1	0.262	0.016	6.2
Silicon (wt%)	0.919	0.394	42.8	0.88	0.146	16.6
Titanium (wt%)	0.023	0.014	61.9	0.035	0.037	107.6
Uranium (wt%)	2.511	0.73	29.1	2.45	0.361	14.7
Zirconium (wt%)	0.036	0.033	92.8	0.042	0.032	75.5
TIC (ppm)	869.542	251.725	28.9	.	.	.
TOC (ppm)	.	.	.	.	.	.
Fe/Li	.	.	.	.	.	.

Table 5.2: SME and MFT Means, Standard Deviations, and Percent Coefficients of Variation Across All Samples

	SME			MFT		
Analyte	Average	Standard Deviation	% Coeff. of Variation	Average	Standard Deviation	% Coeff. of Variation
Total Solids (wt%)	49.76	2.121	23.5	47.215	3.046	6.5
Calcined Solids (wt%)	43.95	2.269	19.4	43.122	2.038	4.7
Insoluble Solids (wt%)	41.058	2.523	16.3	39.496	6.218	15.7
Density (g/mL)	1.443	0.052	27.7	1.429	0.04	2.8
Total Hydroxide (eq/L)	.	.	.	.	.	.
Formate (ppm)	32927.27	3640.43	9	30495.46	3661.574	12
Chloride (ppm)	966.773	295.876	3.3	1001.182	205.383	20.5
Fluoride (ppm)	952.591	331.76	2.9	974.305	289.73	29.7
Nitrate (ppm)	27909.09	5915.129	4.7	25915.91	3918.173	15.1
Nitrite (ppm)	952.591	331.76	2.9	.	.	.
Phosphate (ppm)	982.045	391.955	2.5	.	.	.
Sulfate (ppm)	1043.705	248.355	4.2	1061	235.121	22.2
Aluminum (wt%)	2.307	0.178	13	2.243	0.19	8.5
Boron (wt%)	2.73	0.166	16.4	2.712	0.166	6.1
Calcium (wt%)	0.819	0.083	9.8	0.789	0.115	14.6
Chromium (wt%)	0.075	0.017	4.4	0.072	0.017	23.6
Copper (wt%)	0.334	0.024	14.2	0.319	0.033	10.3
Iron (wt%)	8.508	0.493	17.2	8.134	0.588	7.2
Potassium (wt%)	0.129	0.136	1	0.182	0.202	111.2
Lithium (wt%)	1.758	0.064	27.6	1.77	0.073	4.1
Magnesium (wt%)	1.272	0.069	18.3	1.254	0.058	4.7
Manganese (wt%)	0.875	0.104	8.4	0.837	0.117	14
Sodium (wt%)	8.922	0.377	23.7	8.815	0.454	5.2
Nickel (wt%)	0.117	0.025	4.8	0.123	0.048	39.3
Silicon (wt%)	24.031	0.857	28	24.179	0.997	4.1
Titanium (wt%)	0.025	0.019	1.3	0.029	0.024	84
Uranium (wt%)	0.928	0.279	3.3	0.843	0.308	36.6
Zirconium (wt%)	0.036	0.04	0.9	0.049	0.06	121.5
TIC (ppm)	9170	1483.532	6.2	.	.	.
TOC (ppm)	.	.	.	.	.	.
Fe/Li	4.843	0.294	16.5	4.604	0.39	8.5

Table 6.1: Components of Variation for SRAT Receipt Sample Results

Data from All Batches		%	Components of Variation			% Coefficients of Variation		
Analyte	Mean	S. E. Mean	Batch	Residual	Total	Total	Batch	Residual
Total Solids (wt%)	15.663	2.2%	68.0%	32.0%	0.380	3.9%	3.2%	2.2%
Calcined Solids (wt%)	13.195	3.8%	83.4%	16.6%	0.637	6.0%	5.5%	2.5%
Insoluble Solids (wt%)	11.586	6.1%	75.1%	24.9%	0.723	7.3%	6.4%	3.7%
Density (g/mL)	1.086	2.0%	81.0%	19.0%	0.001	3.4%	3.1%	1.5%
Total Hydroxide (eq/L)	0.170	6.6%	90.3%	9.7%	0.000	10.3%	9.8%	3.2%
Format (ppm)	3453.1	12.0%	94.9%	5.1%	440808.3	19.2%	18.7%	4.3%
Chloride (ppm)	794.6	32.9%	96.3%	3.7%	174328.9	52.5%	51.6%	10.2%
Fluoride (ppm)	790.4	33.7%	96.4%	3.6%	180369.6	53.7%	52.8%	10.2%
Nitrate (ppm)	13031.0	9.2%	93.5%	6.5%	3736092.8	14.8%	14.3%	3.8%
Nitrite (ppm)	6914.2	3.9%	83.7%	16.3%	202775.2	6.5%	6.0%	2.6%
Sulfate (ppm)	921.1	13.7%	88.3%	11.7%	43110.8	22.5%	21.2%	7.7%
Aluminum (wt%)	6.591	3.6%	77.7%	22.3%	0.164	6.1%	5.4%	2.9%
Boron (wt%)	0.100	373.4%	86.3%	13.7%	0.002	43.9%	40.8%	16.2%
Calcium (wt%)	2.486	3.4%	61.8%	38.2%	0.024	6.3%	4.9%	3.9%
Chromium	0.156	16.6%	97.7%	2.3%	0.002	26.3%	26.0%	3.9%
Copper (wt%)	0.270	5.1%	80.9%	19.1%	0.001	8.7%	7.8%	3.8%
Iron (wt%)	25.918	3.2%	70.8%	29.2%	2.127	5.6%	4.7%	3.0%
Potassium (wt%)	0.067	76.4%	95.9%	4.1%	0.007	122.2%	119.7%	24.8%
Magnesium (wt%)	1.263	3.7%	68.7%	31.3%	0.007	6.6%	5.5%	3.7%
Manganese (wt%)	2.753	3.7%	77.3%	22.7%	0.031	6.4%	5.6%	3.0%
Sodium (wt%)	6.546	8.6%	62.2%	37.8%	1.099	16.0%	12.6%	9.8%
Nickel (wt%)	0.289	3.5%	68.7%	31.3%	0.000	6.3%	5.2%	3.5%
Silicon (wt%)	0.919	23.4%	61.1%	38.9%	0.161	43.7%	34.1%	27.3%
Titanium (wt%)	0.023	37.3%	80.0%	20.0%	0.000	63.6%	56.9%	28.5%
Uranium (wt%)	2.511	19.0%	99.1%	0.9%	0.570	30.1%	29.9%	2.8%
Zirconium (wt%)	0.036	58.8%	91.6%	8.4%	0.001	95.6%	91.5%	27.7%
Data After Batch 21		**%**	**Components of Variation**			**% Coefficients of Variation**		
Analyte	**Mean**	**S. E. Mean**	**Batch**	**Residual**	**Total**	**Total**	**Batch**	**Residual**
Total Solids (wt%)	15.795	2.3%	76.2%	23.8%	0.262	3.2%	2.8%	1.6%
Calcined Solids (wt%)	13.508	2.6%	68.7%	31.3%	0.230	3.5%	2.9%	2.0%
Insoluble Solids (wt%)	12.113	5.8%	30.1%	69.9%	0.409	5.3%	2.9%	4.4%
Density (g/mL)	1.087	2.2%	81.6%	18.4%	0.001	3.0%	2.8%	1.3%
Total Hydroxide (eq/L)	0.170	7.9%	91.0%	9.0%	0.000	10.7%	10.2%	3.2%
Format (ppm)	3190.8	8.1%	88.3%	11.7%	123780.2	11.0%	10.4%	3.8%
Chloride (ppm)	1019.9	5.0%	20.6%	79.4%	10863.7	10.2%	4.6%	9.1%
Fluoride (ppm)	1019.9	5.0%	20.6%	79.4%	10863.7	10.2%	4.6%	9.1%
Nitrate (ppm)	13544.4	9.8%	93.1%	6.9%	3152413.2	13.1%	12.6%	3.4%
Nitrite (ppm)	6981.7	3.3%	76.7%	23.3%	110620.3	4.8%	4.2%	2.3%
Sulfate (ppm)	1023.8	4.6%	23.9%	76.1%	8693.5	9.1%	4.4%	7.9%
Aluminum (wt%)	6.747	2.4%	72.9%	27.1%	0.055	3.5%	3.0%	1.8%
Boron (wt%)								
Calcium (wt%)	2.506	4.1%	78.2%	21.8%	0.022	5.9%	5.2%	2.7%
Chromium	0.174	2.1%	23.1%	76.9%	0.000	4.1%	2.0%	3.6%
Copper (wt%)	0.270	6.4%	88.5%	11.5%	0.001	8.7%	8.2%	3.0%
Iron (wt%)	25.843	3.1%	81.4%	18.6%	1.224	4.3%	3.9%	1.8%
Potassium (wt%)	0.041	43.4%	65.7%	34.3%	0.001	65.5%	53.1%	38.3%
Magnesium (wt%)	1.280	3.9%	74.4%	25.6%	0.005	5.7%	4.9%	2.9%
Manganese (wt%)	2.727	2.9%	81.8%	18.2%	0.013	4.1%	3.7%	1.8%
Sodium (wt%)	6.578	10.9%	66.2%	33.8%	1.164	16.4%	13.3%	9.5%
Nickel (wt%)	0.293	3.7%	71.8%	28.2%	0.000	5.4%	4.6%	2.9%
Silicon (wt%)	0.931	31.5%	60.8%	39.2%	0.206	48.7%	38.0%	30.5%
Titanium (wt%)	0.018	35.7%	53.6%	46.4%	0.000	57.7%	42.3%	39.3%
Uranium (wt%)	2.836	2.6%	78.4%	21.6%	0.011	3.7%	3.3%	1.7%
Zirconium (wt%)	0.029	77.9%	87.3%	12.7%	0.001	106.7%	99.6%	38.1%

Table 6.2: Components of Variation for SRAT Product Sample Results

		%	Components of Variation			% Coefficients of Variation		
Analyte	**Mean**	**S. E. Mean**	**Batch**	**Residual**	**Total**	**Total**	**Batch**	**Residual**
Total Solids (wt%)	22.438	2.9%	34.4%	65.6%	2.011	6.3%	3.7%	5.1%
Calcined Solids (wt%)	17.933	4.6%	48.4%	51.6%	2.787	9.3%	6.5%	6.7%
Insoluble Solids (wt%)	14.876	8.3%	84.9%	15.1%	3.853	13.2%	12.2%	5.1%
Density (g/mL)	1.153	0.9%	53.4%	46.6%	0.000	1.8%	1.4%	1.3%
Format (ppm)	15987.8	15.2%	97.1%	2.9%	14929693	24.2%	23.8%	4.1%
Chloride (ppm)	1094.5	38.8%	10.0%	90.0%	1391586.1	107.8%	34.1%	102.3%
Fluoride (ppm)	1093.3	38.9%	10.2%	89.8%	1394196.2	108.0%	34.4%	102.4%
Nitrate (ppm)	42004.1	12.4%	94.6%	5.4%	69976691.0	19.9%	19.4%	4.6%
Nitrite (ppm)	1244.5	36.3%	13.7%	86.3%	1450325.9	96.8%	35.8%	89.9%
Phosphate (ppm)	1121.2	47.7%	11.9%	88.1%	1672849.5	115.4%	39.8%	108.3%
Sulfate (ppm)	1207.6	33.6%	9.5%	90.5%	1285321.5	93.9%	28.9%	89.3%
Aluminum (wt%)	5.990	5.5%	81.7%	18.3%	0.210	7.7%	6.9%	3.3%
Boron (wt%)	0.094	173.2%	6.5%	93.5%	0.001	35.3%	9.0%	34.1%
Calcium (wt%)	1.919	4.8%	73.7%	26.3%	0.018	7.0%	6.0%	3.6%
Chromium (wt%)	0.149	13.0%	96.2%	3.8%	0.001	17.2%	16.9%	3.4%
Copper (wt%)	0.930	5.7%	90.9%	9.1%	0.005	7.7%	7.3%	2.3%
Iron (wt%)	23.402	3.9%	86.3%	13.7%	1.571	5.4%	5.0%	2.0%
Potassium (wt%)	0.079	77.4%	98.3%	1.7%	0.006	101.4%	100.5%	13.4%
Magnesium (wt%)	0.907	7.4%	81.2%	18.8%	0.009	10.4%	9.4%	4.5%
Manganese (wt%)	2.457	6.4%	95.2%	4.8%	0.044	8.5%	8.3%	1.9%
Sodium (wt%)	6.562	6.4%	74.5%	25.5%	0.368	9.2%	8.0%	4.7%
Nickel (wt%)	0.262	4.0%	57.0%	43.0%	0.000	6.4%	4.8%	4.2%
Silicon (wt%)	0.880	11.7%	72.3%	27.7%	0.023	17.1%	14.6%	9.0%
Titanium (wt%)	0.035	83.9%	93.1%	6.9%	0.002	112.2%	108.2%	29.6%
Uranium (wt%)	2.450	12.9%	97.9%	2.1%	0.144	15.5%	15.3%	2.3%
Zirconium (wt%)	0.042	58.5%	91.7%	8.3%	0.001	78.7%	75.3%	22.6%
Data After Batch 21		**%**	**Components of Variation**			**% Coefficients of Variation**		
Analyte	**Mean**	**S. E. Mean**	**Batch**	**Residual**	**Total**	**Total**	**Batch**	**Residual**
Total Solids (wt%)	22.468	3.3%	49.3%	50.7%	1.546	5.5%	3.9%	3.9%
Calcined Solids (wt%)	18.053	4.5%	55.2%	44.8%	1.713	7.2%	5.4%	4.9%
Insoluble Solids (wt%)	15.146	9.4%	83.4%	16.6%	3.953	13.1%	12.0%	5.4%
Density (g/mL)	1.150	1.2%	50.6%	49.4%	0.000	1.9%	1.4%	1.4%
Format (ppm)	14752.8	7.7%	92.7%	7.3%	2285191	10.2%	9.9%	2.8%
Chloride (ppm)	1098.9	7.4%	33.9%	66.1%	22101.3	13.5%	7.9%	11.0%
Fluoride (ppm)	1098.9	7.4%	33.9%	66.1%	22101.3	13.5%	7.9%	11.0%
Nitrate (ppm)	40830.6	12.3%	95.8%	4.2%	44412326.0	16.3%	16.0%	3.3%
Nitrite (ppm)	1238.1	28.2%	93.8%	6.2%	216169.0	37.6%	36.4%	9.3%
Phosphate (ppm)	1133.9	6.7%	14.8%	85.2%	18749.3	12.1%	4.6%	11.1%
Sulfate (ppm)	1126.7	6.2%	27.4%	72.6%	17965.8	11.9%	6.2%	10.1%
Aluminum (wt%)	6.236	4.4%	54.2%	45.8%	0.104	5.2%	3.8%	3.5%
Boron (wt%)								
Calcium (wt%)	1.935	7.2%	97.9%	2.1%	0.172	21.5%	21.2%	3.1%
Chromium (wt%)	0.165	3.2%	70.6%	29.4%	0.000	3.5%	3.0%	1.9%
Copper (wt%)	0.927	6.5%	87.4%	12.6%	0.004	6.5%	6.1%	2.3%
Iron (wt%)	23.448	2.2%	56.7%	43.3%	0.370	2.6%	2.0%	1.7%
Potassium (wt%)	0.043	39.2%	77.6%	22.4%	0.000	40.9%	36.0%	19.4%
Magnesium (wt%)	0.898	12.3%	84.0%	16.0%	0.012	12.4%	11.4%	5.0%
Manganese (wt%)	2.463	5.2%	87.9%	12.1%	0.016	5.2%	4.8%	1.8%
Sodium (wt%)	6.426	8.9%	75.2%	24.8%	0.369	9.4%	8.2%	4.7%
Nickel (wt%)	0.266	3.9%	56.0%	44.0%	0.000	4.6%	3.4%	3.1%
Silicon (wt%)	0.855	14.4%	66.0%	34.0%	0.019	15.9%	12.9%	9.3%
Titanium (wt%)	0.032	152.2%	94.0%	6.0%	0.002	148.4%	143.9%	36.5%
Uranium (wt%)	2.632	4.5%	76.2%	23.8%	0.016	4.7%	4.1%	2.3%
Zirconium (wt%)	0.037	82.7%	86.0%	14.0%	0.001	83.3%	77.3%	31.2%

Table 6.3: Components of Variation for SME Sample Results

		%	Components of Variation			% Coefficients of Variation		
Analyte	**Mean**	**S. E. Mean**	**Batch**	**Residual**	**Total**	**Total**	**Batch**	**Residual**
Total Solids (wt%)	49.760	2.6%	73.8%	26.2%	4.744	4.4%	3.8%	2.2%
Calcined Solids (wt%)	43.950	3.2%	75.6%	24.4%	5.434	5.3%	4.6%	2.6%
Insoluble Solids (wt%)	41.058	4.4%	93.4%	6.6%	6.860	6.4%	6.2%	1.6%
Density (g/mL)	1.443	2.3%	79.5%	20.5%	0.003	3.7%	3.3%	1.7%
Format (ppm)	32927.3	646.1%	65.3%	34.7%	13884954	11.3%	9.1%	6.7%
Chloride (ppm)	966.8	18.3%	67.4%	32.6%	91860.4	31.4%	25.7%	17.9%
Fluoride (ppm)	952.6	21.6%	74.2%	25.8%	116072.9	35.8%	30.8%	18.2%
Nitrate (ppm)	27909.1	14.3%	92.7%	7.3%	37407465.0	21.9%	21.1%	5.9%
Nitrite (ppm)	952.6	21.6%	74.2%	25.8%	116072.9	35.8%	30.8%	18.2%
Phosphate (ppm)	982.0	22.5%	56.8%	43.2%	159969.2	40.7%	30.7%	26.8%
Sulfate (ppm)	1043.7	11.1%	29.2%	70.8%	62963.0	24.0%	13.0%	20.2%
Aluminum (wt%)	2.307	4.8%	75.3%	24.7%	0.034	7.9%	6.9%	3.9%
Boron (wt%)	2.730	3.0%	38.7%	61.3%	0.028	6.2%	3.8%	4.8%
Calcium (wt%)	0.819	6.0%	64.2%	35.8%	0.007	10.4%	8.3%	6.2%
Chromium (wt%)	0.075	12.5%	54.2%	45.8%	0.000	23.0%	17.0%	15.6%
Copper (wt%)	0.334	4.2%	68.0%	32.0%	0.001	7.2%	6.0%	4.1%
Iron (wt%)	8.508	3.4%	66.3%	33.7%	0.256	5.9%	4.8%	3.5%
Potassium (wt%)	0.129	72.2%	96.5%	3.5%	0.020	109.1%	107.1%	20.3%
Lithium (wt%)	1.758	1.8%	39.8%	60.2%	0.004	3.7%	2.3%	2.9%
Magnesium (wt%)	1.272	3.0%	52.0%	48.0%	0.005	5.6%	4.0%	3.9%
Manganese (wt%)	0.875	7.9%	88.3%	11.7%	0.012	12.3%	11.5%	4.2%
Sodium (wt%)	8.922	2.4%	59.9%	40.1%	0.148	4.3%	3.3%	2.7%
Nickel (wt%)	0.117	13.6%	83.8%	16.2%	0.001	21.7%	19.8%	8.7%
Silicon (wt%)	24.031	1.8%	38.7%	61.3%	0.756	3.6%	2.2%	2.8%
Titanium (wt%)	0.025	47.6%	72.2%	27.8%	0.000	80.0%	67.9%	42.2%
Uranium (wt%)	0.928	22.1%	97.0%	3.0%	0.084	31.3%	30.8%	5.5%
Zirconium (wt%)	0.036	69.4%	76.8%	23.2%	0.002	114.0%	99.9%	54.9%
Data After Batch 21		**%**	**Components of Variation**			**% Coefficients of Variation**		
Analyte	**Mean**	**S. E. Mean**	**Batch**	**Residual**	**Total**	**Total**	**Batch**	**Residual**
Total Solids (wt%)	49.899	3.3%	84.4%	15.6%	4.392	4.2%	3.9%	1.7%
Calcined Solids (wt%)	43.958	4.0%	87.4%	12.6%	4.825	5.0%	4.7%	1.8%
Insoluble Solids (wt%)	41.781	4.4%	91.5%	8.5%	5.195	5.5%	5.2%	1.6%
Density (g/mL)	1.453	2.8%	89.3%	10.7%	0.002	3.4%	3.2%	1.1%
Format (ppm)	32337.5	8.3%	62.0%	38.0%	14541630	11.8%	9.3%	7.3%
Chloride (ppm)	1061.1	9.8%	18.1%	81.9%	40098.1	18.9%	8.0%	17.1%
Fluoride (ppm)	1061.1	9.8%	18.1%	81.9%	40098.1	18.9%	8.0%	17.1%
Nitrate (ppm)	27109.4	13.6%	85.5%	14.5%	21892902.0	17.3%	16.0%	6.6%
Nitrite (ppm)	1061.1	9.8%	18.1%	81.9%	40098.1	18.9%	8.0%	17.1%
Phosphate (ppm)	1061.1	9.8%	18.1%	81.9%	40098.1	18.9%	8.0%	17.1%
Sulfate (ppm)	1061.1	9.8%	18.1%	81.9%	40098.1	18.9%	8.0%	17.1%
Aluminum (wt%)	2.360	5.7%	75.8%	24.2%	0.032	7.6%	6.6%	3.7%
Boron (wt%)	2.718	4.5%	48.7%	51.3%	0.035	6.9%	4.8%	4.9%
Calcium (wt%)	0.820	8.6%	74.1%	25.9%	0.009	11.4%	9.8%	5.8%
Chromium (wt%)	0.759	1.6%	50.7%	49.3%	0.000	2.5%	1.7%	1.7%
Copper (wt%)	0.331	4.6%	62.6%	37.4%	0.000	6.5%	5.2%	4.0%
Iron (wt%)	8.467	5.1%	74.6%	25.4%	0.330	6.8%	5.9%	3.4%
Potassium (wt%)	0.069	31.8%	37.2%	62.8%	0.001	52.5%	32.0%	41.6%
Lithium (wt%)	1.764	2.5%	43.6%	56.4%	0.005	4.0%	2.6%	3.0%
Magnesium (wt%)	1.279	4.1%	63.3%	36.7%	0.006	5.8%	4.6%	3.5%
Manganese (wt%)	0.831	7.5%	83.4%	16.6%	0.006	9.6%	8.7%	3.9%
Sodium (wt%)	8.978	3.4%	77.2%	22.8%	0.157	4.4%	3.9%	2.1%
Nickel (wt%)	0.107	7.7%	36.0%	64.0%	0.000	12.8%	7.7%	10.3%
Silicon (wt%)	24.169	2.4%	39.7%	60.3%	0.882	3.9%	2.4%	3.0%
Titanium (wt%)	0.020	66.0%	58.4%	41.6%	0.000	95.3%	72.9%	61.5%
Uranium (wt%)	1.038	11.7%	92.6%	7.4%	0.022	14.4%	13.8%	3.9%
Zirconium (wt%)	0.016	58.0%	76.6%	23.4%	0.000	76.4%	66.9%	37.0%

Table 6.4: Components of Variation for MFT Sample Results

		%	Components of Variation			% Coefficients of Variation		
Analyte	**Mean**	**S. E. Mean**	**Batch**	**Residual**	**Total**	**Total**	**Batch**	**Residual**
Total Solids (wt%)	47.215	4.7%	96.5%	3.5%	10.267	6.8%	6.7%	1.3%
Calcined Solids (wt%)	43.122	3.3%	81.1%	18.9%	4.428	4.9%	4.4%	2.1%
Insoluble Solids (wt%)*	40.481	4.4%	95.1%	4.9%	6.408	6.3%	6.1%	1.4%
Density (g/mL)†								
Format (ppm)	30495.5	8.6%	92.5%	7.5%	14263764	12.4%	11.9%	3.4%
Chloride (ppm)	1001.2	14.9%	95.7%	4.3%	44976.7	21.2%	20.7%	4.4%
Fluoride (ppm)	974.3	21.8%	97.8%	2.2%	89637.8	30.7%	30.4%	4.5%
Nitrate (ppm)	25915.9	10.5%	82.6%	17.4%	16221929.0	15.5%	14.1%	6.5%
Sulfate (ppm)	1061.0	15.7%	87.6%	12.4%	58617.0	22.8%	21.4%	8.0%
Aluminum (wt%)	2.243	5.0%	55.4%	44.6%	0.038	8.6%	6.4%	5.8%
Boron (wt%)	2.712	3.4%	46.2%	53.8%	0.029	6.3%	4.2%	4.6%
Calcium (wt%)	0.789	8.6%	53.5%	46.5%	0.014	14.9%	10.9%	10.2%
Chromium (wt%)	0.072	13.9%	54.4%	45.6%	0.000	24.1%	17.8%	16.3%
Copper (wt%)	0.319	5.5%	39.1%	60.9%	0.001	10.5%	6.6%	8.2%
Iron (wt%)	8.134	3.6%	32.4%	67.6%	0.355	7.3%	4.2%	6.0%
Potassium (wt%)	0.182	82.2%	98.2%	1.8%	0.044	115.8%	114.8%	15.5%
Lithium (wt%)	1.770	2.5%	59.4%	40.6%	0.006	4.2%	3.3%	2.7%
Magnesium (wt%)	1.254	2.8%	56.2%	43.8%	0.004	4.8%	3.6%	3.2%
Manganese (wt%)	0.837	8.6%	60.5%	39.5%	0.014	14.4%	11.2%	9.0%
Sodium (wt%)	8.815	3.2%	65.0%	35.0%	0.218	5.3%	4.3%	3.1%
Nickel (wt%)	0.123	24.1%	60.6%	39.4%	0.002	40.3%	31.4%	25.3%
Silicon (wt%)	24.179	2.4%	49.3%	50.7%	1.036	4.2%	3.0%	3.0%
Titanium (wt%)	0.029	61.6%	96.4%	3.6%	0.001	87.4%	85.8%	16.7%
Uranium (wt%)	0.843	26.6%	94.7%	5.3%	0.103	38.1%	37.0%	8.7%
Zirconium (wt%)	0.049	89.1%	96.4%	3.6%	0.004	126.5%	124.2%	24.1%
Data After Batch 21		**%**	**Components of Variation**			**% Coefficients of Variation**		
Analyte	**Mean**	**S. E. Mean**	**Batch**	**Residual**	**Total**	**Total**	**Batch**	**Residual**
Total Solids (wt%)								
Calcined Solids (wt%)								
Insoluble Solids (wt%)*	40.513	6.2%	96.1%	3.9%	7.649	6.8%	6.7%	1.3%
Density (g/mL)†								
Format (ppm)	32112.5	6.3%	78.5%	21.5%	5580401	7.4%	6.5%	3.4%
Chloride (ppm)	1067.2	3.9%	29.1%	70.9%	3321.4	5.4%	2.9%	4.5%
Fluoride (ppm)	1067.2	3.9%	29.1%	70.9%	3321.4	5.4%	2.9%	4.5%
Nitrate (ppm)	25706.3	13.1%	82.0%	18.0%	14957145.0	15.0%	13.6%	6.4%
Sulfate (ppm)	1067.2	3.9%	29.1%	70.9%	3321.4	5.4%	2.9%	4.5%
Aluminum (wt%)	2.298	4.9%	32.9%	67.1%	0.0310	7.7%	4.4%	6.3%
Boron (wt%)	2.712	4.7%	51.9%	48.1%	0.0304	6.4%	4.6%	4.5%
Calcium (wt%)	0.809	6.9%	19.6%	80.4%	0.0096	12.1%	5.4%	10.9%
Chromium (wt%)	0.073	19.7%	54.3%	45.7%	0.0004	26.5%	19.5%	17.9%
Copper (wt%)	0.324	5.6%	20.4%	79.6%	0.0010	9.7%	4.4%	8.7%
Iron (wt%)	8.230	4.0%	18.1%	81.9%	0.3477	7.2%	3.0%	6.5%
Potassium (wt%)	0.106	29.1%	63.7%	36.3%	0.0015	37.1%	29.6%	22.3%
Lithium (wt%)	1.774	3.6%	63.4%	36.6%	0.0065	4.5%	3.6%	2.7%
Magnesium (wt%)	1.267	3.2%	59.7%	40.3%	0.0026	4.0%	3.1%	2.6%
Manganese (wt%)	0.806	5.7%	16.0%	84.0%	0.0069	10.3%	4.1%	9.4%
Sodium (wt%)	8.917	4.3%	76.0%	24.0%	0.2115	5.2%	4.5%	2.5%
Nickel (wt%)	0.101	7.9%	32.9%	67.1%	0.0002	12.4%	7.1%	10.1%
Silicon (wt%)	24.329	3.0%	49.0%	51.0%	1.0352	4.2%	2.9%	3.0%
Titanium (wt%)	0.015	25.5%	88.2%	11.8%	0.0000	28.2%	26.5%	9.7%
Uranium (wt%)	0.997	14.4%	76.0%	24.0%	0.0297	17.3%	15.1%	8.5%
Zirconium (wt%)	0.022	70.9%	57.7%	42.3%	0.0004	93.3%	70.8%	60.6%

* See the footnote in Exhibit 9 for Insoluble Solids. † Not enough data---only one density value per batch.

Table 7.1 SRAT Receipt Correlations Using Batch Averages

Analyte	1	2	3	4	5	6	7	8	9	10
1 Total Solids (wt%)	1.000	0.762	0.387	-0.502	0.469	-0.103	-0.034	0.027	0.167	-0.194
2 Density (g/mL)	0.762	1.000	0.254	-0.567	-0.113	-0.183	-0.138	0.122	-0.293	-0.259
3 Formate (ppm)	0.387	0.254	1.000	-0.145	0.128	-0.536	-0.661	-0.542	0.062	-0.700
4 Chloride (ppm)	-0.502	-0.567	-0.145	1.000	0.029	0.306	0.243	-0.048	0.031	0.451
5 Nitrate (ppm)	0.469	-0.113	0.128	0.029	1.000	0.158	0.134	0.161	0.543	0.194
6 Aluminum (wt%)	-0.103	-0.183	-0.536	0.306	0.158	1.000	0.933	0.636	0.450	0.929
7 Calcium (wt%)	-0.034	-0.138	-0.661	0.243	0.134	0.933	1.000	0.612	0.447	0.936
8 Chromium (wt%)	0.027	0.122	-0.542	-0.048	0.161	0.636	0.612	1.000	-0.103	0.641
9 Copper (wt%)	0.167	-0.293	0.062	0.031	0.543	0.450	0.447	-0.103	1.000	0.381
10 Iron (wt%)	-0.194	-0.259	-0.700	0.451	0.194	0.929	0.936	0.641	0.381	1.000
11 Potassium (wt%)	0.079	-0.455	-0.117	-0.120	0.523	0.030	0.121	0.017	0.305	-0.002
12 Magnesium (wt%)	0.143	-0.034	-0.227	0.253	0.272	0.904	0.765	0.422	0.510	0.739
13 Manganese (wt%)	-0.244	-0.317	-0.640	0.468	0.123	0.969	0.944	0.596	0.403	0.977
14 Sodium (wt%)	0.279	0.374	0.660	-0.547	-0.057	-0.871	-0.934	-0.480	-0.370	-0.936
15 Nickel (wt%)	-0.332	-0.481	-0.574	0.435	0.002	0.792	0.767	0.366	0.242	0.722
16 Silicon (wt%)	0.153	-0.261	-0.247	-0.109	0.415	0.109	0.136	-0.162	0.275	0.060
17 Titanium (wt%)	0.352	0.248	-0.052	-0.659	0.111	-0.279	-0.226	-0.336	0.119	-0.344
18 Uranium (wt%)	-0.280	-0.176	-0.599	0.284	-0.017	0.883	0.850	0.804	0.220	0.887
19 Zirconium (wt%)	-0.410	-0.446	-0.044	0.163	0.116	0.576	0.306	0.330	0.419	0.406

SRAT Receipt Correlations (continued)

Analyte	11	12	13	14	15	16	17	18	19
1 Total Solids (wt%)	0.079	0.143	-0.244	0.279	-0.332	0.153	0.352	-0.280	-0.410
2 Density (g/mL)	-0.455	-0.034	-0.317	0.374	-0.481	-0.261	0.248	-0.176	-0.446
3 Formate (ppm)	-0.117	-0.227	-0.640	0.660	-0.574	-0.247	-0.052	-0.599	-0.044
4 Chloride (ppm)	-0.120	0.253	0.468	-0.547	0.435	-0.109	-0.659	0.284	0.163
5 Nitrate (ppm)	0.523	0.272	0.123	-0.057	0.002	0.415	0.111	-0.017	0.116
6 Aluminum (wt%)	0.030	0.904	0.969	-0.871	0.792	0.109	-0.279	0.883	0.576
7 Calcium (wt%)	0.121	0.765	0.944	-0.934	0.767	0.136	-0.226	0.850	0.306
8 Chromium (wt%)	0.017	0.422	0.596	-0.480	0.366	-0.162	-0.336	0.804	0.330
9 Copper (wt%)	0.305	0.510	0.403	-0.370	0.242	0.275	0.119	0.220	0.419
10 Iron (wt%)	-0.002	0.739	0.977	-0.936	0.722	0.060	-0.344	0.887	0.406
11 Potassium (wt%)	1.000	0.032	0.037	-0.102	0.376	0.735	0.281	-0.131	-0.017
12 Magnesium (wt%)	0.032	1.000	0.811	-0.673	0.712	0.248	-0.124	0.632	0.554
13 Manganese (wt%)	0.037	0.811	1.000	-0.954	0.823	0.092	-0.364	0.890	0.494
14 Sodium (wt%)	-0.102	-0.673	-0.954	1.000	-0.825	-0.081	0.419	-0.817	-0.288
15 Nickel (wt%)	0.376	0.712	0.823	-0.825	1.000	0.436	-0.180	0.608	0.384
16 Silicon (wt%)	0.735	0.248	0.092	-0.081	0.436	1.000	0.674	-0.257	-0.066
17 Titanium (wt%)	0.281	-0.124	-0.364	0.419	-0.180	0.674	1.000	-0.523	-0.251
18 Uranium (wt%)	-0.131	0.632	0.890	-0.817	0.608	-0.257	-0.523	1.000	0.554
19 Zirconium (wt%)	-0.017	0.554	0.494	-0.288	0.384	-0.066	-0.251	0.554	1.000

Table 7.2 SRAT Product Correlations Using Batch Averages

Analyte	1	2	3	4	5	6	7	8	9	10	11
1 Total Solids (wt%)	1.000	0.980	0.466	0.721	-0.045	-0.484	0.846	0.179	0.210	-0.780	-0.308
2 Calcined Solids (wt%)	0.980	1.000	0.370	0.704	-0.039	-0.573	0.789	0.116	0.186	-0.740	-0.448
3 Insoluble Solids (wt%)	0.466	0.370	1.000	0.376	0.609	0.475	0.158	0.810	0.631	-0.074	0.048
4 Density (g/mL)	0.721	0.704	0.376	1.000	0.382	-0.492	0.522	0.051	0.022	-0.283	0.146
5 Formate (ppm)	-0.045	-0.039	0.609	0.382	1.000	0.409	-0.440	0.503	0.347	0.605	0.156
6 Chloride (ppm)	-0.484	-0.573	0.475	-0.492	0.409	1.000	-0.494	0.472	0.239	0.456	0.329
7 Nitrate (ppm)	0.846	0.789	0.158	0.522	-0.440	-0.494	1.000	-0.207	-0.203	-0.956	-0.039
8 Aluminum (wt%)	0.179	0.116	0.810	0.051	0.503	0.472	-0.207	1.000	0.948	0.197	-0.168
9 Calcium (wt%)	0.210	0.186	0.631	0.022	0.347	0.239	-0.203	0.948	1.000	0.151	-0.385
10 Chromium (wt%)	-0.780	-0.740	-0.074	-0.283	0.605	0.456	-0.956	0.197	0.151	1.000	0.228
11 Copper (wt%)	-0.308	-0.448	0.048	0.146	0.156	0.329	-0.039	-0.168	-0.385	0.228	1.000
12 Iron (wt%)	0.136	0.047	0.865	0.348	0.794	0.509	-0.224	0.851	0.692	0.359	0.240
13 Potassium (wt%)	-0.723	-0.776	-0.235	-0.861	-0.274	0.688	-0.390	-0.160	-0.280	0.246	0.302
14 Magnesium (wt%)	0.460	0.446	0.501	0.187	0.100	-0.112	0.094	0.797	0.924	-0.145	-0.488
15 Manganese (wt%)	-0.302	-0.282	0.532	-0.071	0.850	0.598	-0.721	0.706	0.617	0.750	-0.082
16 Sodium (wt%)	0.708	0.699	0.508	0.365	0.009	-0.292	0.376	0.659	0.789	-0.409	-0.541
17 Nickel (wt%)	-0.521	-0.562	0.354	-0.080	0.724	0.594	-0.770	0.581	0.472	0.862	0.366
18 Silicon (wt%)	0.720	0.792	-0.034	0.675	-0.107	-0.875	0.499	-0.014	0.196	-0.440	-0.471
19 Titanium (wt%)	-0.179	-0.159	-0.329	0.191	-0.009	-0.443	-0.280	0.057	0.234	0.358	0.109
20 Uranium (wt%)	-0.491	-0.479	0.427	-0.407	0.671	0.823	-0.754	0.558	0.424	0.706	-0.056
21 Zirconium (wt%)	0.364	0.306	0.312	0.868	0.471	-0.299	0.205	0.138	0.080	0.071	0.476

SRAT Product Correlations (continued)

Analyte	12	13	14	15	16	17	18	19	20	21
1 Total Solids (wt%)	0.136	-0.723	0.460	-0.302	0.708	-0.521	0.720	-0.179	-0.491	0.364
2 Calcined Solids (wt%)	0.047	-0.776	0.446	-0.282	0.699	-0.562	0.792	-0.159	-0.479	0.306
3 Insoluble Solids (wt%)	0.865	-0.235	0.501	0.532	0.508	0.354	-0.034	-0.329	0.427	0.312
4 Density (g/mL)	0.348	-0.861	0.187	-0.071	0.365	-0.080	0.675	0.191	-0.407	0.868
5 Formate (ppm)	0.794	-0.274	0.100	0.850	0.009	0.724	-0.107	-0.009	0.671	0.471
6 Chloride (ppm)	0.509	0.688	-0.112	0.598	-0.292	0.594	-0.875	-0.443	0.823	-0.299
7 Nitrate (ppm)	-0.224	-0.390	0.094	-0.721	0.376	-0.770	0.499	-0.280	-0.754	0.205
8 Aluminum (wt%)	0.851	-0.160	0.797	0.706	0.659	0.581	-0.014	0.057	0.558	0.138
9 Calcium (wt%)	0.692	-0.280	0.924	0.617	0.789	0.472	0.196	0.234	0.424	0.080
10 Chromium (wt%)	0.359	0.246	-0.145	0.750	-0.409	0.862	-0.440	0.358	0.706	0.071
11 Copper (wt%)	0.240	0.302	-0.488	-0.082	-0.541	0.366	-0.471	0.109	-0.056	0.476
12 Iron (wt%)	1.000	-0.238	0.494	0.756	0.377	0.749	-0.090	0.082	0.554	0.512
13 Potassium (wt%)	-0.238	1.000	-0.494	-0.006	-0.634	0.121	-0.919	-0.392	0.388	-0.681
14 Magnesium (wt%)	0.494	-0.494	1.000	0.308	0.949	0.175	0.506	0.334	0.059	0.157
15 Manganese (wt%)	0.756	-0.006	0.308	1.000	0.103	0.841	-0.276	0.045	0.901	0.087
16 Sodium (wt%)	0.377	-0.634	0.949	0.103	1.000	-0.090	0.668	0.203	-0.150	0.202
17 Nickel (wt%)	0.749	0.121	0.175	0.841	-0.090	1.000	-0.393	0.367	0.716	0.310
18 Silicon (wt%)	-0.090	-0.919	0.506	-0.276	0.668	-0.393	1.000	0.428	-0.610	0.449
19 Titanium (wt%)	0.082	-0.392	0.334	0.045	0.203	0.367	0.428	1.000	-0.267	0.499
20 Uranium (wt%)	0.554	0.388	0.059	0.901	-0.150	0.716	-0.610	-0.267	1.000	-0.275
21 Zirconium (wt%)	0.512	-0.681	0.157	0.087	0.202	0.310	0.449	0.499	-0.275	1.000

Table 7.3 SME Correlations Using Batch Averages

Analytes	1	2	3	4	5	6	7	8	9	10	11	12
1 Total Solids (wt%)	1.0000	0.9565	0.6832	0.8349	0.8514	0.2636	0.0804	-0.2189	0.2144	-0.1410	-0.2176	-0.3966
2 Calcined Solids (wt%)	0.9565	1.0000	0.7921	0.8748	0.7839	0.4909	0.0665	-0.4020	0.0638	-0.2262	-0.3834	-0.4216
3 Insoluble Solids (wt%)	0.6832	0.7921	1.0000	0.7630	0.5136	0.5701	0.4260	-0.4555	0.3585	-0.1687	-0.4988	-0.3284
4 Density (g/mL)	0.8349	0.8748	0.7630	1.0000	0.5011	0.3695	0.0204	-0.5450	0.2459	-0.4075	-0.1629	-0.7764
5 Formate (ppm)	0.8514	0.7839	0.5136	0.5011	1.0000	0.2605	0.3211	0.0516	0.1739	0.0685	-0.3234	-0.0287
6 Chloride (ppm)	0.2636	0.4909	0.5701	0.3695	0.2605	1.0000	-0.0620	-0.3978	-0.3064	0.1064	-0.4646	-0.0324
7 Nitrate (ppm)	0.0804	0.0665	0.4260	0.0204	0.3211	-0.0620	1.0000	0.0286	0.5758	-0.1338	-0.4064	0.0742
8 Aluminum (wt%)	-0.2189	-0.4020	-0.4555	-0.5450	0.0516	-0.3978	0.0286	1.0000	0.3023	0.7602	0.6375	0.5879
9 Boron (wt%)	0.2144	0.0638	0.3585	0.2459	0.1739	-0.3064	0.5758	0.3023	1.0000	0.2094	0.3154	-0.1786
10 Calcium (wt%)	-0.1410	-0.2262	-0.1687	-0.4075	0.0685	0.1064	-0.1338	0.7602	0.2094	1.0000	0.4025	0.6861
11 Chromium (wt%)	-0.2176	-0.3834	-0.4988	-0.1629	-0.3234	-0.4646	-0.4064	0.6375	0.3154	0.4025	1.0000	-0.0999
12 Copper (wt%)	-0.3966	-0.4216	-0.3284	-0.7764	-0.0287	-0.0324	0.0742	0.5879	-0.1786	0.6861	-0.0999	1.0000
13 Iron (wt%)	-0.1390	-0.3267	-0.4515	-0.4578	0.1080	-0.3406	-0.0687	0.9855	0.2767	0.7759	0.6918	0.5103
14 Potassium (wt%)	0.3286	0.2262	0.4861	0.4765	0.0431	-0.2819	0.3218	-0.1457	0.8169	-0.0931	0.1205	-0.4032
15 Lithium (wt%)	0.6004	0.3969	0.3650	0.3676	0.6144	-0.1978	0.3294	0.3618	0.7850	0.3775	0.2218	-0.0444
16 Magnesium (wt%)	-0.2045	-0.2623	-0.0230	-0.5011	0.1688	0.1086	0.3613	0.6705	0.3246	0.8492	0.0428	0.7936
17 Manganese (wt%)	-0.3432	-0.3872	-0.3753	-0.7017	0.0862	0.0754	0.0482	0.7676	-0.1018	0.8148	0.1464	0.8811
18 Sodium (wt%)	0.0209	-0.0562	-0.0898	-0.4251	0.3728	0.1239	0.0891	0.7635	0.0730	0.8696	0.1071	0.8211
19 Nickel (wt%)	0.0889	-0.1327	-0.2131	-0.0493	0.1252	-0.3903	-0.0446	0.7909	0.6249	0.6098	0.8410	0.0521
20 Silicon (wt%)	0.6096	0.3724	0.2414	0.3632	0.5674	-0.3891	0.2177	0.3469	0.7191	0.2519	0.2906	-0.1141
21 Titanium (wt%)	-0.3150	-0.2559	0.3088	-0.1185	-0.2030	-0.0398	0.8387	-0.1303	0.5180	-0.1808	-0.3070	0.0077
22 Uranium (wt%)	-0.0735	-0.3291	-0.5069	-0.4598	0.1207	-0.6041	-0.0977	0.8564	0.3101	0.6670	0.5775	0.5182
23 Zirconium (wt%)	0.2425	0.1679	0.3112	0.4692	-0.0317	-0.1006	0.0609	0.2094	0.7206	0.1166	0.6345	-0.5083

SME Correlations (continued)

Analytes	13	14	15	16	17	18	19	20	21	22	23
1 Total Solids (wt%)	-0.1390	0.3286	0.6004	-0.2045	-0.3432	0.0209	0.0889	0.6096	-0.3150	-0.0735	0.2425
2 Calcined Solids (wt%)	-0.3267	0.2262	0.3969	-0.2623	-0.3872	-0.0562	-0.1327	0.3724	-0.2559	-0.3291	0.1679
3 Insoluble Solids (wt%)	-0.4515	0.4861	0.3650	-0.0230	-0.3753	-0.0898	-0.2131	0.2414	0.3088	-0.5069	0.3112
4 Density (g/mL)	-0.4578	0.4765	0.3676	-0.5011	-0.7017	-0.4251	-0.0493	0.3632	-0.1185	-0.4598	0.4692
5 Formate (ppm)	0.1080	0.0431	0.6144	0.1688	0.0862	0.3728	0.1252	0.5674	-0.2030	0.1207	-0.0317
6 Chloride (ppm)	-0.3406	-0.2819	-0.1978	0.1086	0.0754	0.1239	-0.3903	-0.3891	-0.0398	-0.6041	-0.1006
7 Nitrate (ppm)	-0.0687	0.3218	0.3294	0.3613	0.0482	0.0891	-0.0446	0.2177	0.8387	-0.0977	0.0609
8 Aluminum (wt%)	0.9855	-0.1457	0.3618	0.6705	0.7676	0.7635	0.7909	0.3469	-0.1303	0.8564	0.2094
9 Boron (wt%)	0.2767	0.8169	0.7850	0.3246	-0.1018	0.0730	0.6249	0.7191	0.5180	0.3101	0.7206
10 Calcium (wt%)	0.7759	-0.0931	0.3775	0.8492	0.8148	0.8696	0.6098	0.2519	-0.1808	0.6670	0.1166
11 Chromium (wt%)	0.6918	0.1205	0.2218	0.0428	0.1464	0.1071	0.8410	0.2906	-0.3070	0.5775	0.6345
12 Copper (wt%)	0.5103	-0.4032	-0.0444	0.7936	0.8811	0.8211	0.0521	-0.1141	0.0077	0.5182	-0.5083
13 Iron (wt%)	1.0000	-0.1658	0.3964	0.6238	0.7423	0.7531	0.8403	0.3820	-0.2478	0.8573	0.2500
14 Potassium (wt%)	-0.1658	1.0000	0.6505	-0.0659	-0.5272	-0.2957	0.2923	0.6585	0.3799	0.0629	0.6185
15 Lithium (wt%)	0.3964	0.6505	1.0000	0.3721	0.0426	0.3502	0.6649	0.9630	0.0182	0.5400	0.4752
16 Magnesium (wt%)	0.6238	-0.0659	0.3721	1.0000	0.8552	0.8732	0.3900	0.1947	0.2608	0.5292	-0.0691
17 Manganese (wt%)	0.7423	-0.5272	0.0426	0.8552	1.0000	0.9133	0.3251	-0.0707	-0.0780	0.5708	-0.2931
18 Sodium (wt%)	0.7531	-0.2957	0.3502	0.8732	0.9133	1.0000	0.4275	0.2375	-0.1670	0.6361	-0.1451
19 Nickel (wt%)	0.8403	0.2923	0.6649	0.3900	0.3251	0.4275	1.0000	0.6610	-0.1704	0.7551	0.6628
20 Silicon (wt%)	0.3820	0.6585	0.9630	0.1947	-0.0707	0.2375	0.6610	1.0000	-0.1048	0.5998	0.4502
21 Titanium (wt%)	-0.2478	0.3799	0.0182	0.2608	-0.0780	-0.1670	-0.1704	-0.1048	1.0000	-0.2977	0.1335
22 Uranium (wt%)	0.8573	0.0629	0.5400	0.5292	0.5708	0.6361	0.7551	0.5998	-0.2977	1.0000	0.0737
23 Zirconium (wt%)	0.2500	0.6185	0.4752	-0.0691	-0.2931	-0.1451	0.6628	0.4502	0.1335	0.0737	1.0000

Table 7.4 MFT Correlations Using Batch Averages

Analyte	1	2	3	4	5	6	7	8	9	10	11	12
1 Total Solids (wt%)	1.0000	0.9415	0.3812	0.6711	0.1073	-0.3180	-0.0684	-0.2529	0.9210	0.3971	-0.2181	0.3598
2 Calcined Solids (wt%)	0.9415	1.0000	0.6271	0.6782	-0.0175	-0.4463	-0.1568	-0.3094	0.9447	0.3554	-0.1761	0.2096
3 Insoluble Solids (wt%)	0.3812	0.6271	1.0000	0.5978	-0.4405	-0.7164	-0.0656	-0.6469	0.5763	-0.2517	-0.4455	-0.4921
4 Density (g/mL)	0.6711	0.6782	0.5978	1.0000	0.0157	-0.3526	0.4519	-0.8434	0.7077	-0.3677	-0.4590	-0.3597
5 Formate (ppm)	0.1073	-0.0175	-0.4405	0.0157	1.0000	0.2594	0.5552	0.2801	0.1662	0.0774	0.5246	0.1503
6 Chloride (ppm)	-0.3180	-0.4463	-0.7164	-0.3526	0.2594	1.0000	0.1468	0.3574	-0.5878	0.2320	0.4724	0.2528
7 Nitrate (ppm)	-0.0684	-0.1568	-0.0656	0.4519	0.5552	0.1468	1.0000	-0.5268	-0.0016	-0.6787	-0.1845	-0.6149
8 Aluminum (wt%)	-0.2529	-0.3094	-0.6469	-0.8434	0.2801	0.3574	-0.5268	1.0000	-0.3218	0.7182	0.7065	0.7368
9 Boron (wt%)	0.9210	0.9447	0.5763	0.7077	0.1662	-0.5878	-0.0016	-0.3218	1.0000	0.2155	-0.1929	0.1530
10 Calcium (wt%)	0.3971	0.3554	-0.2517	-0.3677	0.0774	0.2320	-0.6787	0.7182	0.2155	1.0000	0.4595	0.8984
11 Chromium (wt%)	-0.2181	-0.1761	-0.4455	-0.4590	0.5246	0.4724	-0.1845	0.7065	-0.1929	0.4595	1.0000	0.4340
12 Copper (wt%)	0.3598	0.2096	-0.4921	-0.3597	0.1503	0.2528	-0.6149	0.7368	0.1530	0.8984	0.4340	1.0000
13 Iron (wt%)	-0.2000	-0.2725	-0.6392	-0.8430	0.1949	0.3779	-0.5724	0.9849	-0.3172	0.7757	0.6071	0.7745
14 Potassium (wt%)	0.8399	0.7905	0.4004	0.8298	-0.0299	-0.0263	0.1911	-0.5669	0.6851	0.1111	-0.3451	0.0446
15 Lithium (wt %)	0.5580	0.3456	-0.3758	-0.1381	0.3349	0.0488	-0.2400	0.4871	0.3779	0.7222	0.0442	0.7857
16 Magnesium (wt%)	0.4183	0.3942	-0.1659	-0.3336	0.1125	-0.0647	-0.7308	0.7240	0.3508	0.9195	0.4675	0.8971
17 Manganese (wt%)	0.3772	0.3343	-0.2066	-0.3498	-0.1671	0.1842	-0.8105	0.6424	0.1646	0.9595	0.3223	0.9023
18 Sodium (wt%)	0.4244	0.3247	-0.2778	-0.3526	0.0722	-0.0585	-0.6977	0.7049	0.3033	0.8892	0.2892	0.9359
19 Nickel (wt%)	-0.3388	-0.4323	-0.6344	-0.2282	0.5141	0.9264	0.4195	0.2530	-0.5007	0.0456	0.5577	0.0425
20 Silicon (wt%)	0.3389	0.1782	-0.3666	-0.4027	0.1684	-0.0546	-0.4467	0.6412	0.2090	0.7397	0.0531	0.7776
21 Titanium (wt%)	0.7153	0.5989	0.1164	0.6745	-0.0359	0.2580	0.1426	-0.4204	0.4592	0.1901	-0.2358	0.1986
22 Uranium (wt%)	0.0631	-0.0300	-0.6091	-0.5028	0.5573	0.3434	-0.3476	0.8758	0.0042	0.7303	0.8268	0.8110
23 Zirconium (wt%)	0.4780	0.4331	0.3133	0.5507	-0.4646	0.1442	0.0483	-0.5746	0.2281	0.0108	-0.5872	-0.0820

MFT Correlations (continued)

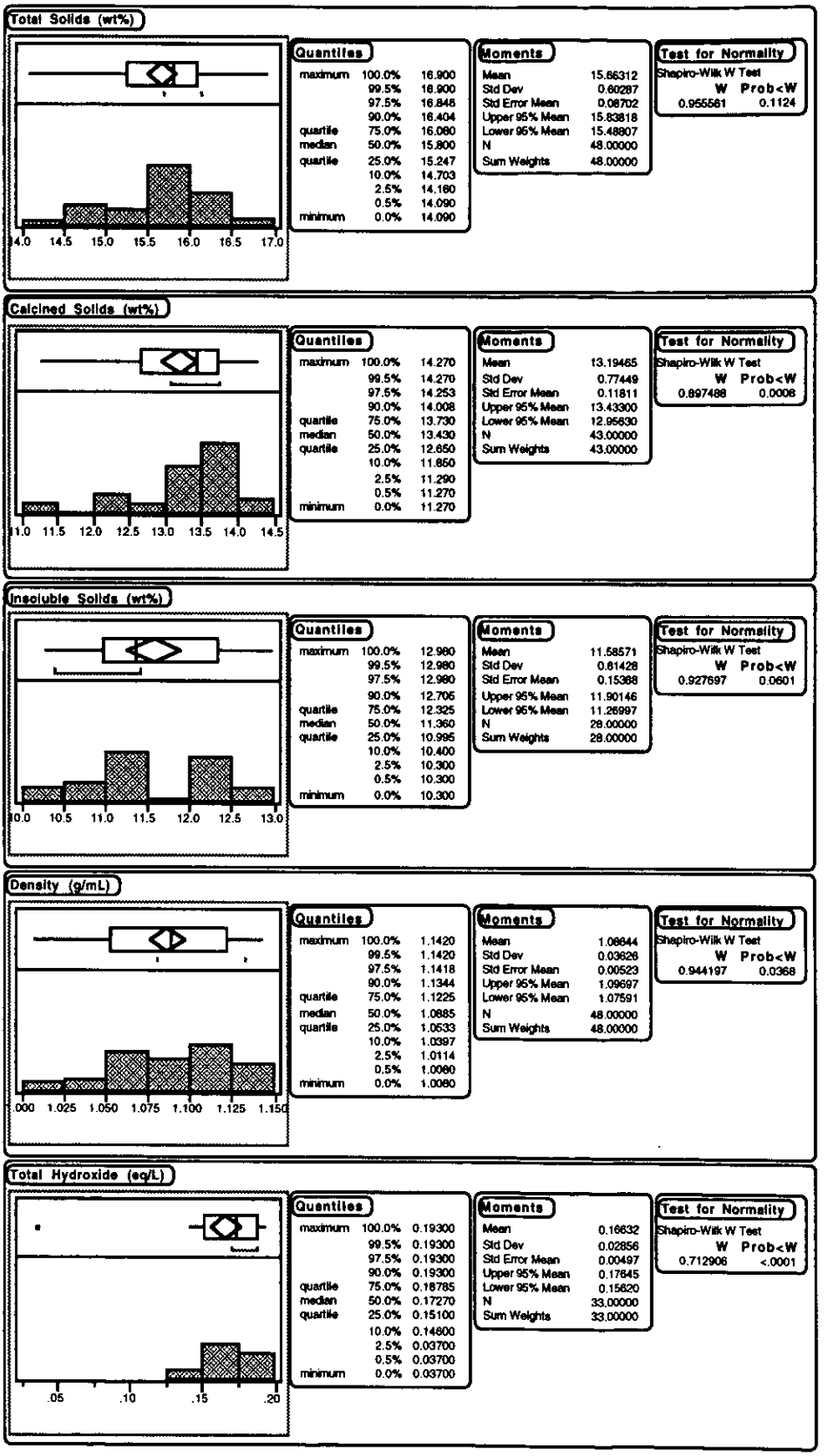
Analyte	13	14	15	16	17	18	19	20	21	22	23
1 Total Solids (wt%)	-0.2000	0.8399	0.5580	0.4183	0.3772	0.4244	-0.3388	0.3389	0.7153	0.0631	0.4780
2 Calcined Solids (wt%)	-0.2725	0.7905	0.3456	0.3942	0.3343	0.3247	-0.4323	0.1782	0.5989	-0.0300	0.4331
3 Insoluble Solids (wt%)	-0.6392	0.4004	-0.3758	-0.1659	-0.2066	-0.2778	-0.6344	-0.3666	0.1164	-0.6091	0.3133
4 Density (g/mL)	-0.8430	0.8298	-0.1381	-0.3336	-0.3498	-0.3526	-0.2282	-0.4027	0.6745	-0.5028	0.5507
5 Formate (ppm)	0.1949	-0.0299	0.3349	0.1125	-0.1671	0.0722	0.5141	0.1684	-0.0359	0.5573	-0.4646
6 Chloride (ppm)	0.3779	-0.0263	0.0488	-0.0647	0.1842	-0.0585	0.9264	-0.0546	0.2580	0.3434	0.1442
7 Nitrate (ppm)	-0.5724	0.1911	-0.2400	-0.7308	-0.8105	-0.6977	0.4195	-0.4467	0.1426	-0.3476	0.0483
8 Aluminum (wt%)	0.9849	-0.5669	0.4871	0.7240	0.6424	0.7049	0.2530	0.6412	-0.4204	0.8758	-0.5746
9 Boron (wt%)	-0.3172	0.6851	0.3779	0.3508	0.1646	0.3033	-0.5007	0.2090	0.4592	0.0042	0.2281
10 Calcium (wt%)	0.7757	0.1111	0.7222	0.9195	0.9595	0.8892	0.0456	0.7397	0.1901	0.7303	0.0108
11 Chromium (wt%)	0.6071	-0.3451	0.0442	0.4675	0.3223	0.2892	0.5577	0.0531	-0.2358	0.8268	-0.5872
12 Copper (wt%)	0.7745	0.0446	0.7857	0.8971	0.9023	0.9359	0.0425	0.7776	0.1986	0.8110	-0.0820
13 Iron (wt%)	1.0000	-0.4973	0.5626	0.7391	0.7166	0.7484	0.2265	0.7157	-0.3419	0.8248	-0.4446
14 Potassium (wt%)	-0.4973	1.0000	0.2173	-0.0166	0.1267	-0.0117	-0.0457	-0.0743	0.9396	-0.2678	0.8038
15 Lithium (wt %)	0.5626	0.2173	1.0000	0.7017	0.6525	0.8288	-0.0781	0.9345	0.2565	0.5618	0.0473
16 Magnesium (wt%)	0.7391	-0.0166	0.7017	1.0000	0.8896	0.9592	-0.2065	0.7603	0.0037	0.7839	-0.2370
17 Manganese (wt%)	0.7166	0.1267	0.6525	0.8896	1.0000	0.8876	-0.0802	0.6964	0.2350	0.6132	0.1264
18 Sodium (wt%)	0.7484	-0.0117	0.8288	0.9592	0.8876	1.0000	-0.2515	0.8866	0.0404	0.7250	-0.1573
19 Nickel (wt%)	0.2265	-0.0457	-0.0781	-0.2065	-0.0802	-0.2515	1.0000	-0.2198	0.1665	0.3235	-0.0216
20 Silicon (wt%)	0.7157	-0.0743	0.9345	0.7603	0.6964	0.8866	-0.2198	1.0000	-0.0441	0.5679	-0.1290
21 Titanium (wt%)	-0.3419	0.9396	0.2565	0.0037	0.2350	0.0404	0.1665	-0.0441	1.0000	-0.1426	0.8333
22 Uranium (wt%)	0.8248	-0.2678	0.5618	0.7839	0.6132	0.7250	0.3235	0.5679	-0.1426	1.0000	-0.5435
23 Zirconium (wt%)	-0.4446	0.8038	0.0473	-0.2370	0.1264	-0.1573	-0.0216	-0.1290	0.8333	-0.5435	1.0000

Table 8: Comparison of SME Sample-to-Sample Error Versus PCCS Historical[5]

	SME						PCCS HISTORICAL		Comparison of Std. Deviations	
		Components of Variation Standard Deviations			% Coefficients of Variation					
Analyte	Mean	Total	Batch	Residual	Batch	Residual	Average	% RSD	Historical Std Dev	Current Std Dev
Aluminum (wt%)	2.360	0.1785	0.1554	0.0879	6.6%	3.7%	2.222	5.1%	0.113	0.120
Boron (wt%)	2.718	0.1874	0.1308	0.1342	4.8%	4.9%	2.093	7.2%	0.151	0.196
Calcium (wt%)	0.820	0.0939	0.0808	0.0478	9.8%	5.8%	1.077	5.9%	0.064	0.048
Chromium (wt%)	0.759	0.0186	0.0133	0.0131	1.7%	1.7%	0.064	33.5%	0.021	0.254
Copper (wt%)	0.331	0.0216	0.0171	0.0132	5.2%	4.0%	0.250	5.8%	0.015	0.019
Iron (wt%)	8.467	0.5743	0.4961	0.2894	5.9%	3.4%	6.235	4.8%	0.299	0.406
Potassium (wt%)	0.069	0.0364	0.0222	0.0288	32.0%	41.6%	2.455	6.5%	0.160	0.005
Lithium (wt%)	1.764	0.0702	0.0464	0.0527	2.6%	3.0%	1.963	4.1%	0.080	0.072
Magnesium (wt%)	1.279	0.0742	0.0591	0.0449	4.6%	3.5%	0.842	4.8%	0.040	0.061
Manganese (wt%)	0.831	0.0794	0.0725	0.0323	8.7%	3.9%	2.111	5.2%	0.110	0.043
Sodium (wt%)	8.978	0.3968	0.3486	0.1896	3.9%	2.1%	7.463	4.5%	0.336	0.404
Nickel (wt%)	0.107	0.0137	0.0082	0.0110	7.7%	10.3%	0.643	13.2%	0.085	0.014
Silicon (wt%)	24.169	0.9392	0.5914	0.7296	2.4%	3.0%	23.310	5.7%	1.329	1.378
Titanium (wt%)	0.020	0.0192	0.0147	0.0124	72.9%	61.5%	0.256	4.5%	0.012	0.001
Uranium (wt%)	1.038	0.1492	0.1436	0.0405	13.8%	3.9%	0.000	0.0%	0.000	0.000
Zirconium (wt%)	0.016	0.0119	0.0104	0.0057	66.9%	37.0%	0.029	9.0%	0.003	0.001

[5]The current version of PCCS computes the variance for each constraint two ways, both using the historical relative standard deviations (RSD's). These RSD's are multiplied by the historical means of the elemental concentrations to compute one variance, and they are multiplied by the average concentrations of the current samples to compute the other. The larger of the two is used by PCCS to determine the appropriate Measurement Acceptable Region.

Exhibit 1: Summary Statistics for Measurements from SRAT Receipt Samples



Total Solids (wt%)

Quantiles		
maximum	100.0%	16.900
	99.5%	16.900
	97.5%	16.848
	90.0%	16.404
quartile	75.0%	16.060
median	50.0%	15.800
quartile	25.0%	15.247
	10.0%	14.703
	2.5%	14.160
	0.5%	14.090
minimum	0.0%	14.090

Moments	
Mean	15.66312
Std Dev	0.60287
Std Error Mean	0.08702
Upper 95% Mean	15.83818
Lower 95% Mean	15.48807
N	48.00000
Sum Weights	48.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.955561	0.1124

Calcined Solids (wt%)

Quantiles		
maximum	100.0%	14.270
	99.5%	14.270
	97.5%	14.253
	90.0%	14.008
quartile	75.0%	13.730
median	50.0%	13.430
quartile	25.0%	12.650
	10.0%	11.850
	2.5%	11.290
	0.5%	11.270
minimum	0.0%	11.270

Moments	
Mean	13.19465
Std Dev	0.77449
Std Error Mean	0.11811
Upper 95% Mean	13.43300
Lower 95% Mean	12.95630
N	43.00000
Sum Weights	43.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.897488	0.0008

Insoluble Solids (wt%)

Quantiles		
maximum	100.0%	12.980
	99.5%	12.980
	97.5%	12.980
	90.0%	12.705
quartile	75.0%	12.325
median	50.0%	11.360
quartile	25.0%	10.995
	10.0%	10.400
	2.5%	10.300
	0.5%	10.300
minimum	0.0%	10.300

Moments	
Mean	11.58571
Std Dev	0.81428
Std Error Mean	0.15388
Upper 95% Mean	11.90146
Lower 95% Mean	11.26997
N	28.00000
Sum Weights	28.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.927697	0.0601

Density (g/mL)

Quantiles		
maximum	100.0%	1.1420
	99.5%	1.1420
	97.5%	1.1418
	90.0%	1.1344
quartile	75.0%	1.1225
median	50.0%	1.0885
quartile	25.0%	1.0533
	10.0%	1.0397
	2.5%	1.0114
	0.5%	1.0060
minimum	0.0%	1.0060

Moments	
Mean	1.08644
Std Dev	0.03626
Std Error Mean	0.00523
Upper 95% Mean	1.09697
Lower 95% Mean	1.07591
N	48.00000
Sum Weights	48.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.944197	0.0368

Total Hydroxide (eq/L)

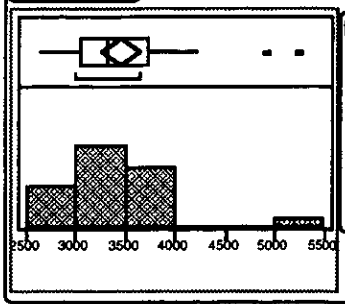
Quantiles		
maximum	100.0%	0.19300
	99.5%	0.19300
	97.5%	0.19300
	90.0%	0.19300
quartile	75.0%	0.18785
median	50.0%	0.17270
quartile	25.0%	0.15100
	10.0%	0.14600
	2.5%	0.03700
	0.5%	0.03700
minimum	0.0%	0.03700

Moments	
Mean	0.16632
Std Dev	0.02856
Std Error Mean	0.00497
Upper 95% Mean	0.17645
Lower 95% Mean	0.15620
N	33.00000
Sum Weights	33.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.712906	<.0001

Exhibit 1: Summary Statistics for Measurements from SRAT Receipt Samples
(Continued)

Formate (ppm)

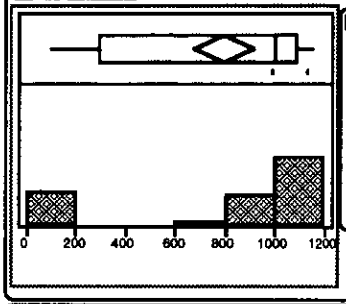


Quantiles		
maximum	100.0%	5260.0
	99.5%	5260.0
	97.5%	5255.5
	90.0%	4290.0
quartile	75.0%	3722.5
median	50.0%	3305.0
quartile	25.0%	3035.0
	10.0%	2788.0
	2.5%	2651.2
	0.5%	2640.0
minimum	0.0%	2640.0

Moments	
Mean	3453.125
Std Dev	643.502
Std Error Mean	92.881
Upper 95% Mean	3639.978
Lower 95% Mean	3266.272
N	48.000
Sum Weights	48.000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.847829	<.0001

Chloride (ppm)

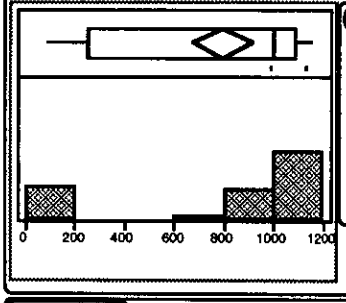


Quantiles		
maximum	100.0%	1150.0
	99.5%	1150.0
	97.5%	1147.8
	90.0%	1121.0
quartile	75.0%	1080.0
median	50.0%	994.5
quartile	25.0%	291.2
	10.0%	104.7
	2.5%	99.5
	0.5%	99.1
minimum	0.0%	99.1

Moments	
Mean	794.5646
Std Dev	404.4958
Std Error Mean	58.3839
Upper 95% Mean	912.0176
Lower 95% Mean	677.1116
N	48.0000
Sum Weights	48.0000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.694185	<.0001

Fluoride (ppm)

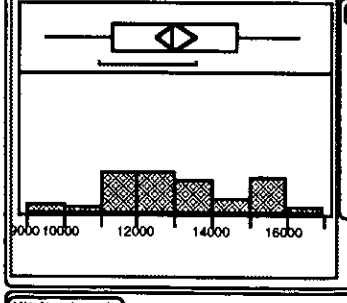


Quantiles		
maximum	100.0%	1150.0
	99.5%	1150.0
	97.5%	1147.8
	90.0%	1121.0
quartile	75.0%	1080.0
median	50.0%	994.5
quartile	25.0%	259.0
	10.0%	98.9
	2.5%	92.6
	0.5%	91.9
minimum	0.0%	91.9

Moments	
Mean	790.4333
Std Dev	411.4246
Std Error Mean	59.3840
Upper 95% Mean	909.8983
Lower 95% Mean	670.9684
N	48.0000
Sum Weights	48.0000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.687123	<.0001

Nitrate (ppm)

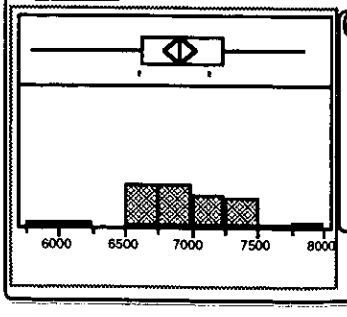


Quantiles		
maximum	100.0%	16300
	99.5%	16300
	97.5%	16232
	90.0%	15710
quartile	75.0%	14650
median	50.0%	12900
quartile	25.0%	11325
	10.0%	10660
	2.5%	9539
	0.5%	9510
minimum	0.0%	9510

Moments	
Mean	13031.04
Std Dev	1874.30
Std Error Mean	270.53
Upper 95% Mean	13575.28
Lower 95% Mean	12486.80
N	48.00
Sum Weights	48.00

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.952252	0.0818

Nitrite (ppm)

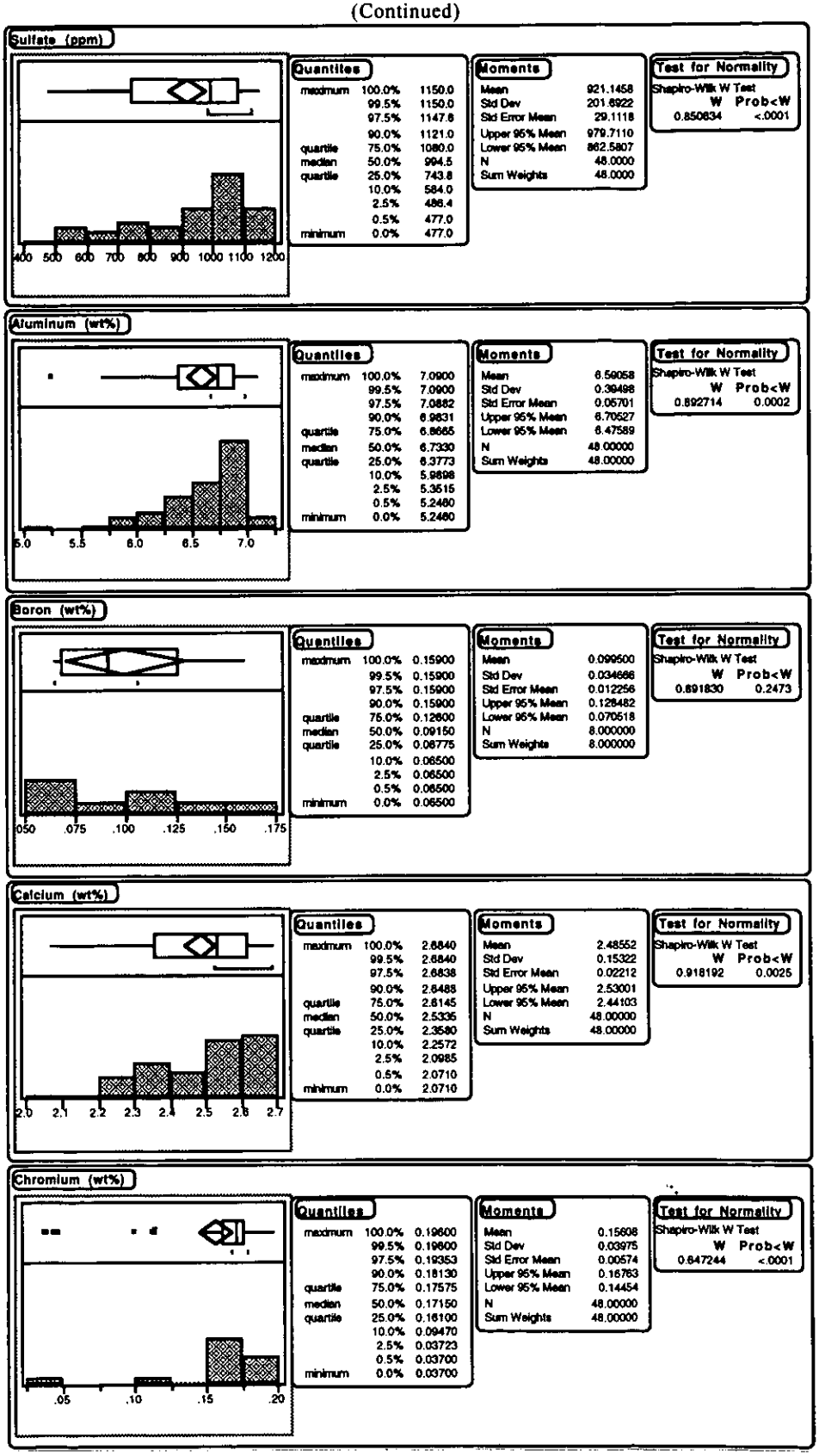


Quantiles		
maximum	100.0%	7850.0
	99.5%	7850.0
	97.5%	7832.0
	90.0%	7424.0
quartile	75.0%	7240.0
median	50.0%	6900.0
quartile	25.0%	6625.0
	10.0%	6458.0
	2.5%	5838.2
	0.5%	5800.0
minimum	0.0%	5800.0

Moments	
Mean	6914.167
Std Dev	438.119
Std Error Mean	63.237
Upper 95% Mean	7041.383
Lower 95% Mean	6786.951
N	48.000
Sum Weights	48.000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.970873	0.4200

Exhibit 1: Summary Statistics for Measurements from SRAT Receipt Samples
(Continued)



Sulfate (ppm)

Quantiles		
maximum	100.0%	1150.0
	99.5%	1150.0
	97.5%	1147.6
	90.0%	1121.0
quartile	75.0%	1080.0
median	50.0%	994.5
quartile	25.0%	743.8
	10.0%	584.0
	2.5%	486.4
	0.5%	477.0
minimum	0.0%	477.0

Moments	
Mean	921.1458
Std Dev	201.8922
Std Error Mean	29.1118
Upper 95% Mean	979.7110
Lower 95% Mean	862.5807
N	48.0000
Sum Weights	48.0000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.850834	<.0001

400 500 600 700 800 900 1000 1100 1200

Aluminum (wt%)

Quantiles		
maximum	100.0%	7.0900
	99.5%	7.0900
	97.5%	7.0882
	90.0%	6.9831
quartile	75.0%	6.8665
median	50.0%	6.7330
quartile	25.0%	6.3773
	10.0%	5.9898
	2.5%	5.3515
	0.5%	5.2480
minimum	0.0%	5.2480

Moments	
Mean	6.59058
Std Dev	0.39498
Std Error Mean	0.05701
Upper 95% Mean	6.70527
Lower 95% Mean	6.47589
N	48.00000
Sum Weights	48.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.892714	0.0002

5.0 5.5 6.0 6.5 7.0

Boron (wt%)

Quantiles		
maximum	100.0%	0.15900
	99.5%	0.15900
	97.5%	0.15900
	90.0%	0.15900
quartile	75.0%	0.12600
median	50.0%	0.09150
quartile	25.0%	0.06775
	10.0%	0.06500
	2.5%	0.06500
	0.5%	0.06500
minimum	0.0%	0.06500

Moments	
Mean	0.099500
Std Dev	0.034686
Std Error Mean	0.012256
Upper 95% Mean	0.128482
Lower 95% Mean	0.070518
N	8.000000
Sum Weights	8.000000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.891830	0.2473

050 .075 .100 .125 .150 .175

Calcium (wt%)

Quantiles		
maximum	100.0%	2.6840
	99.5%	2.6840
	97.5%	2.6838
	90.0%	2.6488
quartile	75.0%	2.6145
median	50.0%	2.5335
quartile	25.0%	2.3580
	10.0%	2.2572
	2.5%	2.0985
	0.5%	2.0710
minimum	0.0%	2.0710

Moments	
Mean	2.48552
Std Dev	0.15322
Std Error Mean	0.02212
Upper 95% Mean	2.53001
Lower 95% Mean	2.44103
N	48.00000
Sum Weights	48.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.918192	0.0025

2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7

Chromium (wt%)

Quantiles		
maximum	100.0%	0.19600
	99.5%	0.19600
	97.5%	0.19353
	90.0%	0.18130
quartile	75.0%	0.17575
median	50.0%	0.17150
quartile	25.0%	0.16100
	10.0%	0.09470
	2.5%	0.03723
	0.5%	0.03700
minimum	0.0%	0.03700

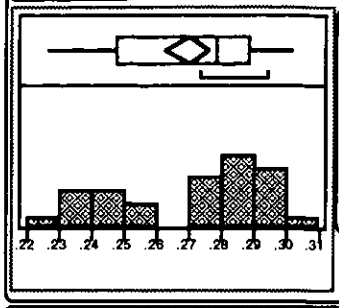
Moments	
Mean	0.15608
Std Dev	0.03975
Std Error Mean	0.00574
Upper 95% Mean	0.16763
Lower 95% Mean	0.14454
N	48.00000
Sum Weights	48.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.647244	<.0001

.05 .10 .15 .20

Exhibit 1: Summary Statistics for Measurements from SRAT Receipt Samples
(Continued)

Copper (wt%)



Quantiles

maximum	100.0%	0.30100
	99.5%	0.30100
	97.5%	0.30078
	90.0%	0.29420
quartile	75.0%	0.28850
median	50.0%	0.27850
quartile	25.0%	0.24800
	10.0%	0.23490
	2.5%	0.22723
	0.5%	0.22700
minimum	0.0%	0.22700

Moments

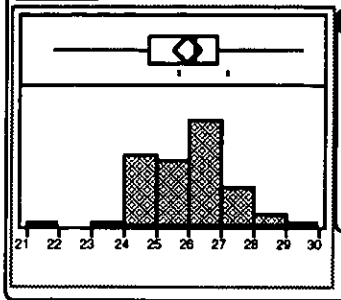
Mean	0.26967
Std Dev	0.02281
Std Error Mean	0.00329
Upper 95% Mean	0.27629
Lower 95% Mean	0.26304
N	48.00000
Sum Weights	48.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.883514	<.0001

Iron (wt%)



Quantiles

maximum	100.0%	29.469
	99.5%	29.469
	97.5%	29.343
	90.0%	27.355
quartile	75.0%	26.780
median	50.0%	26.140
quartile	25.0%	24.785
	10.0%	24.218
	2.5%	22.213
	0.5%	21.835
minimum	0.0%	21.835

Moments

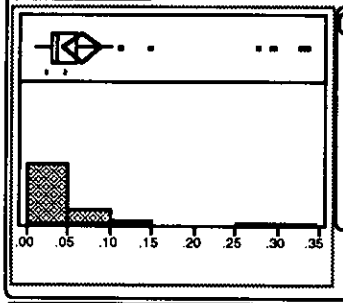
Mean	25.91775
Std Dev	1.42517
Std Error Mean	0.20571
Upper 95% Mean	26.33157
Lower 95% Mean	25.50393
N	48.00000
Sum Weights	48.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.979625	0.7261

Potassium (wt%)



Quantiles

maximum	100.0%	0.33700
	99.5%	0.33700
	97.5%	0.33520
	90.0%	0.16000
quartile	75.0%	0.06075
median	50.0%	0.03800
quartile	25.0%	0.03000
	10.0%	0.01500
	2.5%	0.01122
	0.5%	0.01100
minimum	0.0%	0.01100

Moments

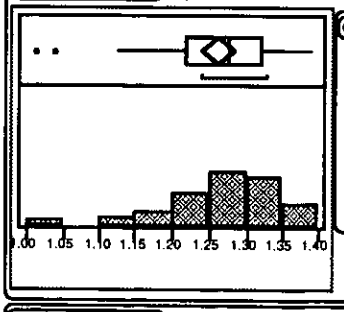
Mean	0.06681
Std Dev	0.07912
Std Error Mean	0.01142
Upper 95% Mean	0.08979
Lower 95% Mean	0.04384
N	48.00000
Sum Weights	48.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.599757	<.0001

Magnesium (wt%)



Quantiles

maximum	100.0%	1.3900
	99.5%	1.3900
	97.5%	1.3855
	90.0%	1.3534
quartile	75.0%	1.3228
median	50.0%	1.2770
quartile	25.0%	1.2170
	10.0%	1.1428
	2.5%	1.0212
	0.5%	1.0160
minimum	0.0%	1.0160

Moments

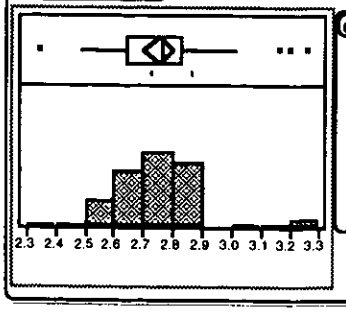
Mean	1.26292
Std Dev	0.06146
Std Error Mean	0.01176
Upper 95% Mean	1.28657
Lower 95% Mean	1.23926
N	48.00000
Sum Weights	48.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.927618	0.0067

Manganese (wt%)



Quantiles

maximum	100.0%	3.2620
	99.5%	3.2620
	97.5%	3.2485
	90.0%	2.8954
quartile	75.0%	2.8277
median	50.0%	2.7675
quartile	25.0%	2.6387
	10.0%	2.5608
	2.5%	2.3755
	0.5%	2.3440
minimum	0.0%	2.3440

Moments

Mean	2.75294
Std Dev	0.17105
Std Error Mean	0.02469
Upper 95% Mean	2.80260
Lower 95% Mean	2.70327
N	48.00000
Sum Weights	48.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.930396	0.0089

Exhibit 1: Summary Statistics for Measurements from SRAT Receipt Samples
(Continued)

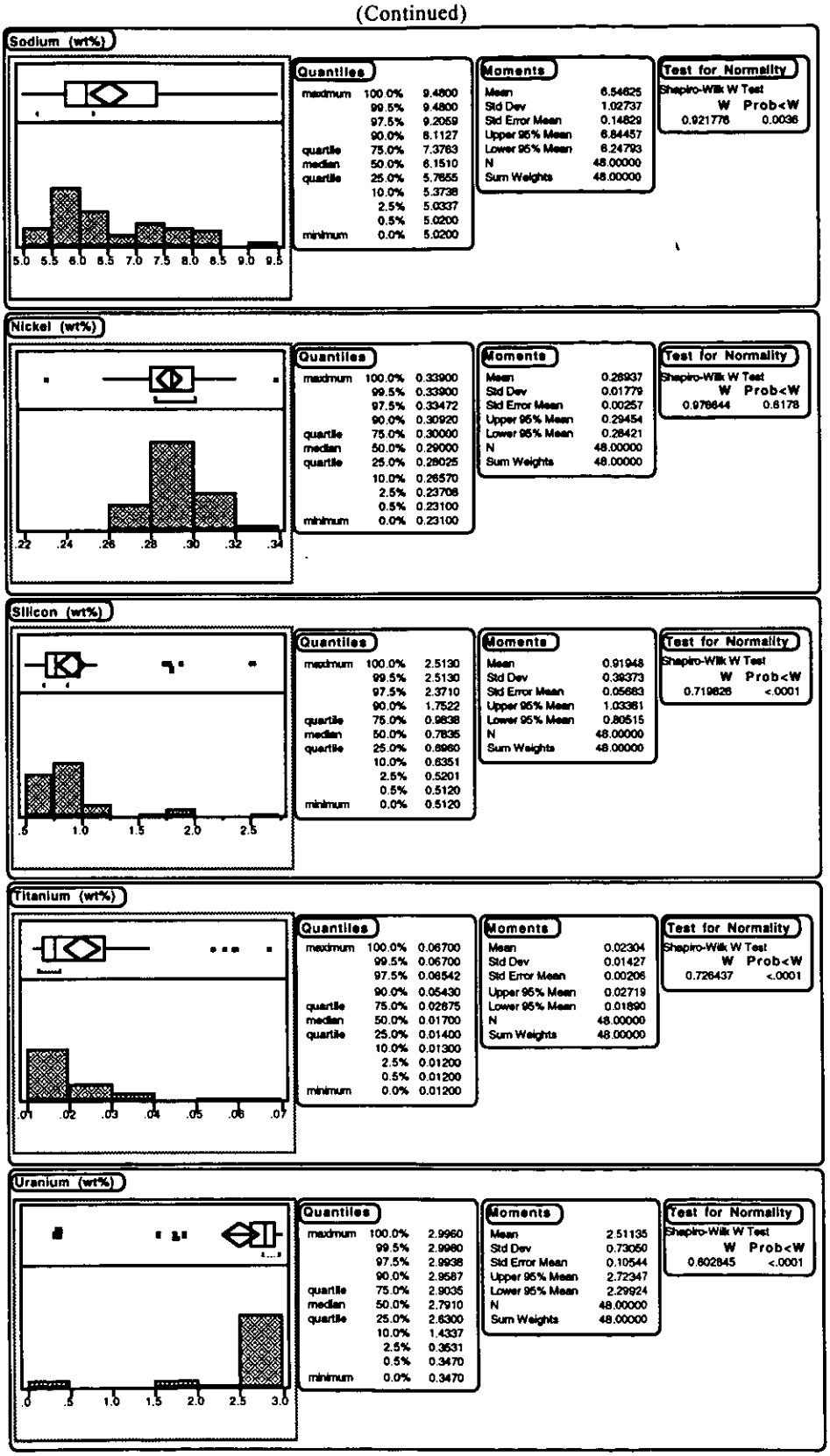


Exhibit 1: Summary Statistics for Measurements from SRAT Receipt Samples
(Continued)

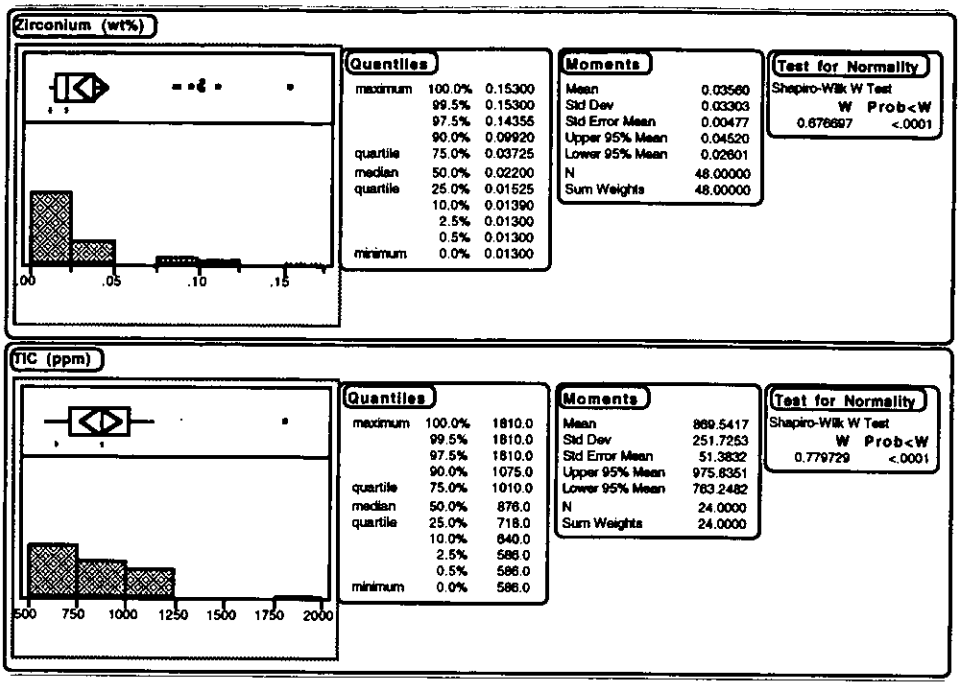


Exhibit 2: Summary Statistics for Measurements from SRAT Product Samples

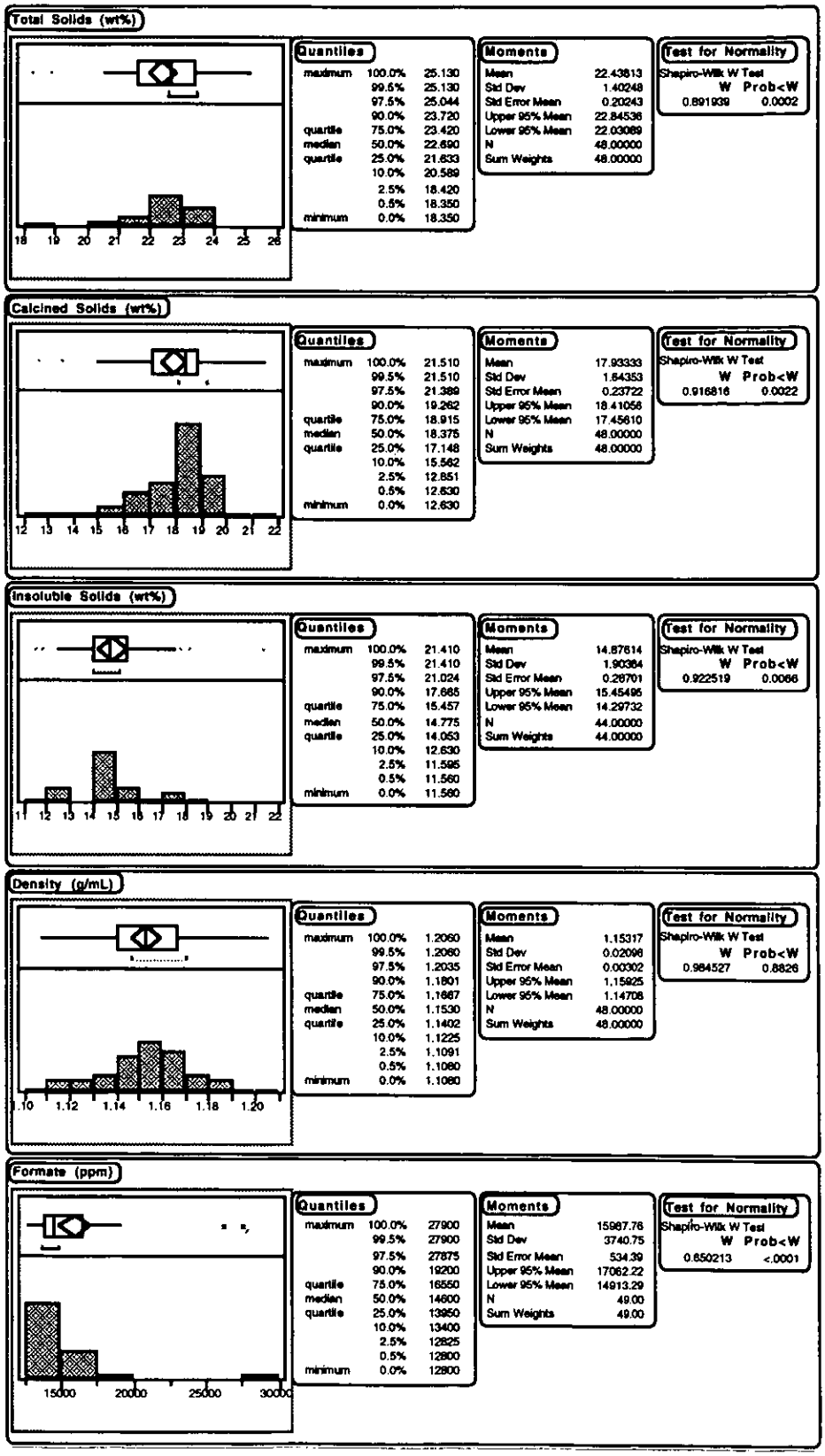
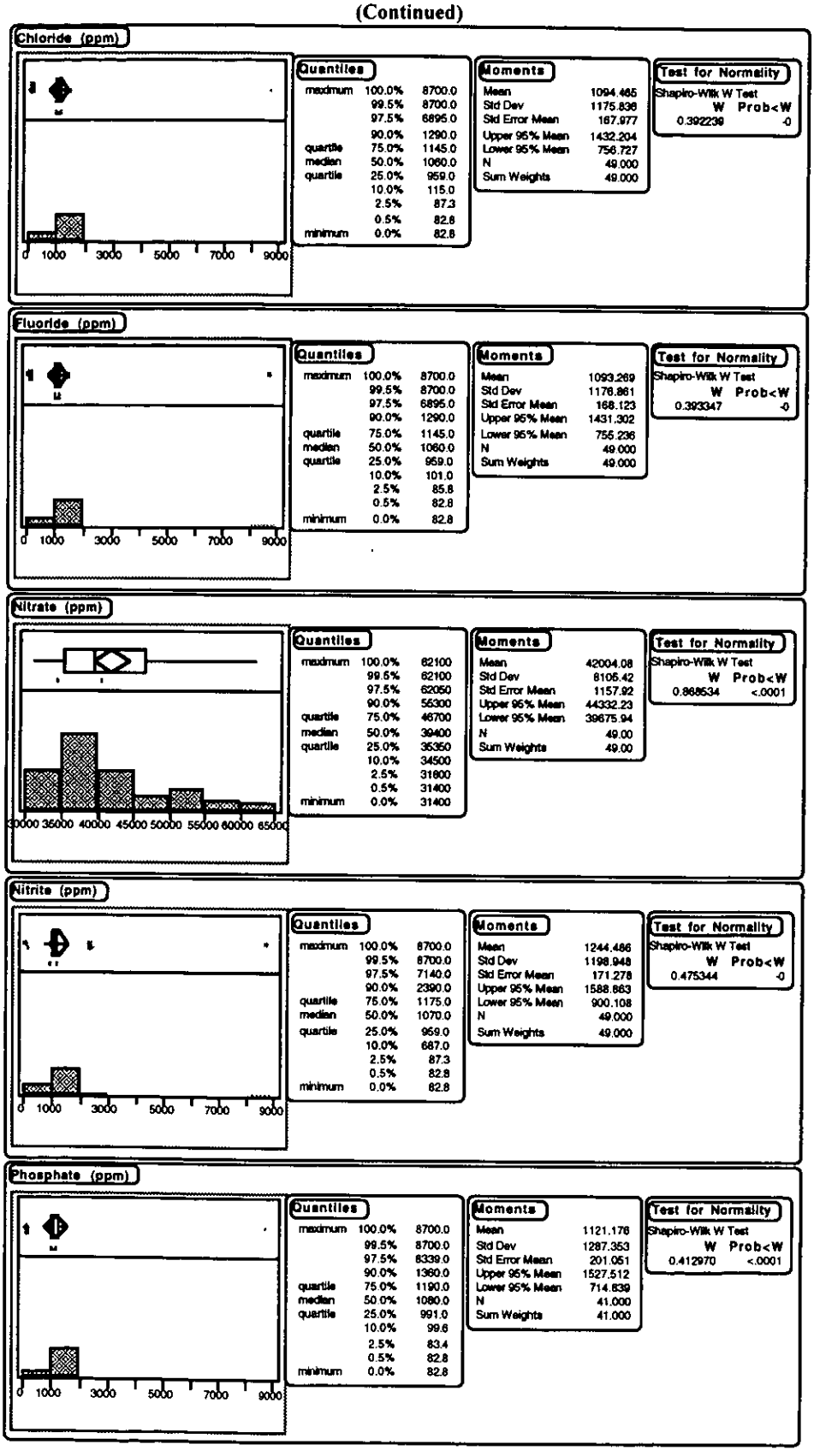


Exhibit 2: Summary Statistics for Measurements from SRAT Product Samples (Continued)



Chloride (ppm)

Quantiles		
maximum	100.0%	8700.0
	99.5%	8700.0
	97.5%	6895.0
	90.0%	1290.0
quartile	75.0%	1145.0
median	50.0%	1060.0
quartile	25.0%	959.0
	10.0%	115.0
	2.5%	87.3
	0.5%	82.8
minimum	0.0%	82.8

Moments	
Mean	1094.465
Std Dev	1175.836
Std Error Mean	167.977
Upper 95% Mean	1432.204
Lower 95% Mean	756.727
N	49.000
Sum Weights	49.000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.392239	-0

0 1000 3000 5000 7000 9000

Fluoride (ppm)

Quantiles		
maximum	100.0%	8700.0
	99.5%	8700.0
	97.5%	6895.0
	90.0%	1290.0
quartile	75.0%	1145.0
median	50.0%	1060.0
quartile	25.0%	959.0
	10.0%	101.0
	2.5%	85.8
	0.5%	82.8
minimum	0.0%	82.8

Moments	
Mean	1093.269
Std Dev	1176.861
Std Error Mean	168.123
Upper 95% Mean	1431.302
Lower 95% Mean	755.236
N	49.000
Sum Weights	49.000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.393347	-0

0 1000 3000 5000 7000 9000

Nitrate (ppm)

Quantiles		
maximum	100.0%	62100
	99.5%	62100
	97.5%	62050
	90.0%	55300
quartile	75.0%	46700
median	50.0%	39400
quartile	25.0%	35350
	10.0%	34500
	2.5%	31600
	0.5%	31400
minimum	0.0%	31400

Moments	
Mean	42004.08
Std Dev	8105.42
Std Error Mean	1157.92
Upper 95% Mean	44332.23
Lower 95% Mean	39675.94
N	49.00
Sum Weights	49.00

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.868534	<.0001

30000 35000 40000 45000 50000 55000 60000 65000

Nitrite (ppm)

Quantiles		
maximum	100.0%	8700.0
	99.5%	8700.0
	97.5%	7140.0
	90.0%	2390.0
quartile	75.0%	1175.0
median	50.0%	1070.0
quartile	25.0%	959.0
	10.0%	687.0
	2.5%	87.3
	0.5%	82.8
minimum	0.0%	82.8

Moments	
Mean	1244.486
Std Dev	1198.948
Std Error Mean	171.278
Upper 95% Mean	1588.863
Lower 95% Mean	900.108
N	49.000
Sum Weights	49.000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.475344	-0

0 1000 3000 5000 7000 9000

Phosphate (ppm)

Quantiles		
maximum	100.0%	8700.0
	99.5%	8700.0
	97.5%	8339.0
	90.0%	1360.0
quartile	75.0%	1190.0
median	50.0%	1080.0
quartile	25.0%	991.0
	10.0%	99.6
	2.5%	83.4
	0.5%	82.8
minimum	0.0%	82.8

Moments	
Mean	1121.176
Std Dev	1287.353
Std Error Mean	201.051
Upper 95% Mean	1527.512
Lower 95% Mean	714.839
N	41.000
Sum Weights	41.000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.412970	<.0001

0 1000 3000 5000 7000 9000

Exhibit 2: Summary Statistics for Measurements from SRAT Product Samples (Continued)

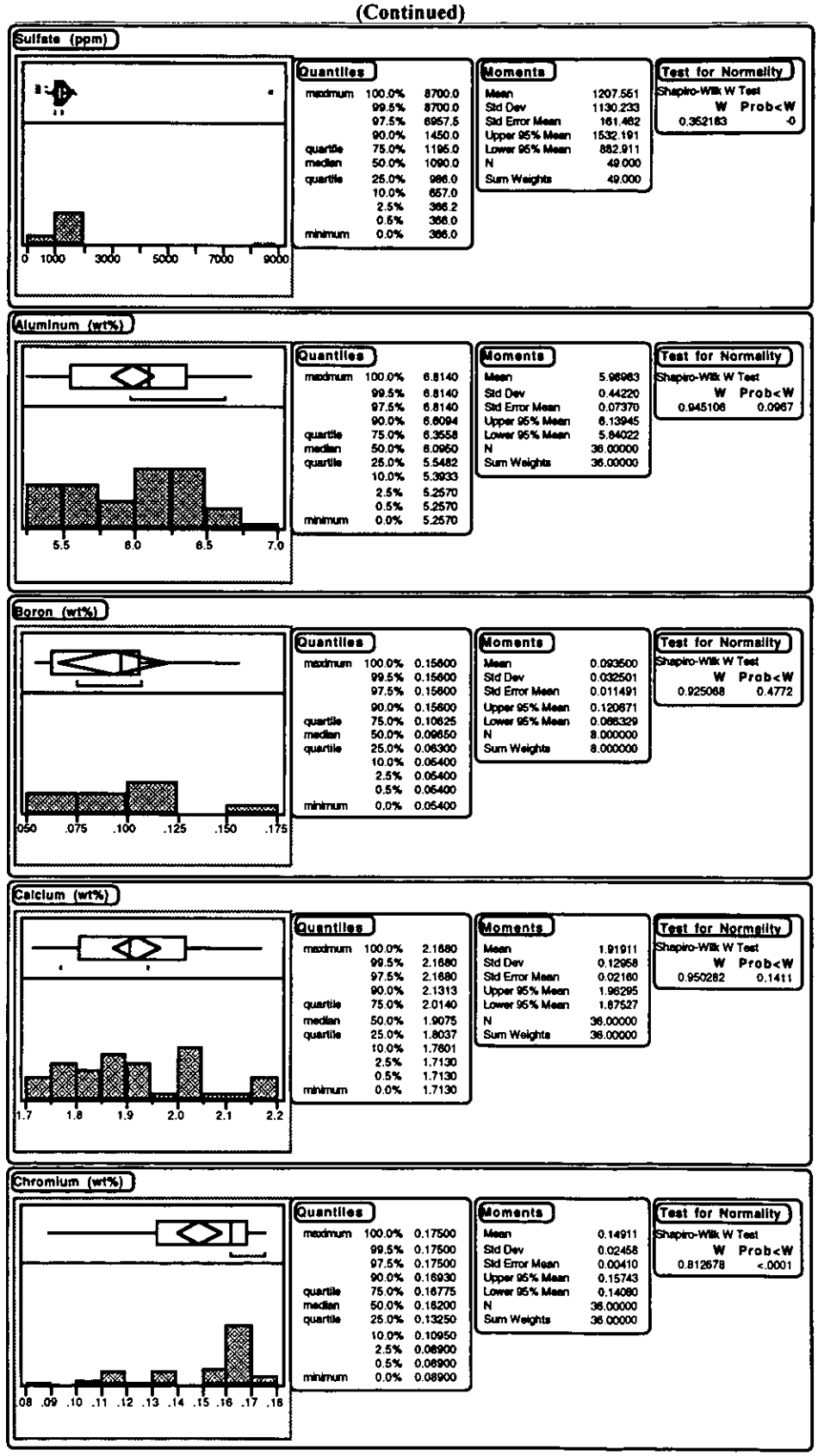


Exhibit 2: Summary Statistics for Measurements from SRAT Product Samples (Continued)

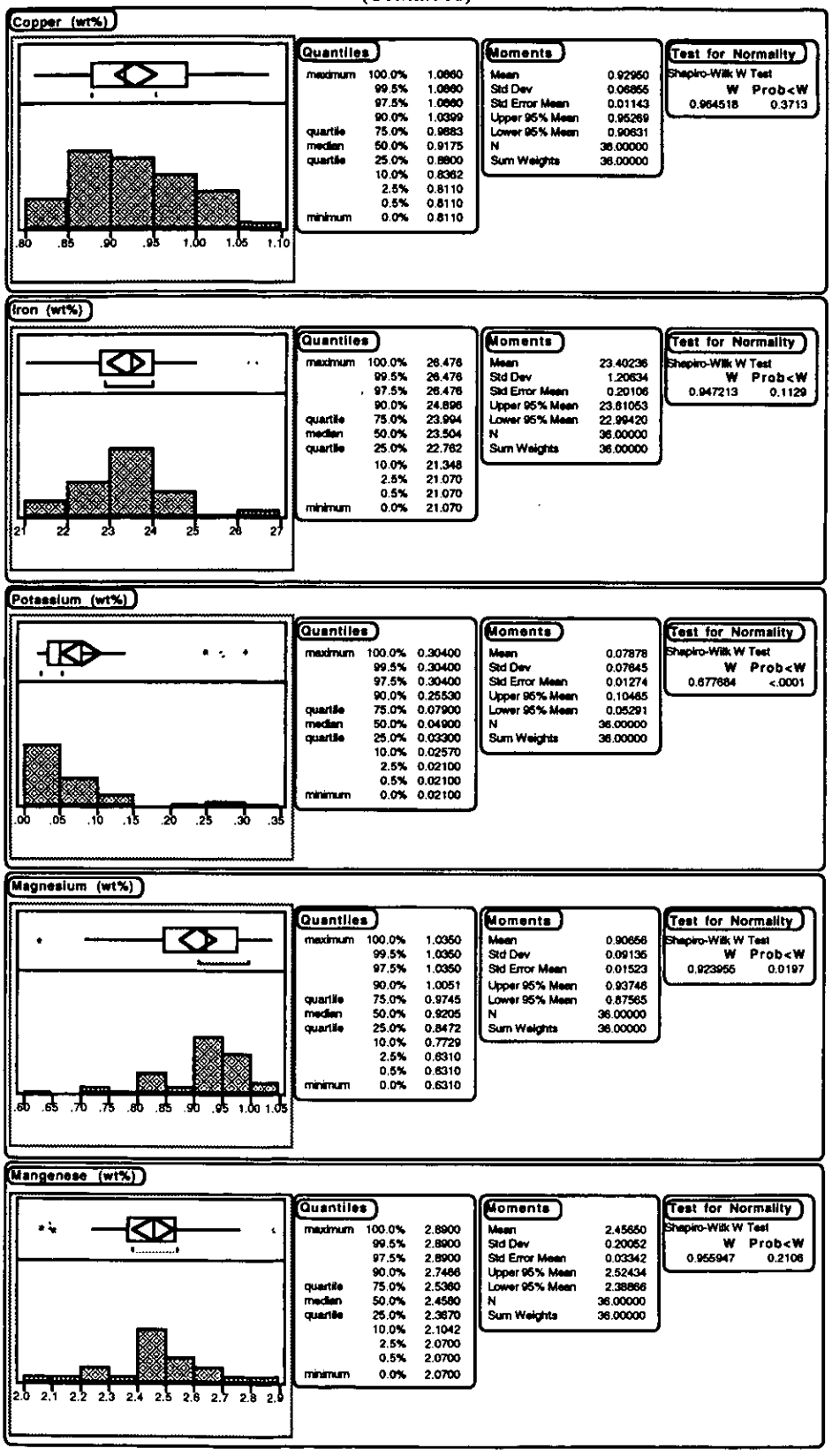


Exhibit 2: Summary Statistics for Measurements from SRAT Product Samples (Continued)

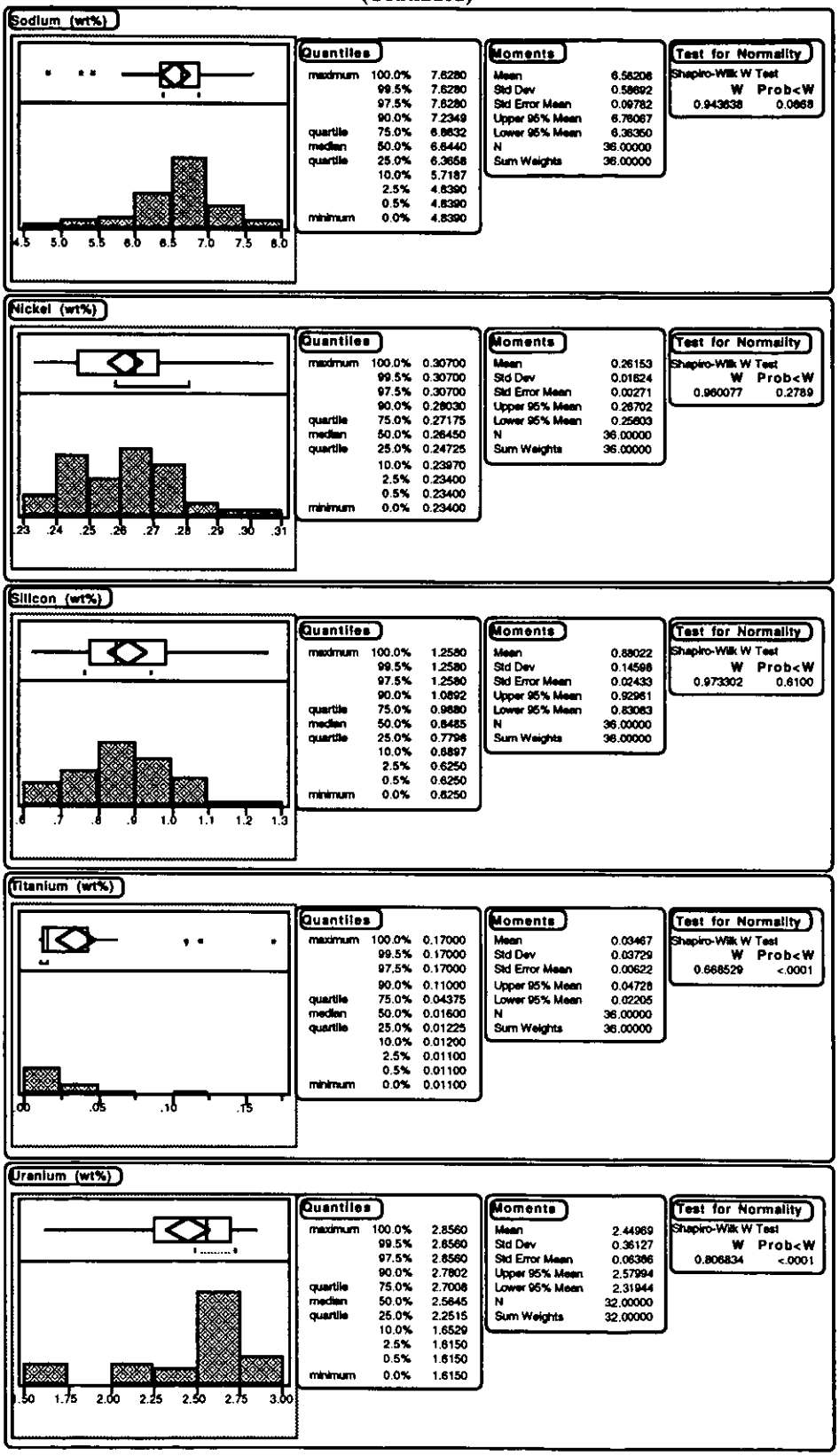


Exhibit 2: Summary Statistics for Measurements from SRAT Product Samples (Continued)

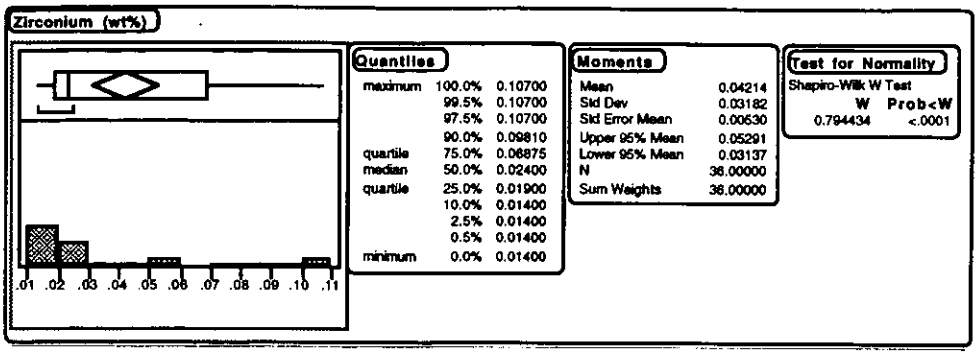


Exhibit 3: Summary Statistics for Measurements from SME Samples (Continued)

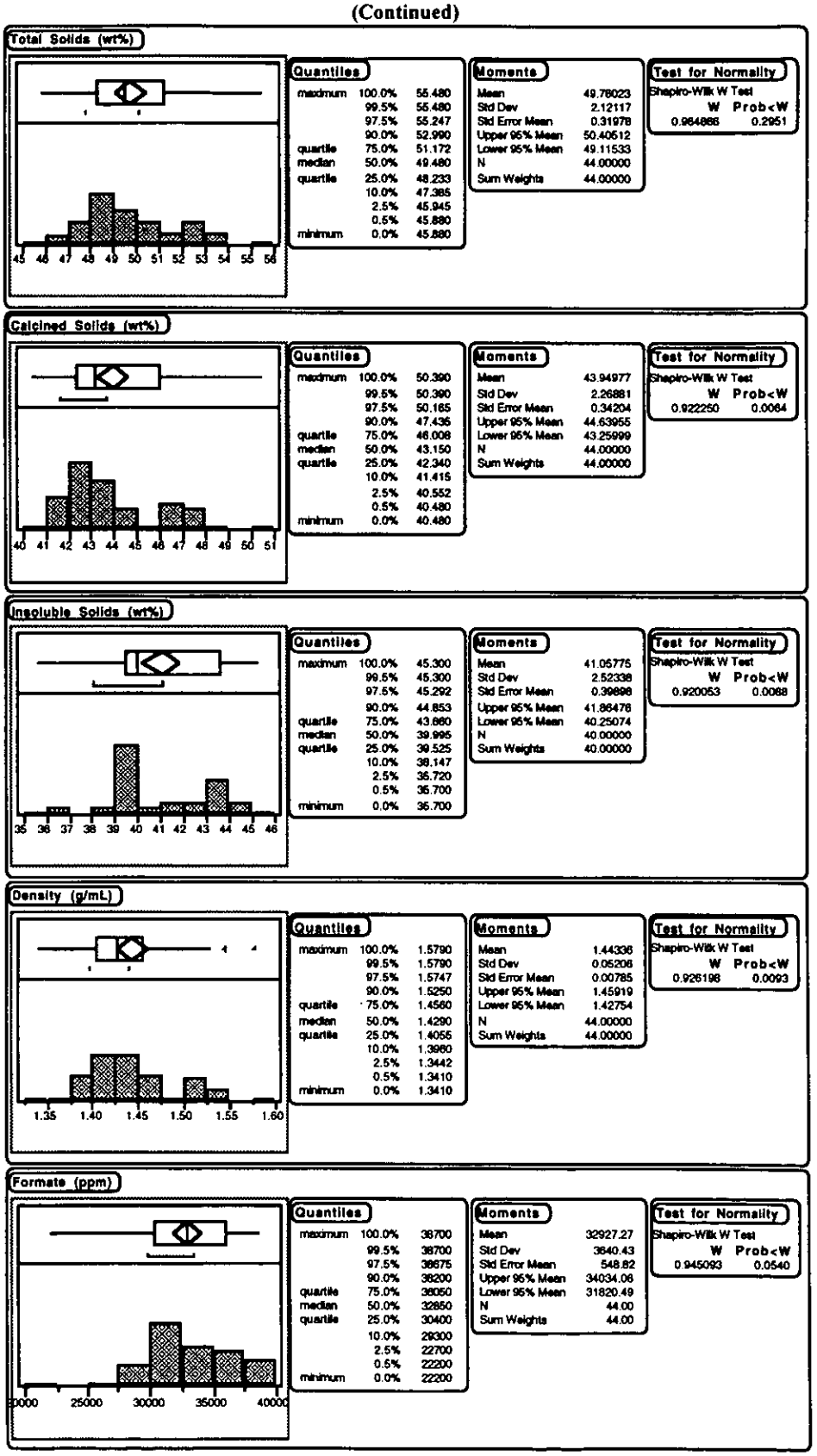
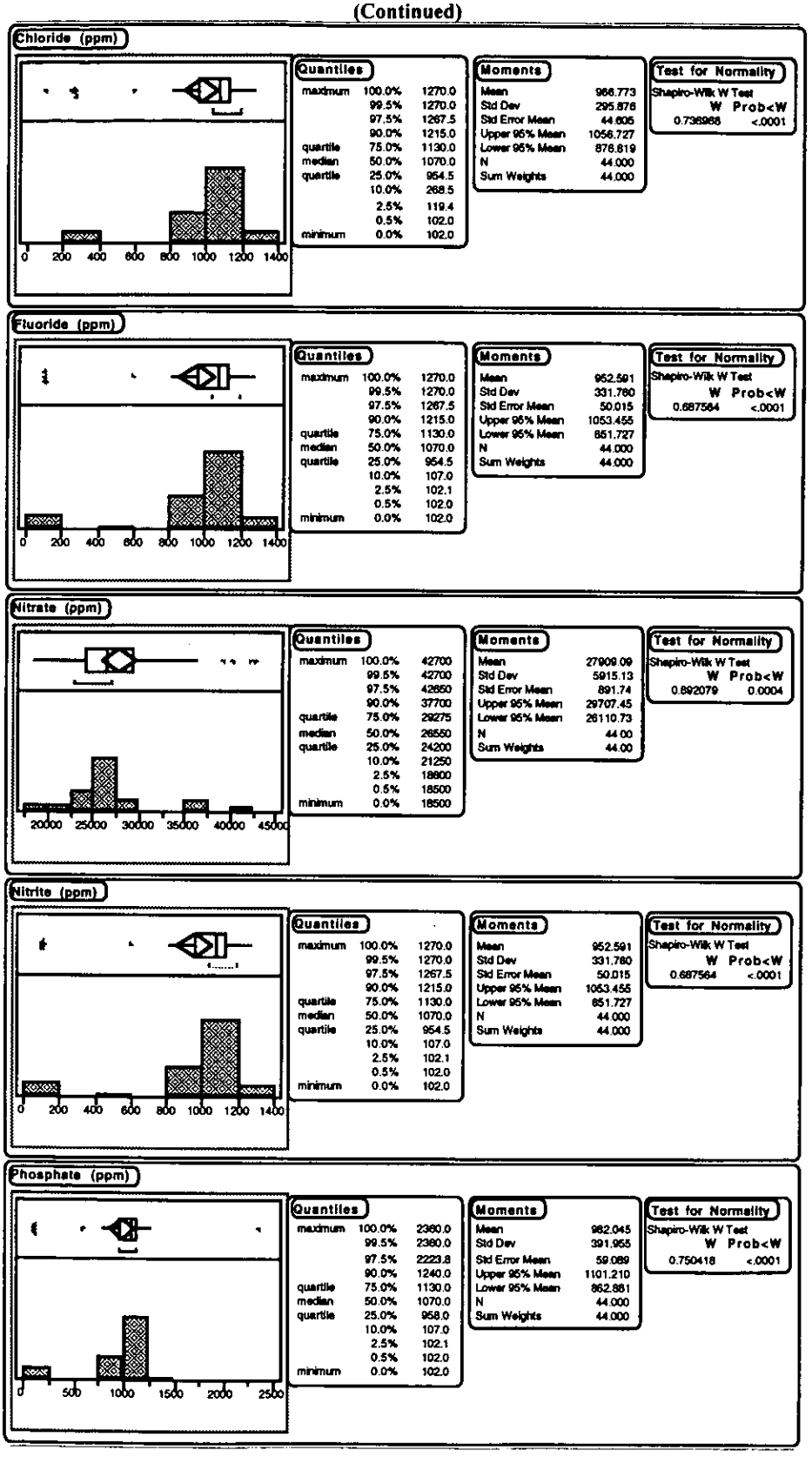


Exhibit 3: Summary Statistics for Measurements from SME Samples (Continued)



Chloride (ppm)

Quantiles

maximum	100.0%	1270.0
	99.5%	1270.0
	97.5%	1267.5
	90.0%	1215.0
quartile	75.0%	1130.0
median	50.0%	1070.0
quartile	25.0%	954.5
	10.0%	268.5
	2.5%	119.4
	0.5%	102.0
minimum	0.0%	102.0

Moments

Mean	966.773
Std Dev	295.876
Std Error Mean	44.605
Upper 95% Mean	1056.727
Lower 95% Mean	876.819
N	44.000
Sum Weights	44.000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.736968	<.0001

Fluoride (ppm)

Quantiles

maximum	100.0%	1270.0
	99.5%	1270.0
	97.5%	1267.5
	90.0%	1215.0
quartile	75.0%	1130.0
median	50.0%	1070.0
quartile	25.0%	954.5
	10.0%	107.0
	2.5%	102.1
	0.5%	102.0
minimum	0.0%	102.0

Moments

Mean	952.591
Std Dev	331.780
Std Error Mean	50.015
Upper 95% Mean	1053.455
Lower 95% Mean	851.727
N	44.000
Sum Weights	44.000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.687564	<.0001

Nitrate (ppm)

Quantiles

maximum	100.0%	42700
	99.5%	42700
	97.5%	42650
	90.0%	37700
quartile	75.0%	29275
median	50.0%	26550
quartile	25.0%	24200
	10.0%	21250
	2.5%	18800
	0.5%	18500
minimum	0.0%	18500

Moments

Mean	27909.09
Std Dev	5915.13
Std Error Mean	891.74
Upper 95% Mean	29707.45
Lower 95% Mean	26110.73
N	44.00
Sum Weights	44.00

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.892079	0.0004

Nitrite (ppm)

Quantiles

maximum	100.0%	1270.0
	99.5%	1270.0
	97.5%	1267.5
	90.0%	1215.0
quartile	75.0%	1130.0
median	50.0%	1070.0
quartile	25.0%	954.5
	10.0%	107.0
	2.5%	102.1
	0.5%	102.0
minimum	0.0%	102.0

Moments

Mean	952.591
Std Dev	331.780
Std Error Mean	50.015
Upper 95% Mean	1053.455
Lower 95% Mean	851.727
N	44.000
Sum Weights	44.000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.687564	<.0001

Phosphate (ppm)

Quantiles

maximum	100.0%	2360.0
	99.5%	2360.0
	97.5%	2223.8
	90.0%	1240.0
quartile	75.0%	1130.0
median	50.0%	1070.0
quartile	25.0%	958.0
	10.0%	107.0
	2.5%	102.1
	0.5%	102.0
minimum	0.0%	102.0

Moments

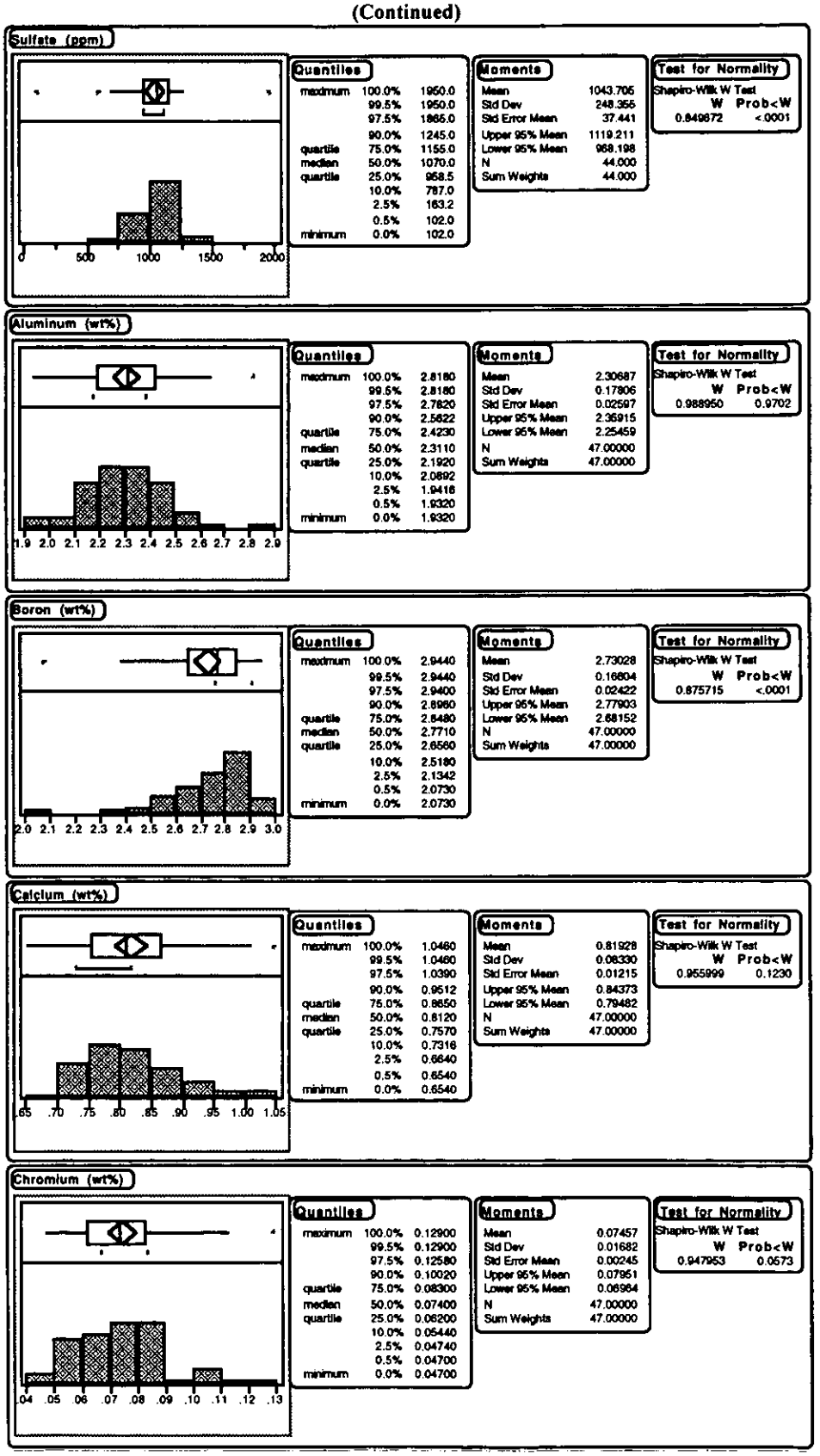
Mean	982.045
Std Dev	391.955
Std Error Mean	59.089
Upper 95% Mean	1101.210
Lower 95% Mean	862.881
N	44.000
Sum Weights	44.000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.750418	<.0001

Exhibit 3: Summary Statistics for Measurements from SME Samples (Continued)



Sulfate (ppm)

Quantiles		
maximum	100.0%	1950.0
	99.5%	1950.0
	97.5%	1865.0
	90.0%	1245.0
quartile	75.0%	1155.0
median	50.0%	1070.0
quartile	25.0%	958.5
	10.0%	787.0
	2.5%	163.2
	0.5%	102.0
minimum	0.0%	102.0

Moments	
Mean	1043.705
Std Dev	248.355
Std Error Mean	37.441
Upper 95% Mean	1119.211
Lower 95% Mean	968.198
N	44.000
Sum Weights	44.000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.849872	<.0001

Aluminum (wt%)

Quantiles		
maximum	100.0%	2.8180
	99.5%	2.8180
	97.5%	2.7820
	90.0%	2.5622
quartile	75.0%	2.4230
median	50.0%	2.3110
quartile	25.0%	2.1920
	10.0%	2.0892
	2.5%	1.9416
	0.5%	1.9320
minimum	0.0%	1.9320

Moments	
Mean	2.30687
Std Dev	0.17806
Std Error Mean	0.02597
Upper 95% Mean	2.35915
Lower 95% Mean	2.25459
N	47.00000
Sum Weights	47.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.988950	0.9702

Boron (wt%)

Quantiles		
maximum	100.0%	2.9440
	99.5%	2.9440
	97.5%	2.9400
	90.0%	2.8980
quartile	75.0%	2.8480
median	50.0%	2.7710
quartile	25.0%	2.6560
	10.0%	2.5180
	2.5%	2.1342
	0.5%	2.0730
minimum	0.0%	2.0730

Moments	
Mean	2.73028
Std Dev	0.16804
Std Error Mean	0.02422
Upper 95% Mean	2.77903
Lower 95% Mean	2.68152
N	47.00000
Sum Weights	47.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.875715	<.0001

Calcium (wt%)

Quantiles		
maximum	100.0%	1.0460
	99.5%	1.0460
	97.5%	1.0390
	90.0%	0.9512
quartile	75.0%	0.8650
median	50.0%	0.8120
quartile	25.0%	0.7570
	10.0%	0.7316
	2.5%	0.6640
	0.5%	0.6540
minimum	0.0%	0.6540

Moments	
Mean	0.81928
Std Dev	0.08330
Std Error Mean	0.01215
Upper 95% Mean	0.84373
Lower 95% Mean	0.79482
N	47.00000
Sum Weights	47.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.955999	0.1230

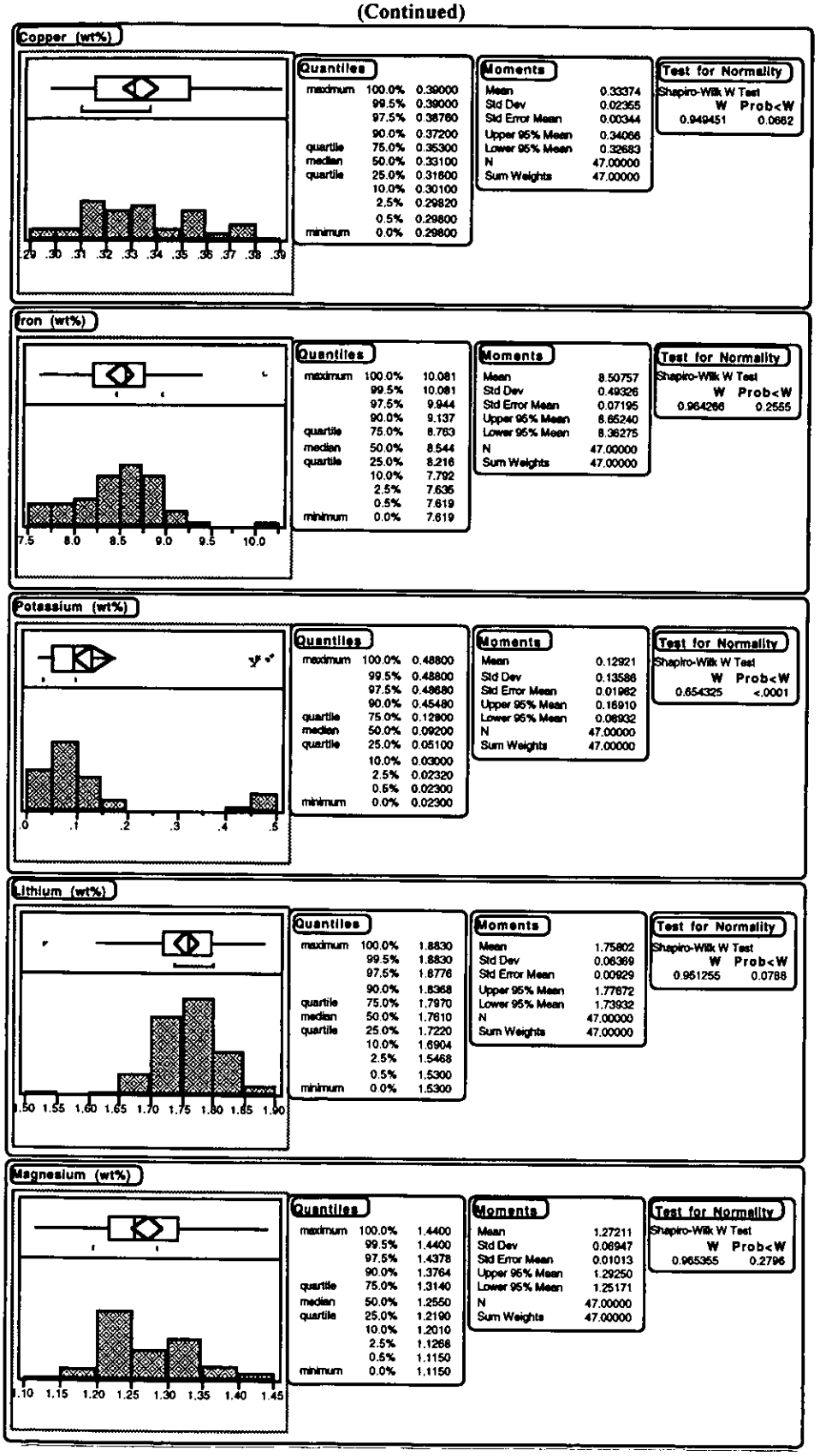
Chromium (wt%)

Quantiles		
maximum	100.0%	0.12900
	99.5%	0.12900
	97.5%	0.12580
	90.0%	0.10020
quartile	75.0%	0.08300
median	50.0%	0.07400
quartile	25.0%	0.06200
	10.0%	0.05440
	2.5%	0.04740
	0.5%	0.04700
minimum	0.0%	0.04700

Moments	
Mean	0.07457
Std Dev	0.01682
Std Error Mean	0.00245
Upper 95% Mean	0.07951
Lower 95% Mean	0.06964
N	47.00000
Sum Weights	47.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.947953	0.0573

Exhibit 3: Summary Statistics for Measurements from SME Samples (Continued)



Copper (wt%)

Quantiles

maximum	100.0%	0.39000
	99.5%	0.39000
	97.5%	0.38760
	90.0%	0.37200
quartile	75.0%	0.35300
median	50.0%	0.33100
quartile	25.0%	0.31600
	10.0%	0.30100
	2.5%	0.29820
	0.5%	0.29800
minimum	0.0%	0.29800

Moments

Mean	0.33374
Std Dev	0.02355
Std Error Mean	0.00344
Upper 95% Mean	0.34066
Lower 95% Mean	0.32683
N	47.00000
Sum Weights	47.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.949451	0.0662

Iron (wt%)

Quantiles

maximum	100.0%	10.081
	99.5%	10.081
	97.5%	9.944
	90.0%	9.137
quartile	75.0%	8.763
median	50.0%	8.544
quartile	25.0%	8.216
	10.0%	7.792
	2.5%	7.636
	0.5%	7.619
minimum	0.0%	7.619

Moments

Mean	8.50757
Std Dev	0.49326
Std Error Mean	0.07195
Upper 95% Mean	8.65240
Lower 95% Mean	8.36275
N	47.00000
Sum Weights	47.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.964266	0.2555

Potassium (wt%)

Quantiles

maximum	100.0%	0.48800
	99.5%	0.48800
	97.5%	0.48680
	90.0%	0.45480
quartile	75.0%	0.12800
median	50.0%	0.09200
quartile	25.0%	0.05100
	10.0%	0.03000
	2.5%	0.02320
	0.5%	0.02300
minimum	0.0%	0.02300

Moments

Mean	0.12921
Std Dev	0.13586
Std Error Mean	0.01982
Upper 95% Mean	0.16910
Lower 95% Mean	0.08932
N	47.00000
Sum Weights	47.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.654325	<.0001

Lithium (wt%)

Quantiles

maximum	100.0%	1.8830
	99.5%	1.8830
	97.5%	1.8776
	90.0%	1.8368
quartile	75.0%	1.7970
median	50.0%	1.7610
quartile	25.0%	1.7220
	10.0%	1.6904
	2.5%	1.5468
	0.5%	1.5300
minimum	0.0%	1.5300

Moments

Mean	1.75802
Std Dev	0.06369
Std Error Mean	0.00929
Upper 95% Mean	1.77672
Lower 95% Mean	1.73932
N	47.00000
Sum Weights	47.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.951255	0.0788

Magnesium (wt%)

Quantiles

maximum	100.0%	1.4400
	99.5%	1.4400
	97.5%	1.4378
	90.0%	1.3764
quartile	75.0%	1.3140
median	50.0%	1.2550
quartile	25.0%	1.2190
	10.0%	1.2010
	2.5%	1.1268
	0.5%	1.1150
minimum	0.0%	1.1150

Moments

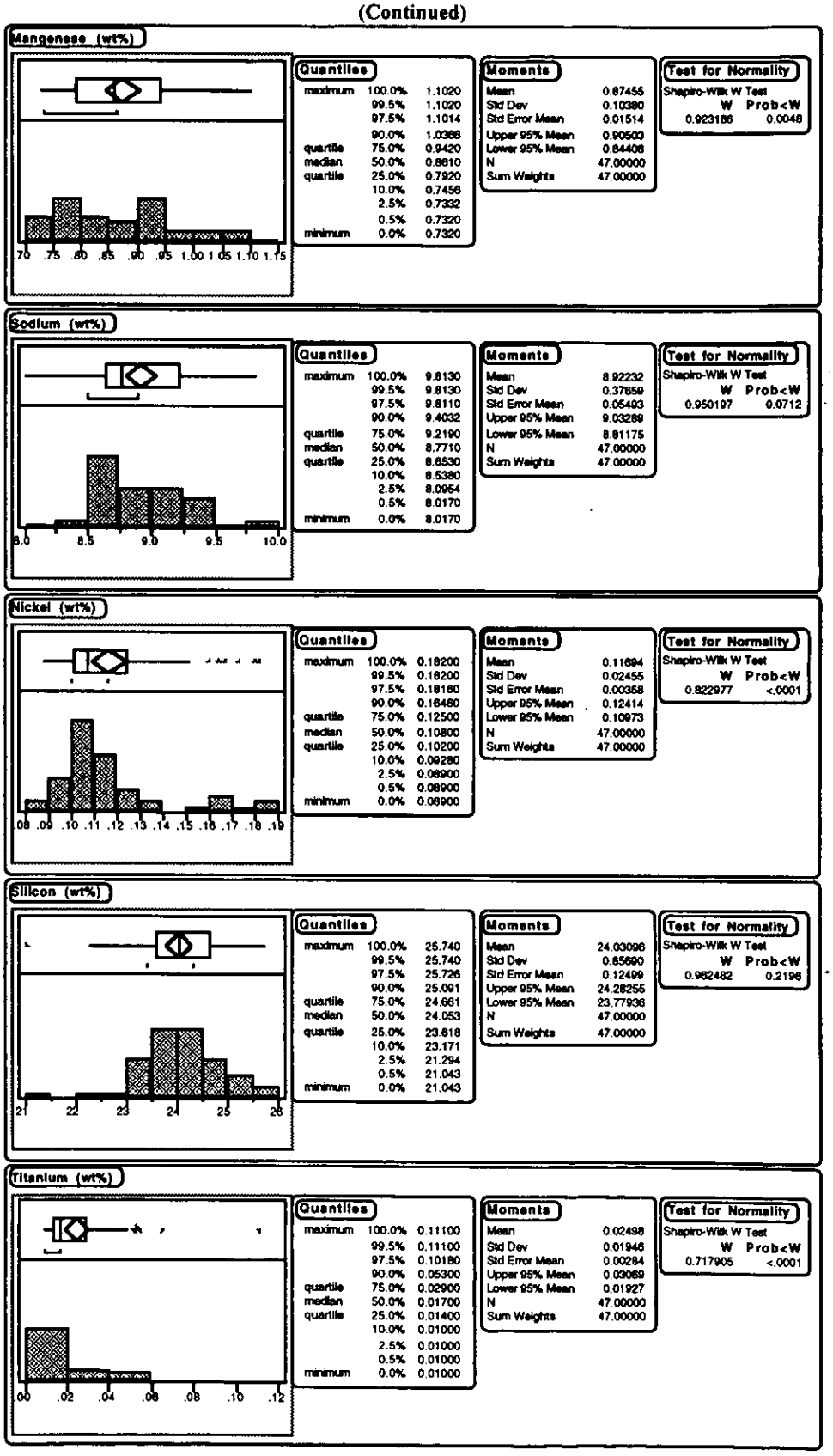
Mean	1.27211
Std Dev	0.06947
Std Error Mean	0.01013
Upper 95% Mean	1.29250
Lower 95% Mean	1.25171
N	47.00000
Sum Weights	47.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.965355	0.2796

Exhibit 3: Summary Statistics for Measurements from SME Samples (Continued)



Manganese (wt%)

Quantiles

maximum	100.0%	1.1020
	99.5%	1.1020
	97.5%	1.1014
	90.0%	1.0366
quartile	75.0%	0.9420
median	50.0%	0.8610
quartile	25.0%	0.7920
	10.0%	0.7456
	2.5%	0.7332
	0.5%	0.7320
minimum	0.0%	0.7320

Moments

Mean	0.87455
Std Dev	0.10380
Std Error Mean	0.01514
Upper 95% Mean	0.90503
Lower 95% Mean	0.84406
N	47.00000
Sum Weights	47.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.923166	0.0048

Sodium (wt%)

Quantiles

maximum	100.0%	9.8130
	99.5%	9.8130
	97.5%	9.8110
	90.0%	9.4032
quartile	75.0%	9.2190
median	50.0%	8.7710
quartile	25.0%	8.6530
	10.0%	8.5380
	2.5%	8.0954
	0.5%	8.0170
minimum	0.0%	8.0170

Moments

Mean	8.92232
Std Dev	0.37659
Std Error Mean	0.05493
Upper 95% Mean	9.03289
Lower 95% Mean	8.81175
N	47.00000
Sum Weights	47.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.950197	0.0712

Nickel (wt%)

Quantiles

maximum	100.0%	0.18200
	99.5%	0.18200
	97.5%	0.18160
	90.0%	0.16480
quartile	75.0%	0.12500
median	50.0%	0.10800
quartile	25.0%	0.10200
	10.0%	0.09280
	2.5%	0.08900
	0.5%	0.08900
minimum	0.0%	0.08900

Moments

Mean	0.11694
Std Dev	0.02455
Std Error Mean	0.00358
Upper 95% Mean	0.12414
Lower 95% Mean	0.10973
N	47.00000
Sum Weights	47.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.822977	<.0001

Silicon (wt%)

Quantiles

maximum	100.0%	25.740
	99.5%	25.740
	97.5%	25.726
	90.0%	25.091
quartile	75.0%	24.661
median	50.0%	24.053
quartile	25.0%	23.618
	10.0%	23.171
	2.5%	21.294
	0.5%	21.043
minimum	0.0%	21.043

Moments

Mean	24.03096
Std Dev	0.85690
Std Error Mean	0.12499
Upper 95% Mean	24.28255
Lower 95% Mean	23.77936
N	47.00000
Sum Weights	47.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.962482	0.2196

Titanium (wt%)

Quantiles

maximum	100.0%	0.11100
	99.5%	0.11100
	97.5%	0.10180
	90.0%	0.05300
quartile	75.0%	0.02900
median	50.0%	0.01700
quartile	25.0%	0.01400
	10.0%	0.01000
	2.5%	0.01000
	0.5%	0.01000
minimum	0.0%	0.01000

Moments

Mean	0.02498
Std Dev	0.01946
Std Error Mean	0.00284
Upper 95% Mean	0.03069
Lower 95% Mean	0.01927
N	47.00000
Sum Weights	47.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.717905	<.0001

Exhibit 3: Summary Statistics for Measurements from SME Samples (Continued)

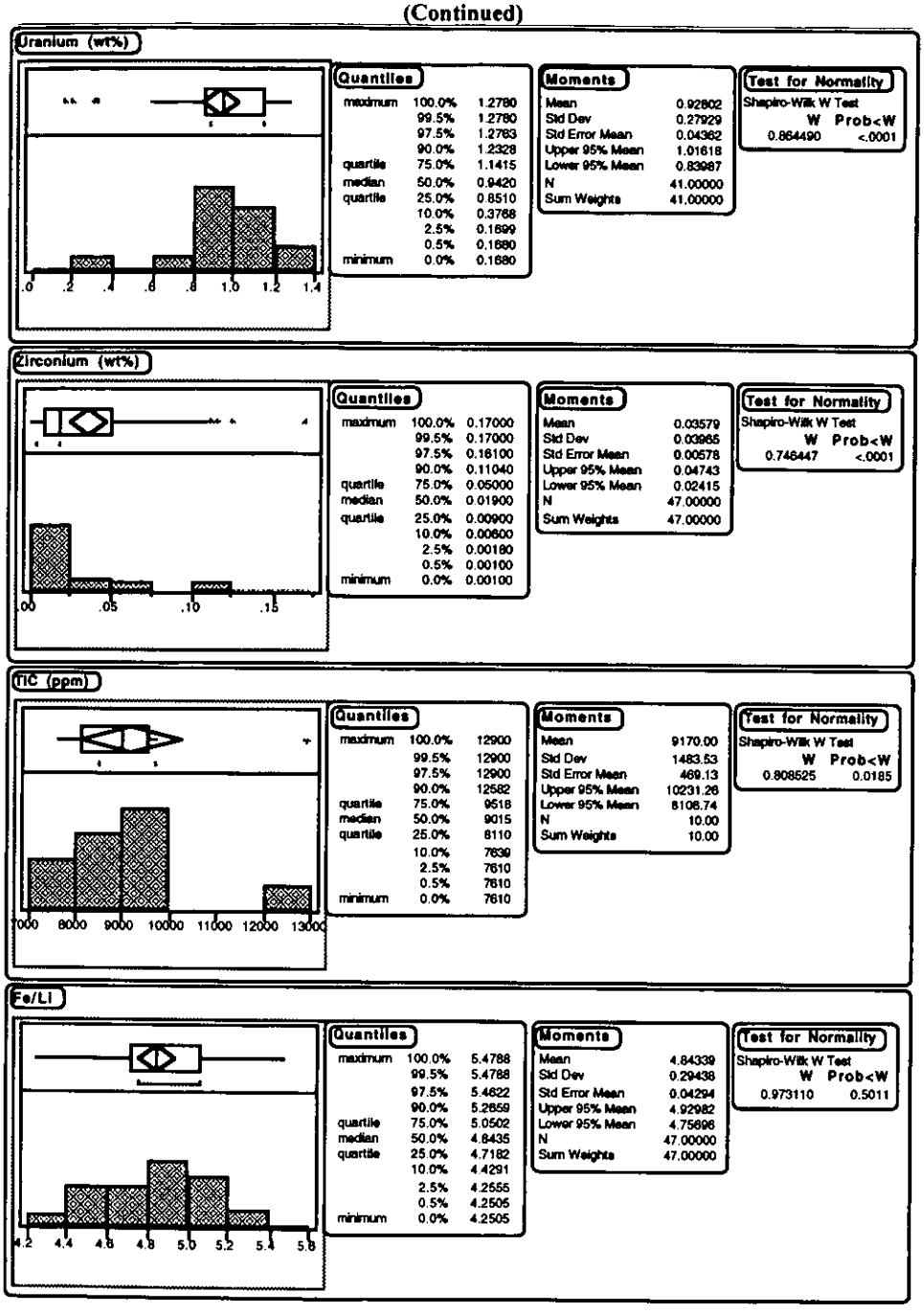


Exhibit 4: Summary Statistics for Measurements from MFT Samples

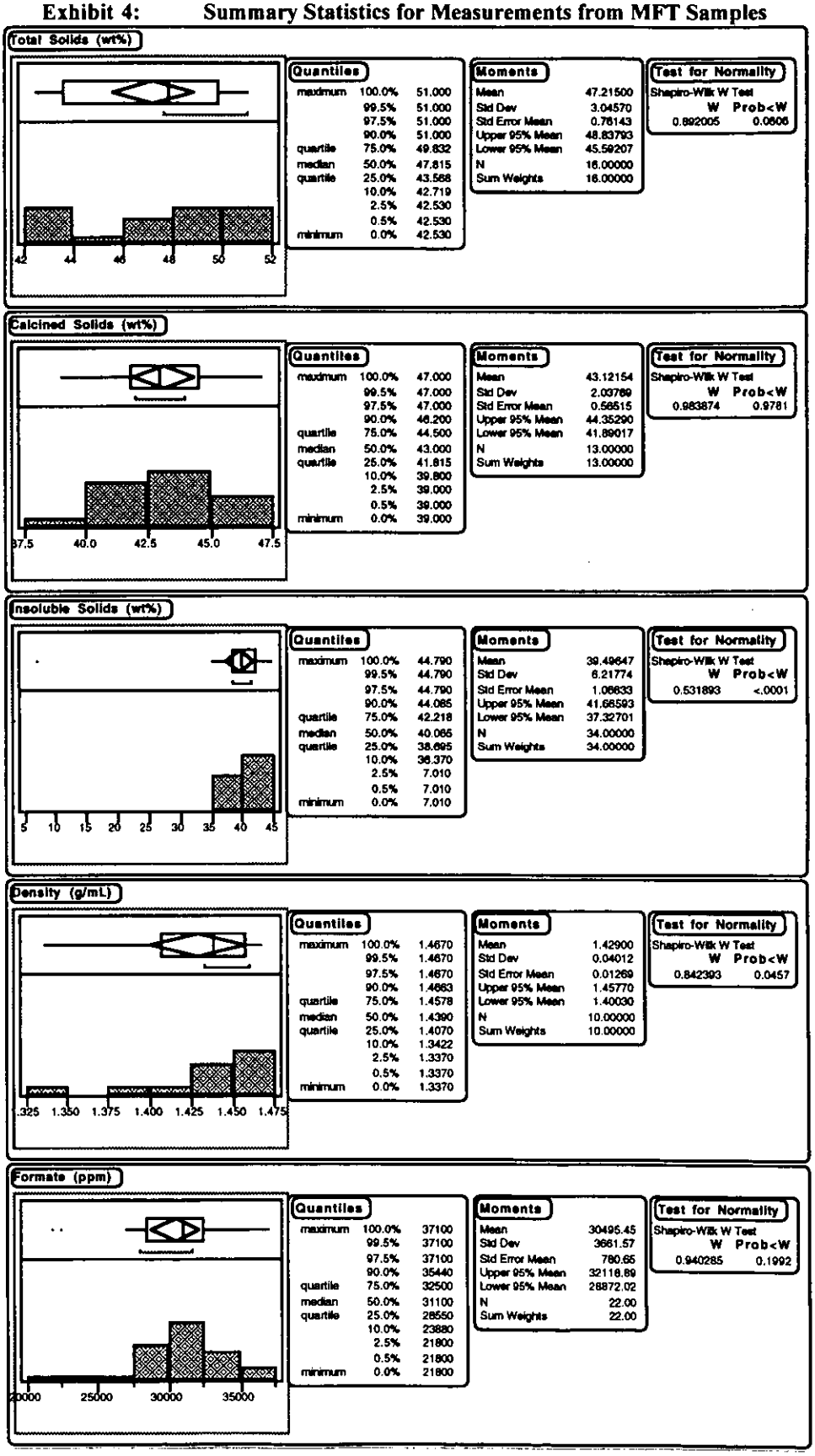
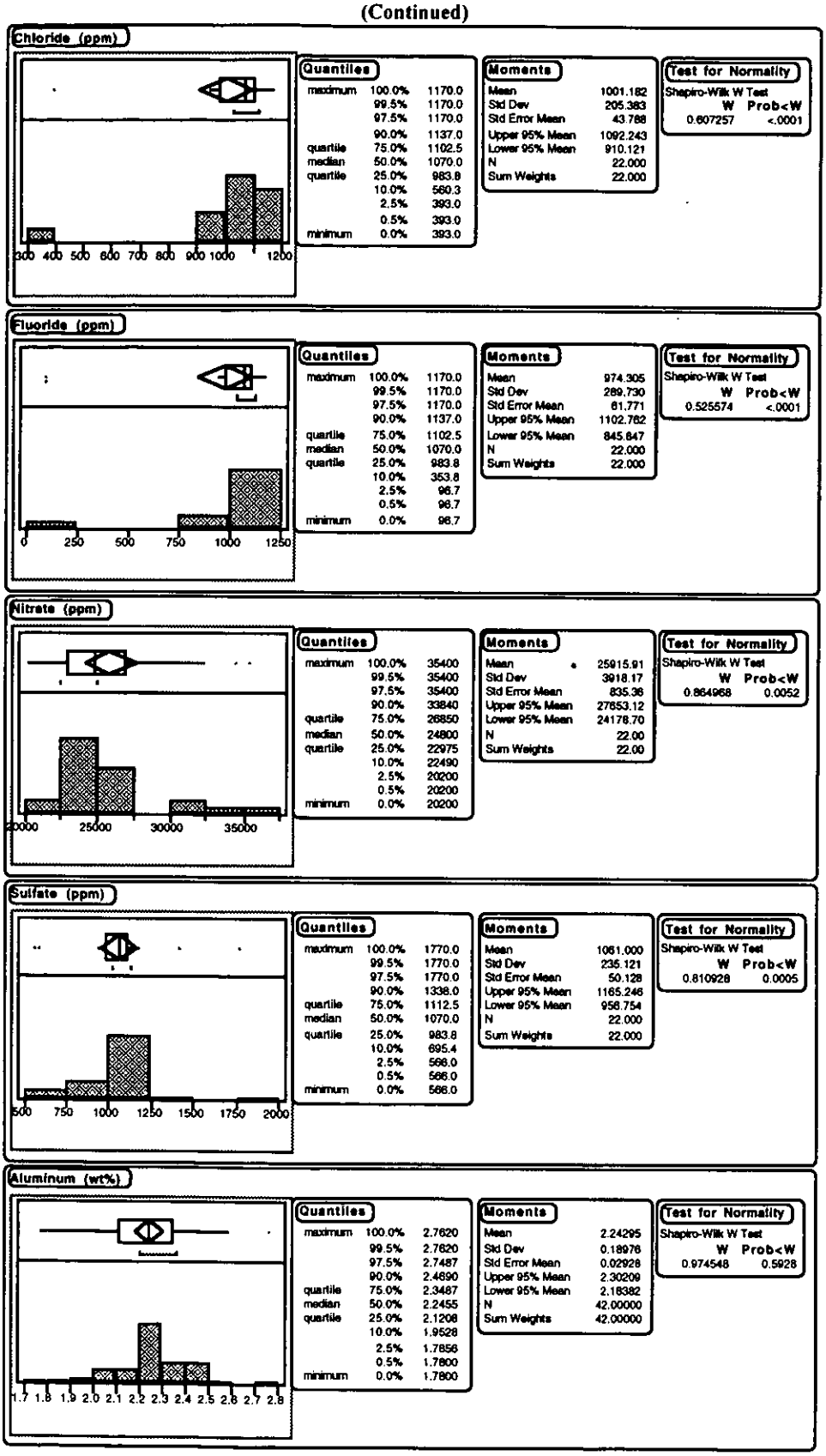


Exhibit 4: Summary Statistics for Measurements from MFT Samples (Continued)



Chloride (ppm)

Quantiles		
maximum	100.0%	1170.0
	99.5%	1170.0
	97.5%	1170.0
	90.0%	1137.0
quartile	75.0%	1102.5
median	50.0%	1070.0
quartile	25.0%	983.8
	10.0%	560.3
	2.5%	393.0
	0.5%	393.0
minimum	0.0%	393.0

Moments	
Mean	1001.182
Std Dev	205.383
Std Error Mean	43.788
Upper 95% Mean	1092.243
Lower 95% Mean	910.121
N	22.000
Sum Weights	22.000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.607257	<.0001

Fluoride (ppm)

Quantiles		
maximum	100.0%	1170.0
	99.5%	1170.0
	97.5%	1170.0
	90.0%	1137.0
quartile	75.0%	1102.5
median	50.0%	1070.0
quartile	25.0%	983.8
	10.0%	353.8
	2.5%	96.7
	0.5%	96.7
minimum	0.0%	96.7

Moments	
Mean	974.305
Std Dev	289.730
Std Error Mean	61.771
Upper 95% Mean	1102.782
Lower 95% Mean	845.847
N	22.000
Sum Weights	22.000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.525574	<.0001

Nitrate (ppm)

Quantiles		
maximum	100.0%	35400
	99.5%	35400
	97.5%	35400
	90.0%	33840
quartile	75.0%	26850
median	50.0%	24800
quartile	25.0%	22975
	10.0%	22490
	2.5%	20200
	0.5%	20200
minimum	0.0%	20200

Moments	
Mean	25915.91
Std Dev	3918.17
Std Error Mean	835.36
Upper 95% Mean	27653.12
Lower 95% Mean	24178.70
N	22.00
Sum Weights	22.00

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.864968	0.0052

Sulfate (ppm)

Quantiles		
maximum	100.0%	1770.0
	99.5%	1770.0
	97.5%	1770.0
	90.0%	1338.0
quartile	75.0%	1112.5
median	50.0%	1070.0
quartile	25.0%	983.8
	10.0%	695.4
	2.5%	566.0
	0.5%	566.0
minimum	0.0%	566.0

Moments	
Mean	1061.000
Std Dev	235.121
Std Error Mean	50.128
Upper 95% Mean	1165.246
Lower 95% Mean	956.754
N	22.000
Sum Weights	22.000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.810928	0.0005

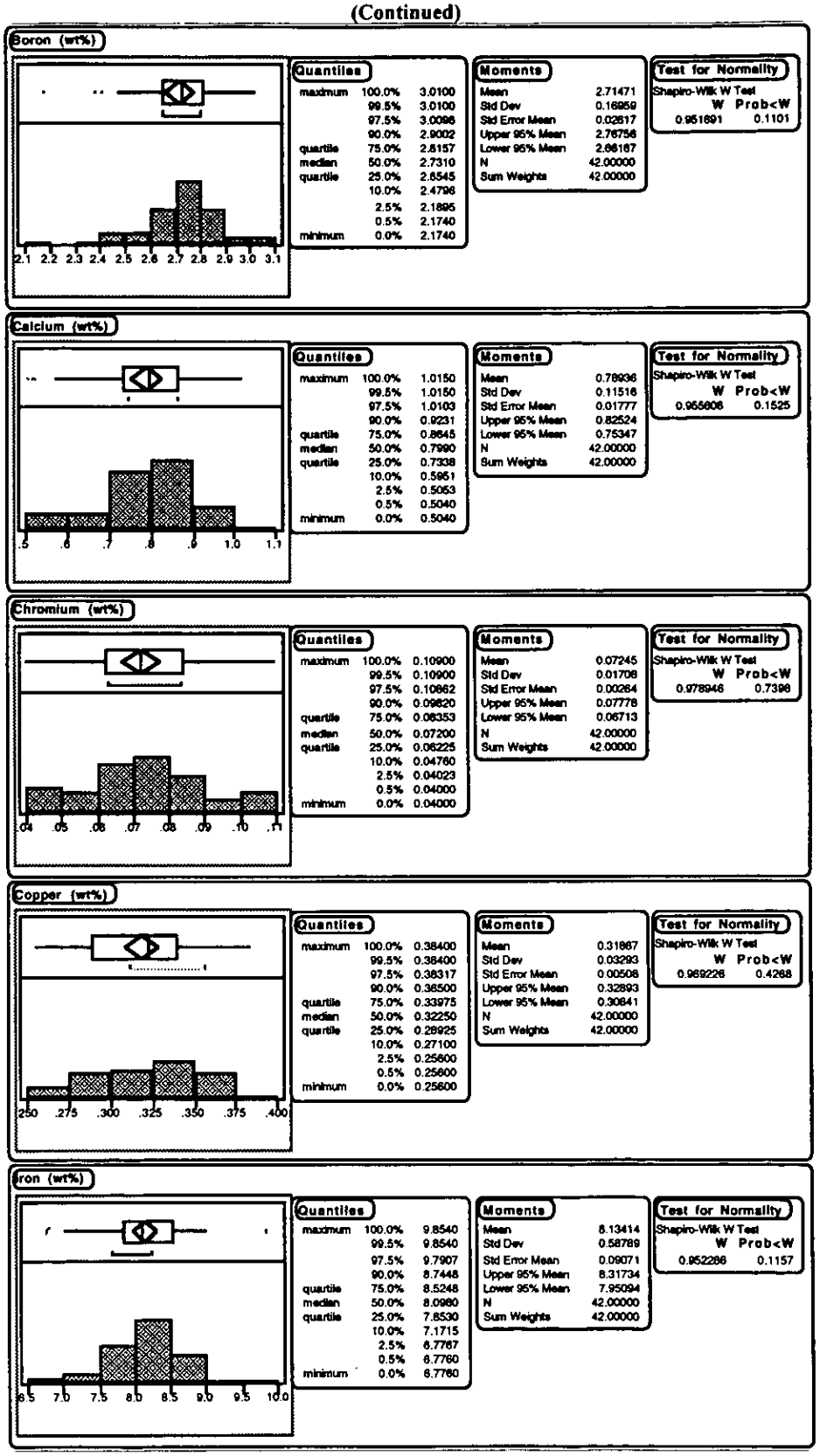
Aluminum (wt%)

Quantiles		
maximum	100.0%	2.7620
	99.5%	2.7620
	97.5%	2.7487
	90.0%	2.4690
quartile	75.0%	2.3487
median	50.0%	2.2455
quartile	25.0%	2.1208
	10.0%	1.9528
	2.5%	1.7856
	0.5%	1.7800
minimum	0.0%	1.7800

Moments	
Mean	2.24295
Std Dev	0.18976
Std Error Mean	0.02928
Upper 95% Mean	2.30209
Lower 95% Mean	2.18382
N	42.00000
Sum Weights	42.00000

Test for Normality	
Shapiro-Wilk W Test	
W	Prob<W
0.974548	0.5928

Exhibit 4: Summary Statistics for Measurements from MFT Samples (Continued)



Boron (wt%)

Quantiles

maximum	100.0%	3.0100
	99.5%	3.0100
	97.5%	3.0096
	90.0%	2.9002
quartile	75.0%	2.8157
median	50.0%	2.7310
quartile	25.0%	2.6545
	10.0%	2.4796
	2.5%	2.1895
	0.5%	2.1740
minimum	0.0%	2.1740

Moments

Mean	2.71471
Std Dev	0.16959
Std Error Mean	0.02617
Upper 95% Mean	2.76756
Lower 95% Mean	2.66187
N	42.00000
Sum Weights	42.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.951691	0.1101

Calcium (wt%)

Quantiles

maximum	100.0%	1.0150
	99.5%	1.0150
	97.5%	1.0103
	90.0%	0.9231
quartile	75.0%	0.8645
median	50.0%	0.7990
quartile	25.0%	0.7338
	10.0%	0.5951
	2.5%	0.5053
	0.5%	0.5040
minimum	0.0%	0.5040

Moments

Mean	0.78936
Std Dev	0.11516
Std Error Mean	0.01777
Upper 95% Mean	0.82524
Lower 95% Mean	0.75347
N	42.00000
Sum Weights	42.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.955606	0.1525

Chromium (wt%)

Quantiles

maximum	100.0%	0.10900
	99.5%	0.10900
	97.5%	0.10862
	90.0%	0.09820
quartile	75.0%	0.08353
median	50.0%	0.07200
quartile	25.0%	0.06225
	10.0%	0.04760
	2.5%	0.04023
	0.5%	0.04000
minimum	0.0%	0.04000

Moments

Mean	0.07245
Std Dev	0.01708
Std Error Mean	0.00264
Upper 95% Mean	0.07778
Lower 95% Mean	0.06713
N	42.00000
Sum Weights	42.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.978946	0.7398

Copper (wt%)

Quantiles

maximum	100.0%	0.38400
	99.5%	0.38400
	97.5%	0.38317
	90.0%	0.36500
quartile	75.0%	0.33975
median	50.0%	0.32250
quartile	25.0%	0.28925
	10.0%	0.27100
	2.5%	0.25600
	0.5%	0.25600
minimum	0.0%	0.25600

Moments

Mean	0.31867
Std Dev	0.03293
Std Error Mean	0.00508
Upper 95% Mean	0.32893
Lower 95% Mean	0.30841
N	42.00000
Sum Weights	42.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.969226	0.4268

Iron (wt%)

Quantiles

maximum	100.0%	9.8540
	99.5%	9.8540
	97.5%	9.7907
	90.0%	8.7448
quartile	75.0%	8.5248
median	50.0%	8.0980
quartile	25.0%	7.8530
	10.0%	7.1715
	2.5%	6.7767
	0.5%	6.7760
minimum	0.0%	6.7760

Moments

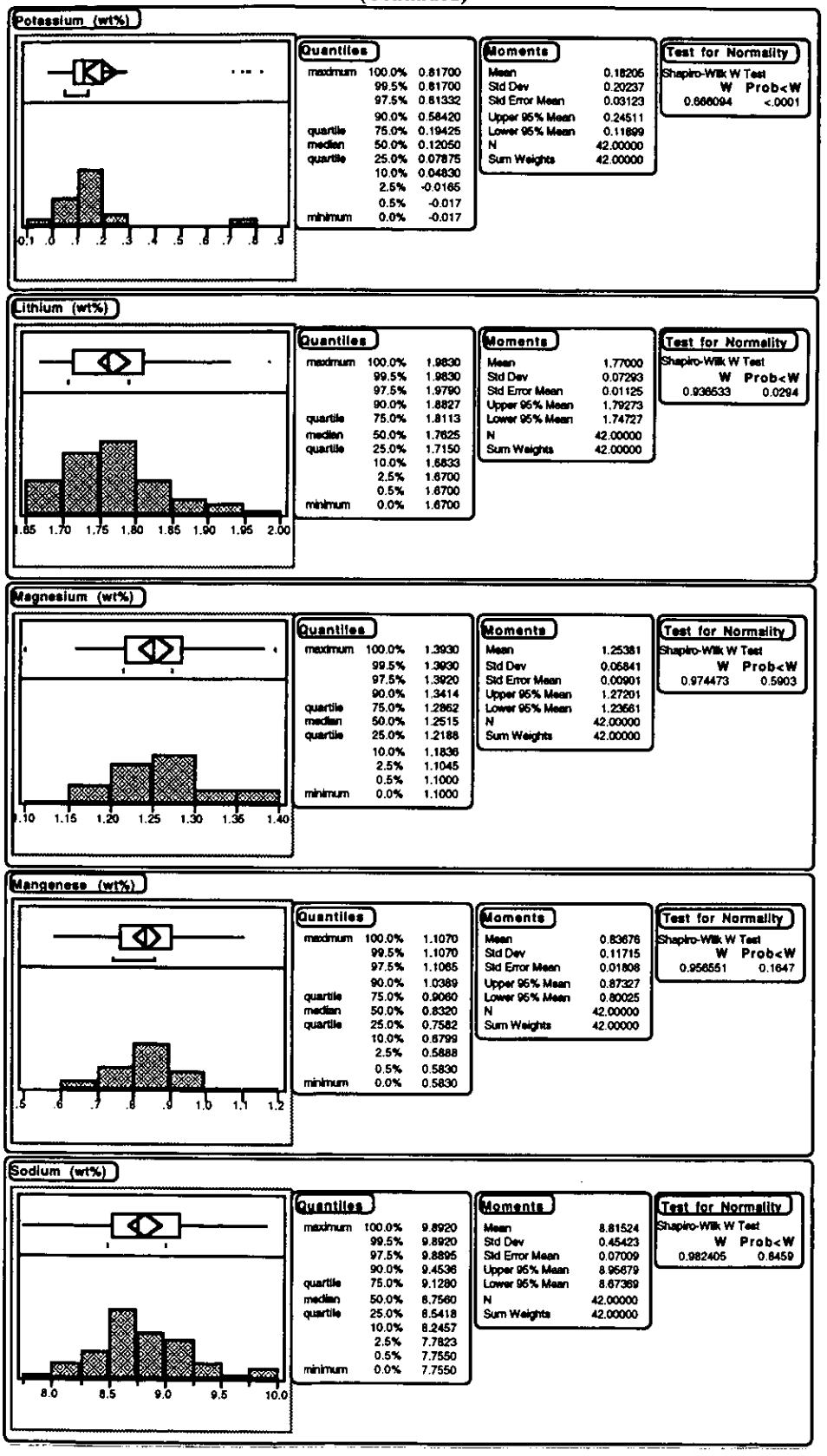
Mean	8.13414
Std Dev	0.58789
Std Error Mean	0.09071
Upper 95% Mean	8.31734
Lower 95% Mean	7.95094
N	42.00000
Sum Weights	42.00000

Test for Normality

Shapiro-Wilk W Test

W	Prob<W
0.952286	0.1157

Exhibit 4: Summary Statistics for Measurements from MFT Samples (Continued)



Potassium (wt%)

Quantiles		
maximum	100.0%	0.81700
	99.5%	0.81700
	97.5%	0.81332
	90.0%	0.58420
quartile	75.0%	0.19425
median	50.0%	0.12050
quartile	25.0%	0.07875
	10.0%	0.04830
	2.5%	-0.0165
	0.5%	-0.017
minimum	0.0%	-0.017

Moments	
Mean	0.18205
Std Dev	0.20237
Std Error Mean	0.03123
Upper 95% Mean	0.24511
Lower 95% Mean	0.11899
N	42.00000
Sum Weights	42.00000

Test for Normality		
Shapiro-Wilk W Test		
	W	Prob<W
	0.666094	<.0001

Lithium (wt%)

Quantiles		
maximum	100.0%	1.9830
	99.5%	1.9830
	97.5%	1.9790
	90.0%	1.8827
quartile	75.0%	1.8113
median	50.0%	1.7625
quartile	25.0%	1.7150
	10.0%	1.6833
	2.5%	1.6700
	0.5%	1.6700
minimum	0.0%	1.6700

Moments	
Mean	1.77000
Std Dev	0.07293
Std Error Mean	0.01125
Upper 95% Mean	1.79273
Lower 95% Mean	1.74727
N	42.00000
Sum Weights	42.00000

Test for Normality		
Shapiro-Wilk W Test		
	W	Prob<W
	0.936533	0.0294

Magnesium (wt%)

Quantiles		
maximum	100.0%	1.3930
	99.5%	1.3930
	97.5%	1.3920
	90.0%	1.3414
quartile	75.0%	1.2862
median	50.0%	1.2515
quartile	25.0%	1.2188
	10.0%	1.1836
	2.5%	1.1045
	0.5%	1.1000
minimum	0.0%	1.1000

Moments	
Mean	1.25381
Std Dev	0.05841
Std Error Mean	0.00901
Upper 95% Mean	1.27201
Lower 95% Mean	1.23561
N	42.00000
Sum Weights	42.00000

Test for Normality		
Shapiro-Wilk W Test		
	W	Prob<W
	0.974473	0.5903

Manganese (wt%)

Quantiles		
maximum	100.0%	1.1070
	99.5%	1.1070
	97.5%	1.1065
	90.0%	1.0389
quartile	75.0%	0.9060
median	50.0%	0.8320
quartile	25.0%	0.7582
	10.0%	0.6799
	2.5%	0.5888
	0.5%	0.5830
minimum	0.0%	0.5830

Moments	
Mean	0.83676
Std Dev	0.11715
Std Error Mean	0.01808
Upper 95% Mean	0.87327
Lower 95% Mean	0.80025
N	42.00000
Sum Weights	42.00000

Test for Normality		
Shapiro-Wilk W Test		
	W	Prob<W
	0.956551	0.1647

Sodium (wt%)

Quantiles		
maximum	100.0%	9.8920
	99.5%	9.8920
	97.5%	9.8895
	90.0%	9.4536
quartile	75.0%	9.1280
median	50.0%	8.7560
quartile	25.0%	8.5418
	10.0%	8.2457
	2.5%	7.7823
	0.5%	7.7550
minimum	0.0%	7.7550

Moments	
Mean	8.81524
Std Dev	0.45423
Std Error Mean	0.07009
Upper 95% Mean	8.95679
Lower 95% Mean	8.67369
N	42.00000
Sum Weights	42.00000

Test for Normality		
Shapiro-Wilk W Test		
	W	Prob<W
	0.982405	0.8459

Exhibit 4: Summary Statistics for Measurements from MFT Samples (Continued)

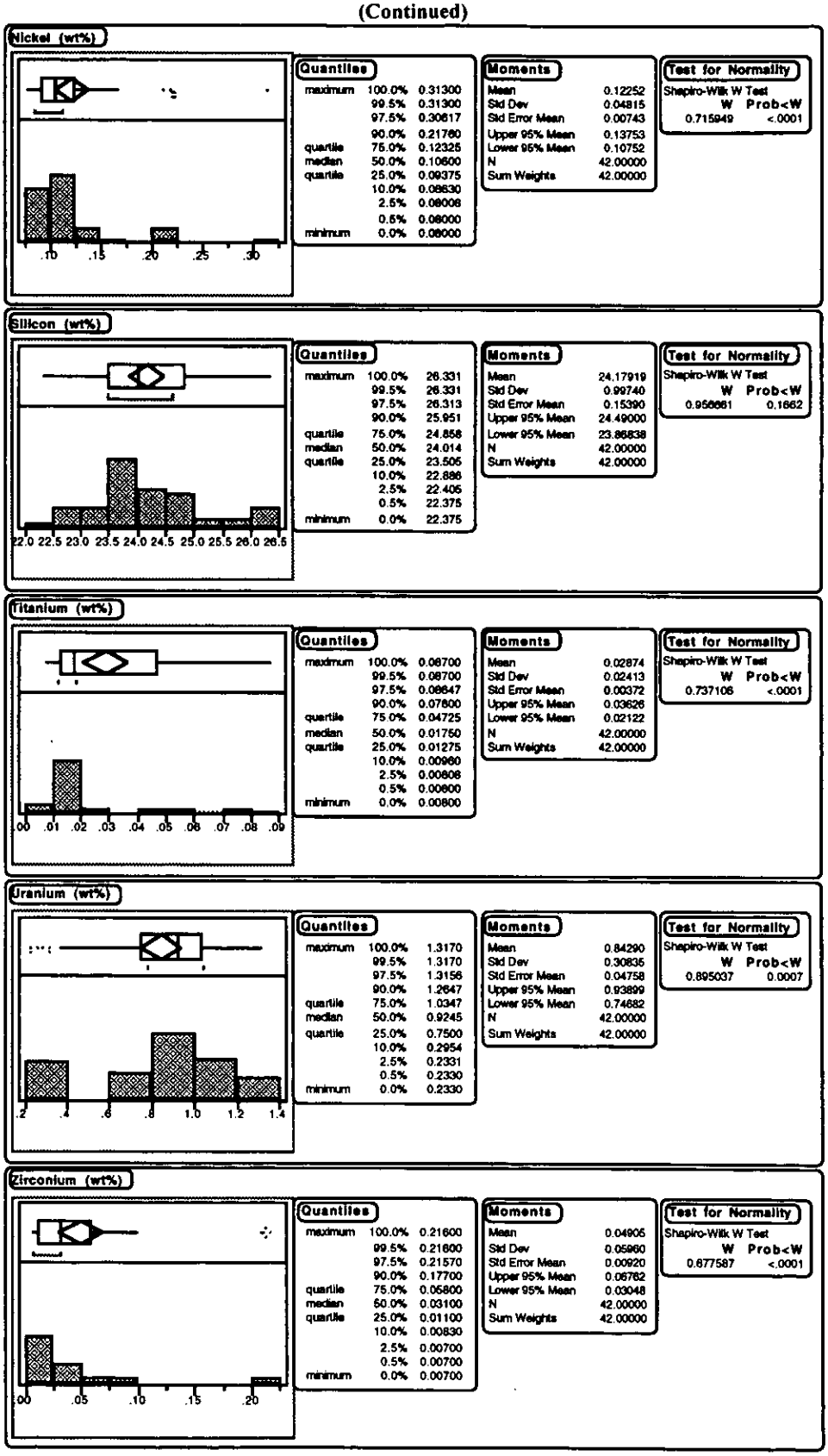
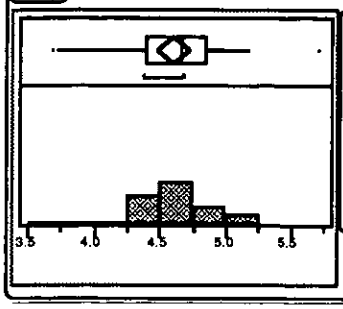


Exhibit 4: Summary Statistics for Measurements from MFT Samples (Continued)

Fe/Li



Quantiles

maximum	100.0%	5.7125
	99.5%	5.7125
	97.5%	5.6725
	90.0%	5.0787
quantile	75.0%	4.8493
median	50.0%	4.6689
quantile	25.0%	4.3948
	10.0%	3.9986
	2.5%	3.6928
	0.5%	3.6903
minimum	0.0%	3.6903

Moments

Mean	4.60382
Std Dev	0.39021
Std Error Mean	0.06021
Upper 95% Mean	4.72542
Lower 95% Mean	4.48223
N	42.00000
Sum Weights	42.00000

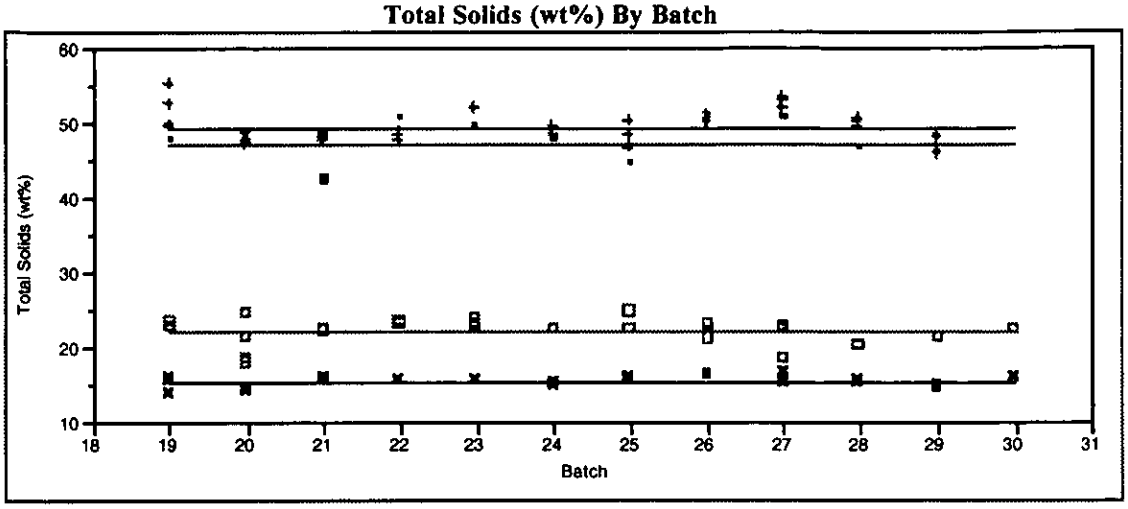
Test for Normality

Shapiro-Wilk W Test	
W	Prob<W
0.962820	0.2698

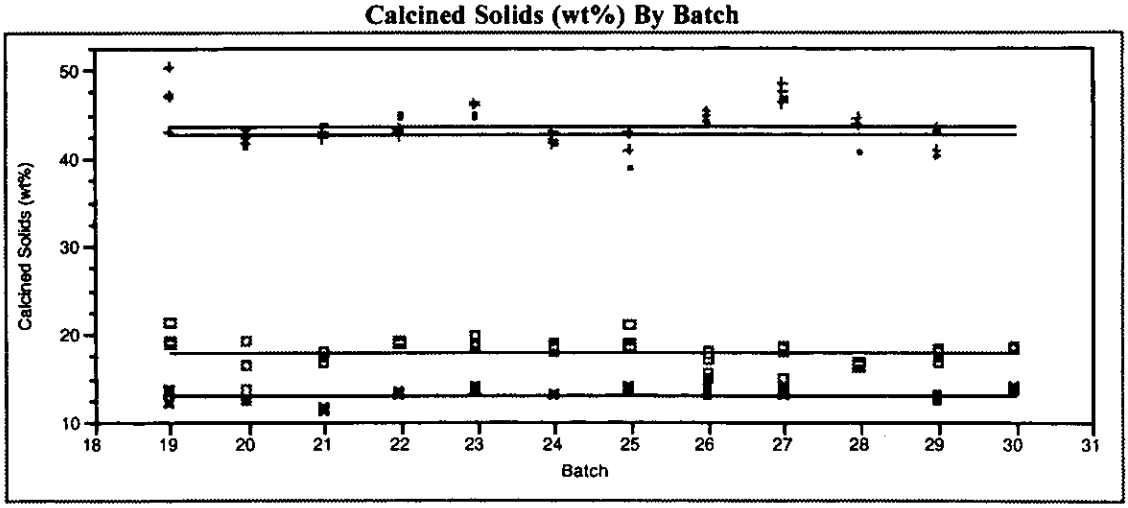
Exhibit 5: A Chart of Sample Measurements by Batch by Vessel

Small Box - MFT; Plus - SME; Open Box - SRAT Receipt; x's - SRAT Product

Total Solids (wt%) By Batch



Calcined Solids (wt%) By Batch



Insoluble Solids (wt%) By Batch

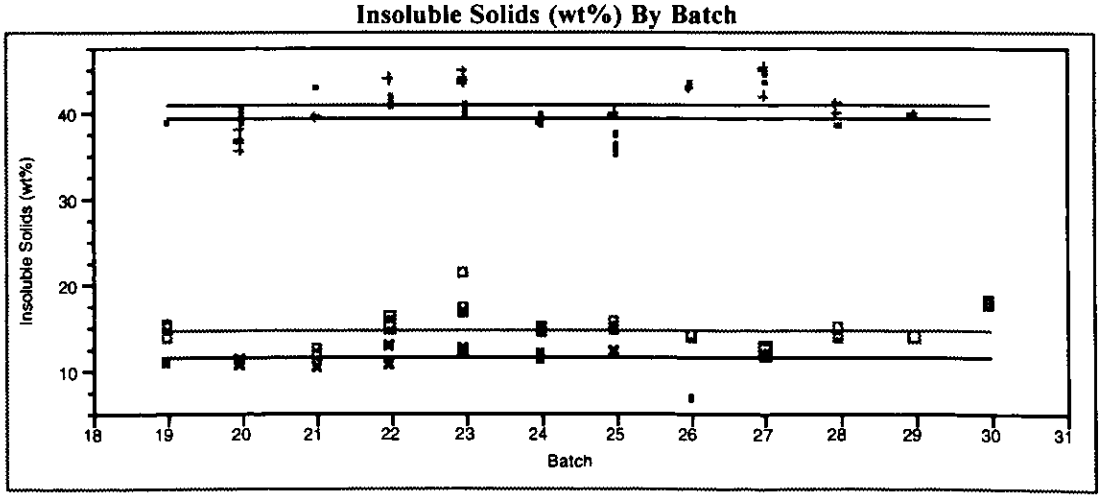
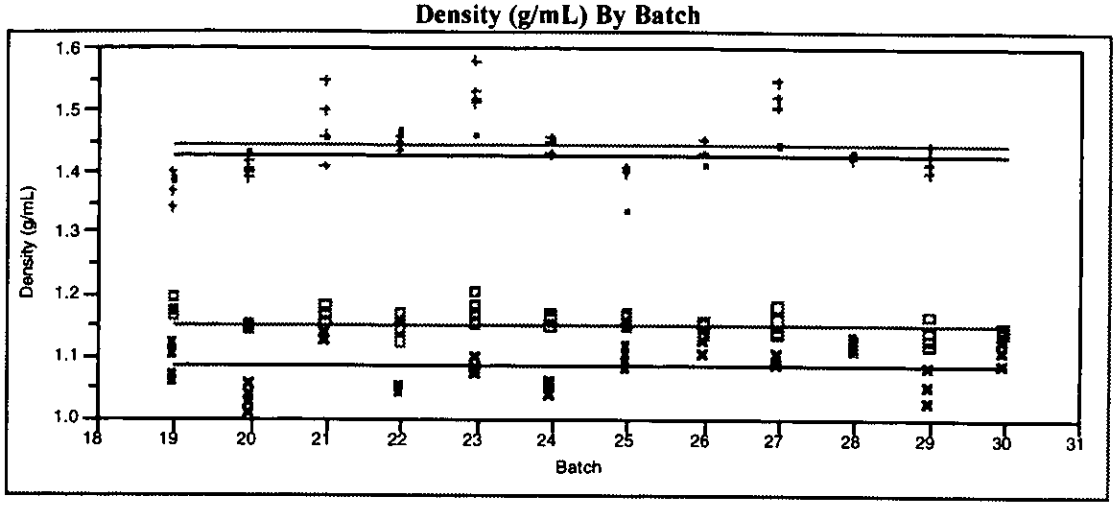


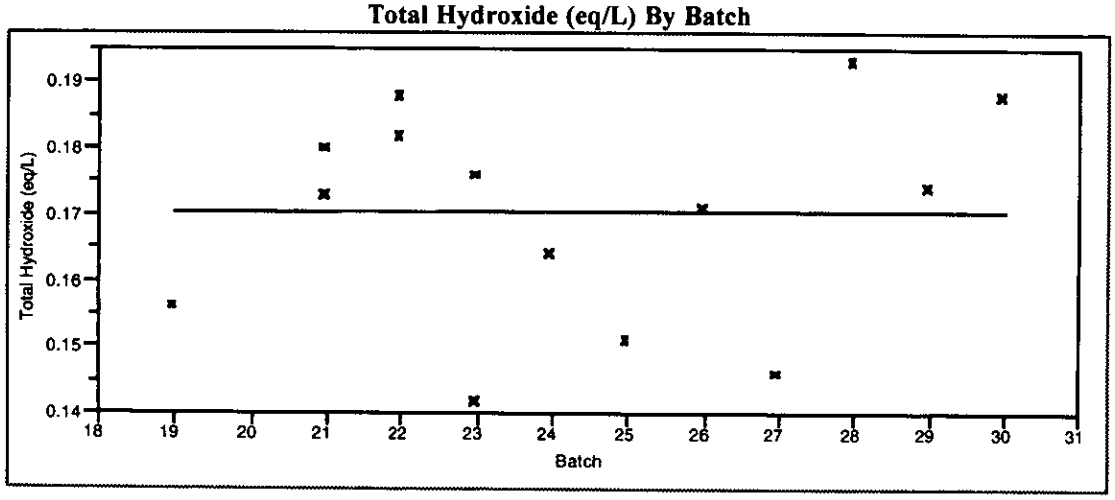
Exhibit 5: A Chart of Sample Measurements by Batch by Vessel
(Continued)

Small Box - MFT; Plus - SME; Open Box - SRAT Receipt; x's - SRAT Product

Density (g/mL) By Batch



Total Hydroxide (eq/L) By Batch



Formate (ppm) By Batch

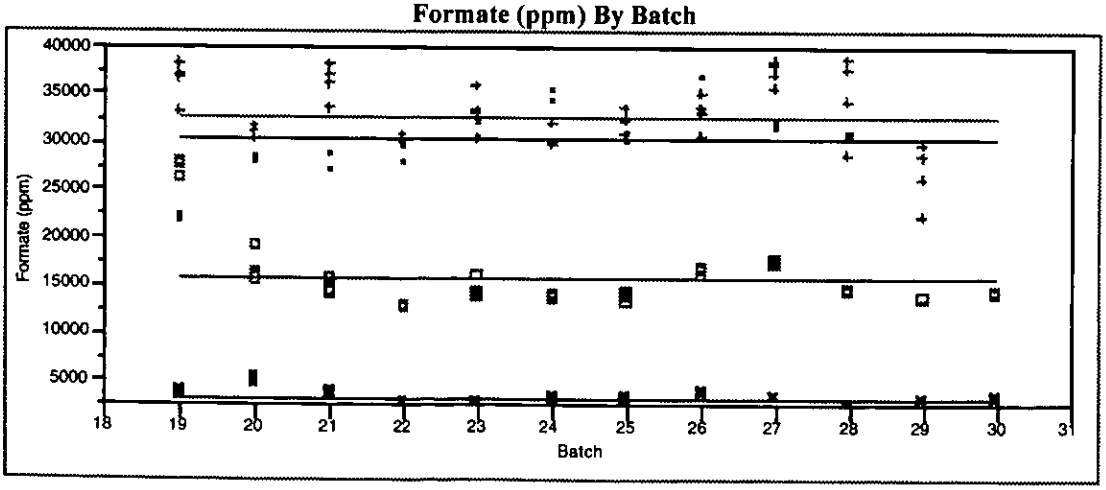
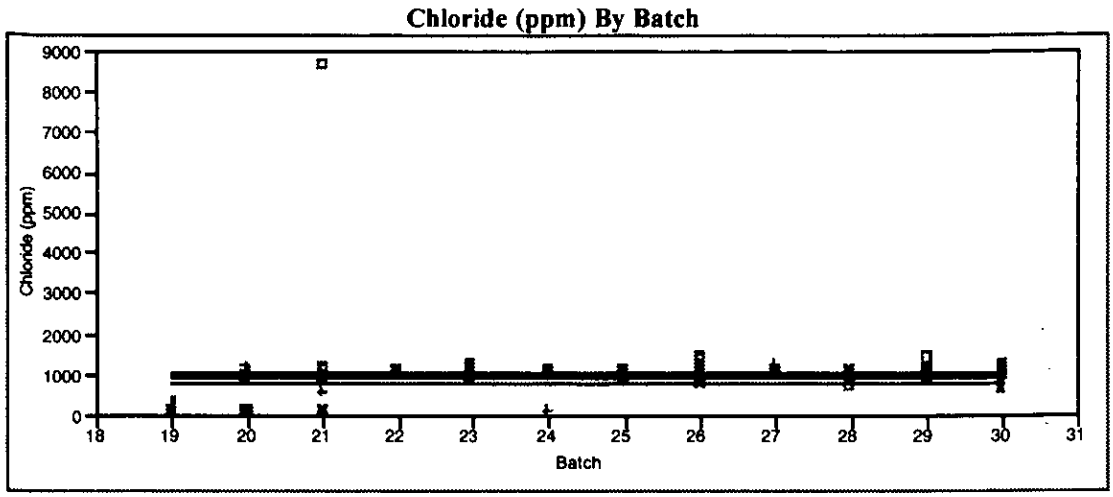
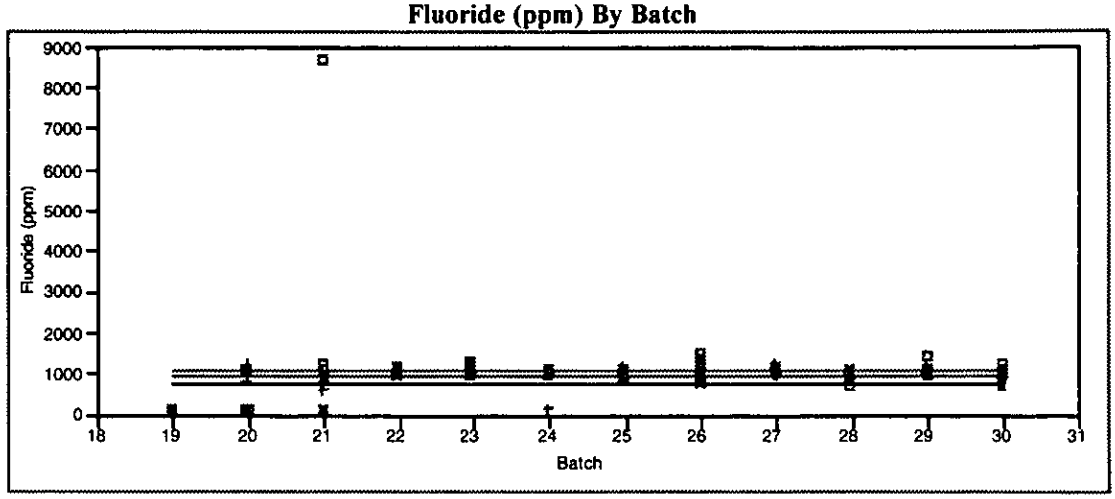


Exhibit 5: A Chart of Sample Measurements by Batch by Vessel
(Continued)
Small Box - MFT; Plus - SME; Open Box - SRAT Receipt; x's - SRAT Product





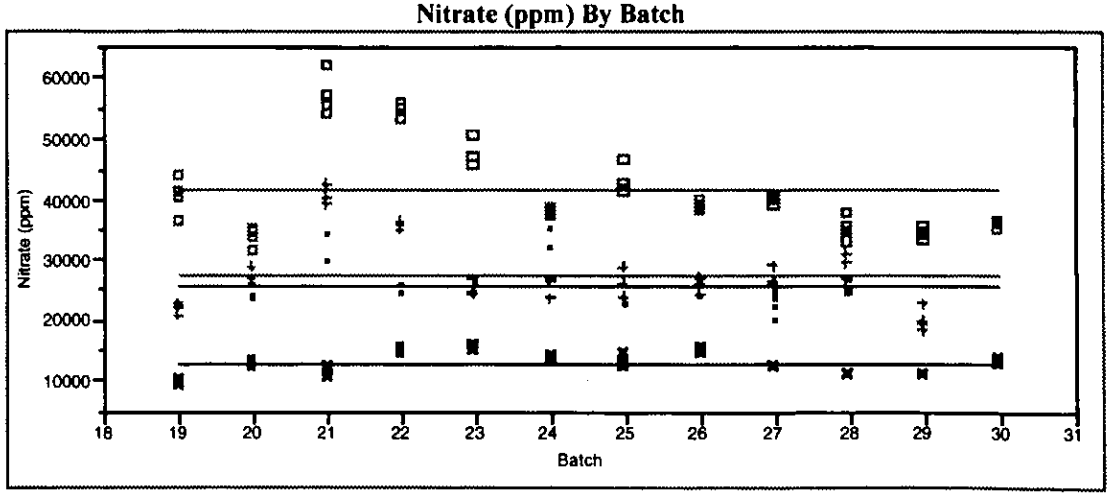
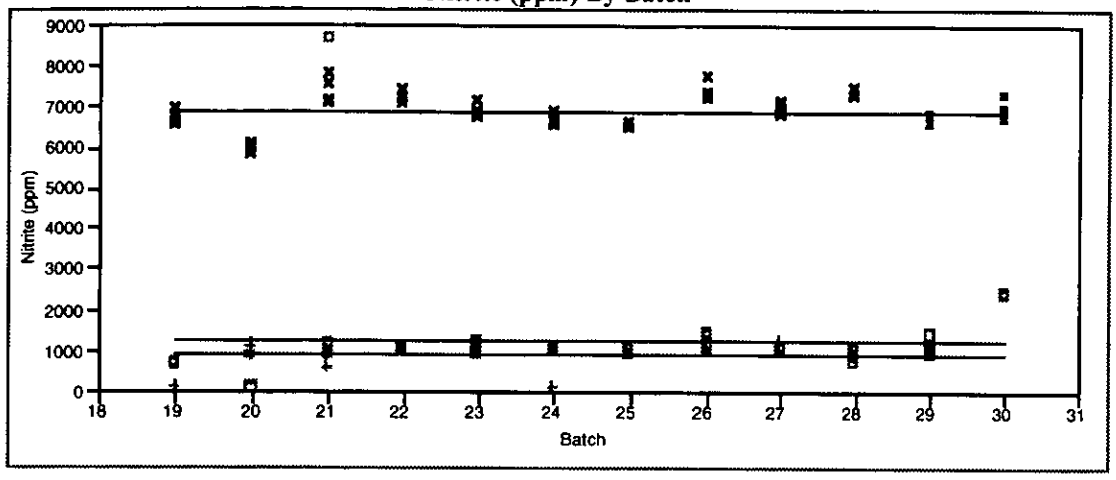


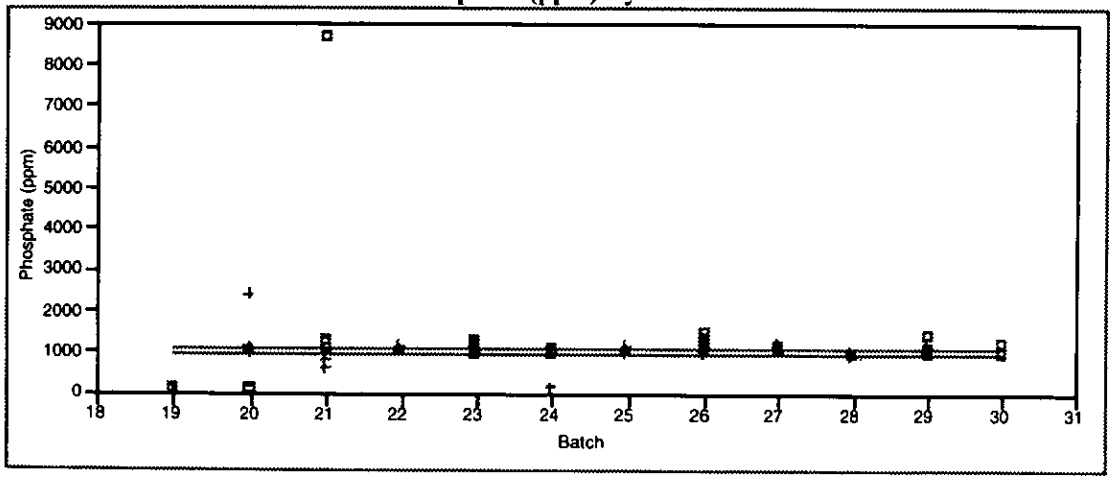
Exhibit 5: A Chart of Sample Measurements by Batch by Vessel
(Continued)

Small Box - MFT; Plus - SME; Open Box - SRAT Receipt; x's - SRAT Product

Nitrite (ppm) By Batch



Phosphate (ppm) By Batch



Sulfate (ppm) By Batch

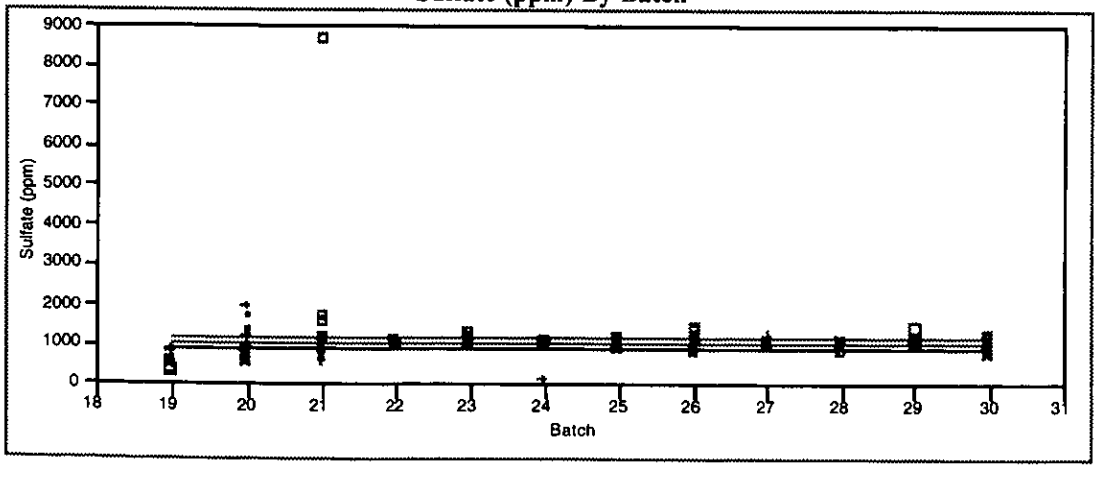
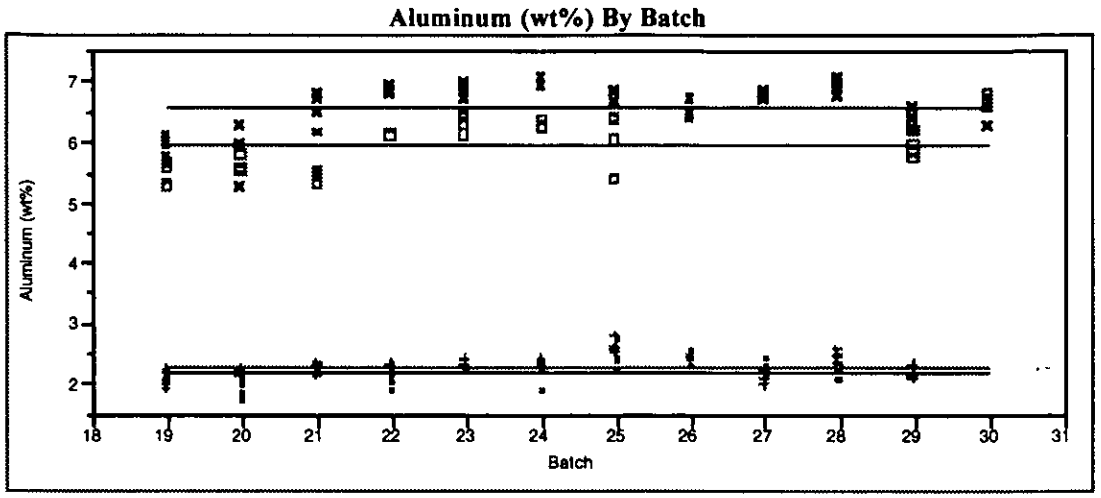
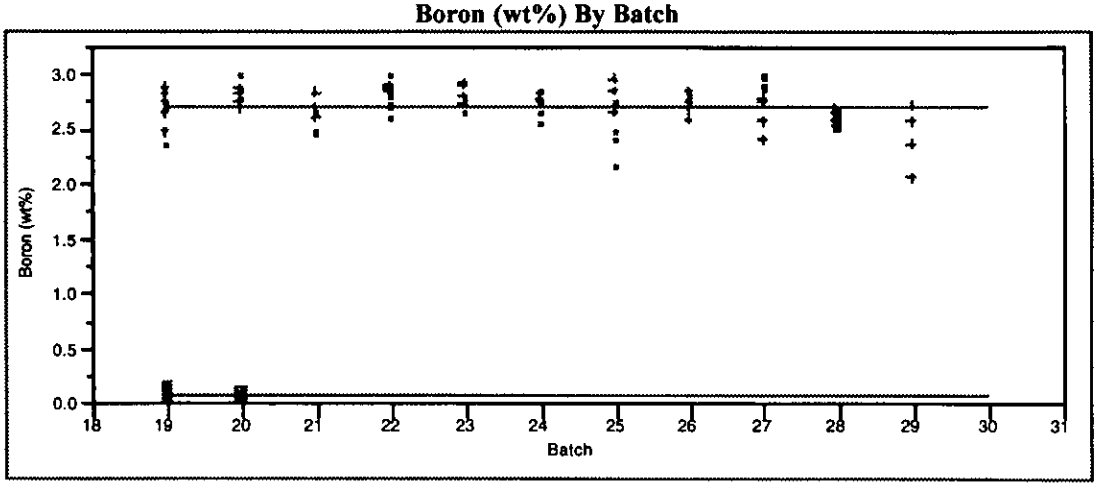


Exhibit 5: A Chart of Sample Measurements by Batch by Vessel
(Continued)
Small Box - MFT; Plus - SME; Open Box - SRAT Receipt; x's - SRAT Product





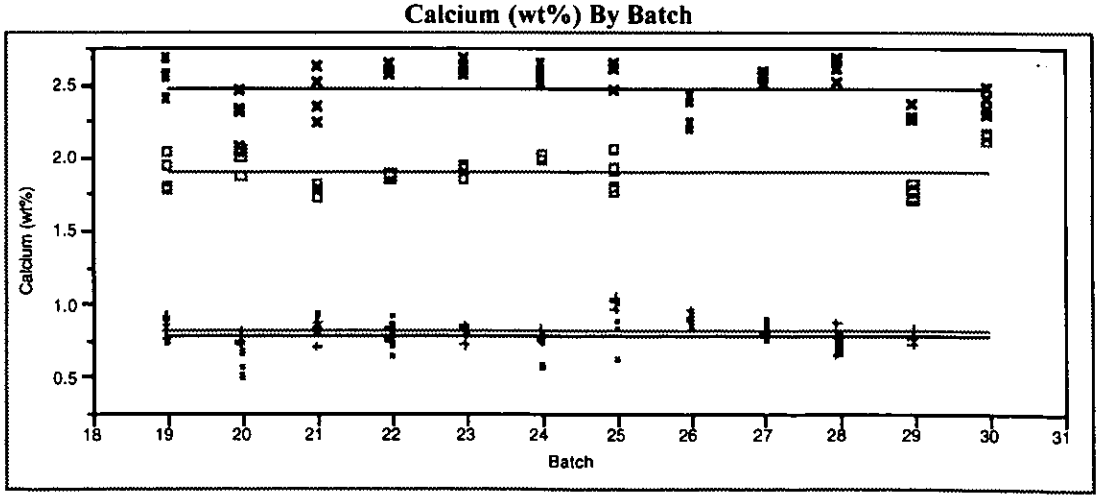
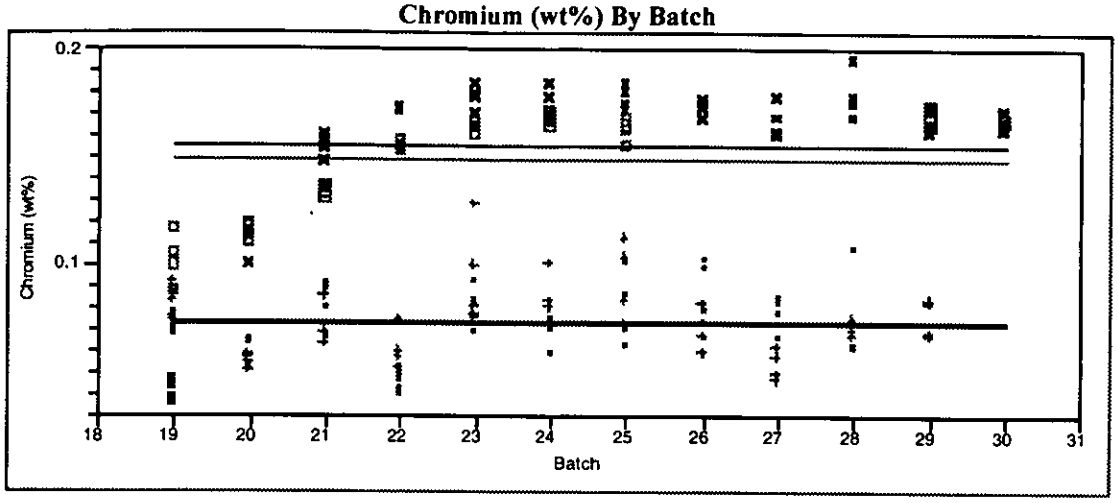
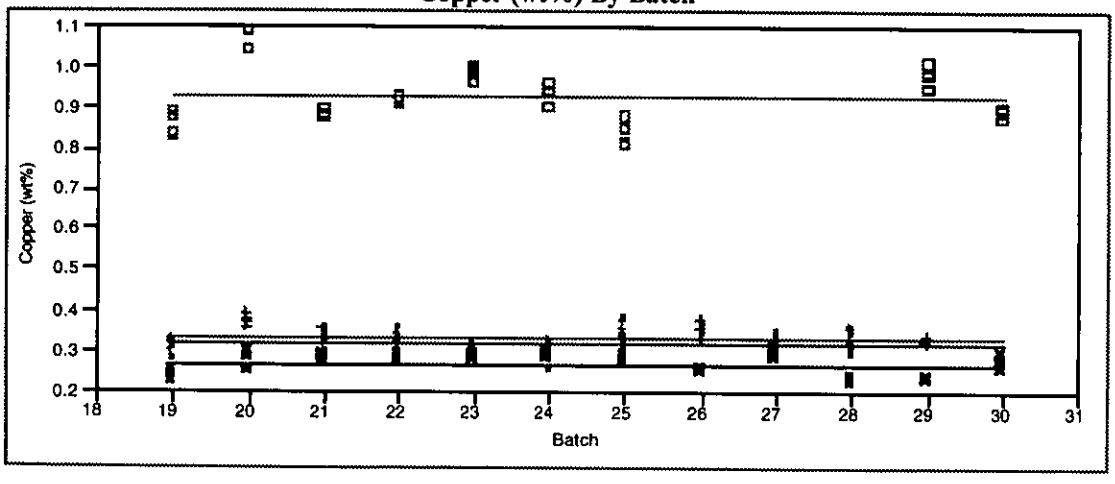


Exhibit 5: A Chart of Sample Measurements by Batch by Vessel
(Continued)

Small Box - MFT; Plus - SME; Open Box - SRAT Receipt; x's - SRAT Product





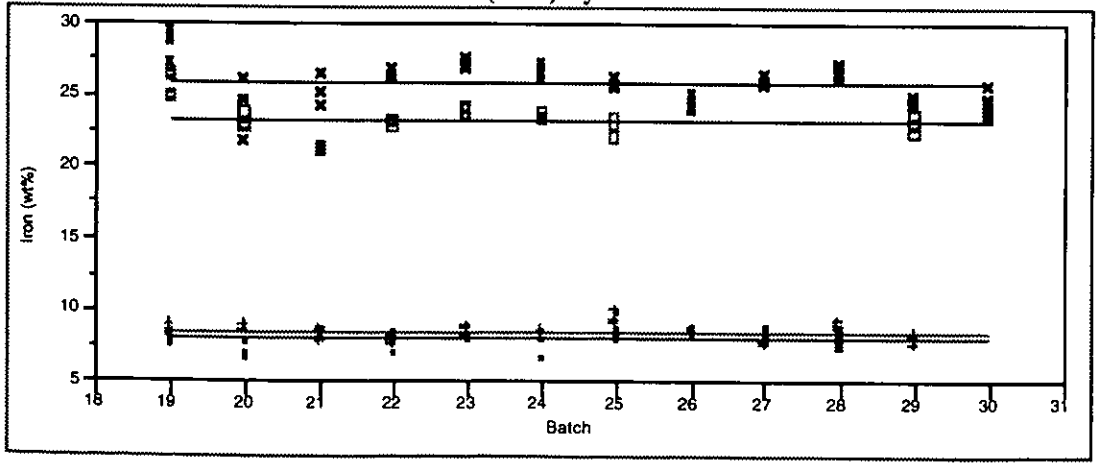
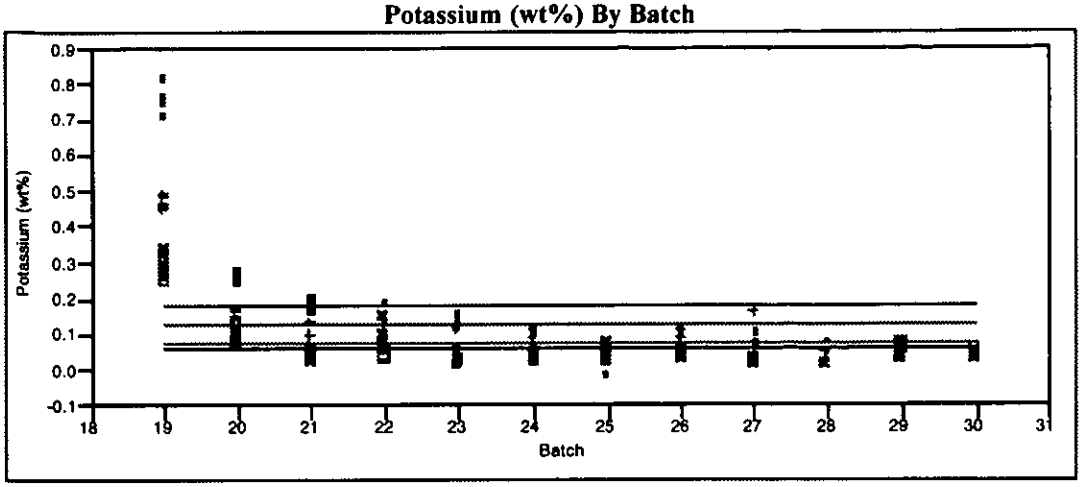


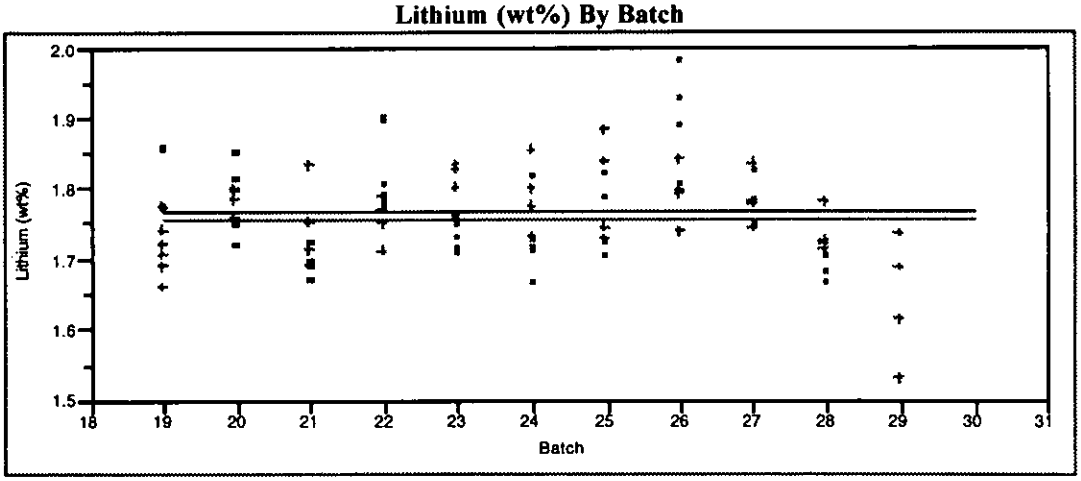
Exhibit 5: A Chart of Sample Measurements by Batch by Vessel
(Continued)

Small Box - MFT; Plus - SME; Open Box - SRAT Receipt; x's - SRAT Product

Potassium (wt%) By Batch



Lithium (wt%) By Batch



Magnesium (wt%) By Batch

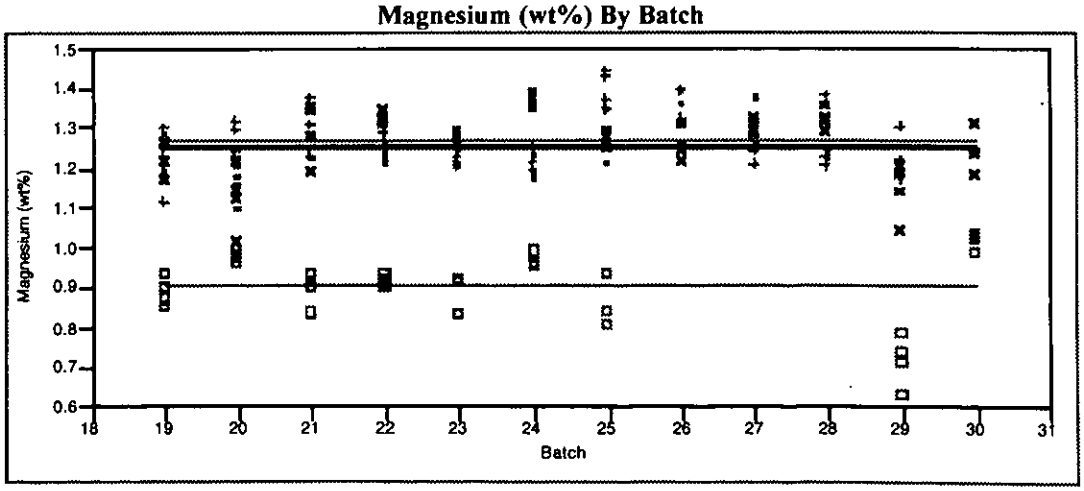
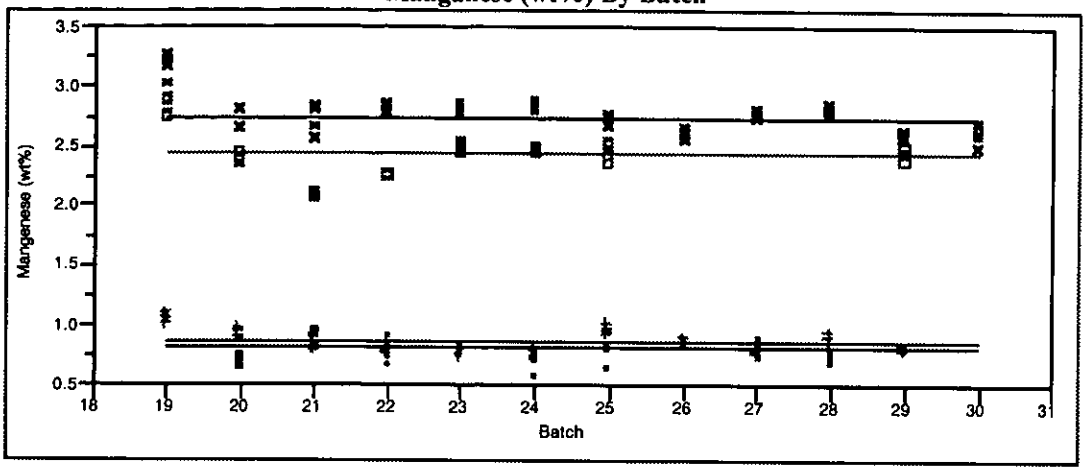


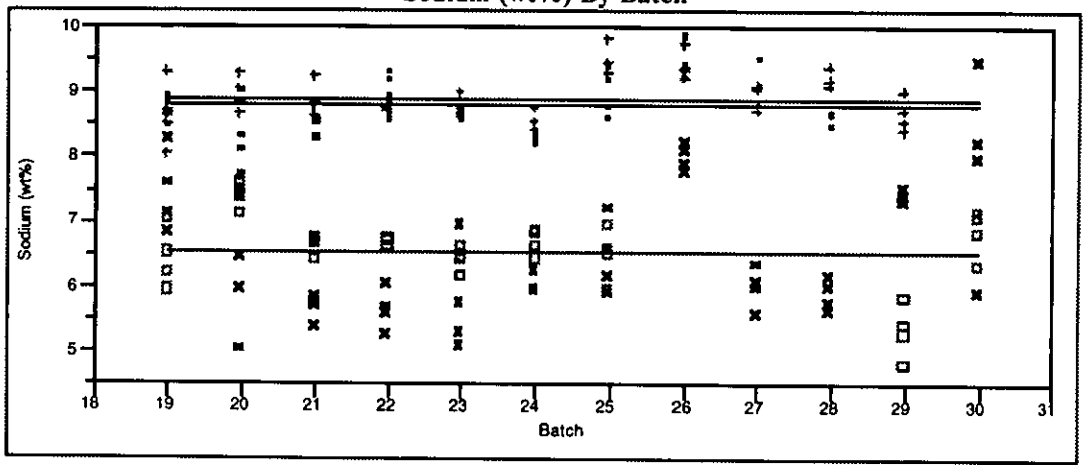
Exhibit 5: A Chart of Sample Measurements by Batch by Vessel
(Continued)

Small Box - MFT; Plus - SME; Open Box - SRAT Receipt; x's - SRAT Product

Manganese (wt%) By Batch



Sodium (wt%) By Batch



Nickel (wt%) By Batch

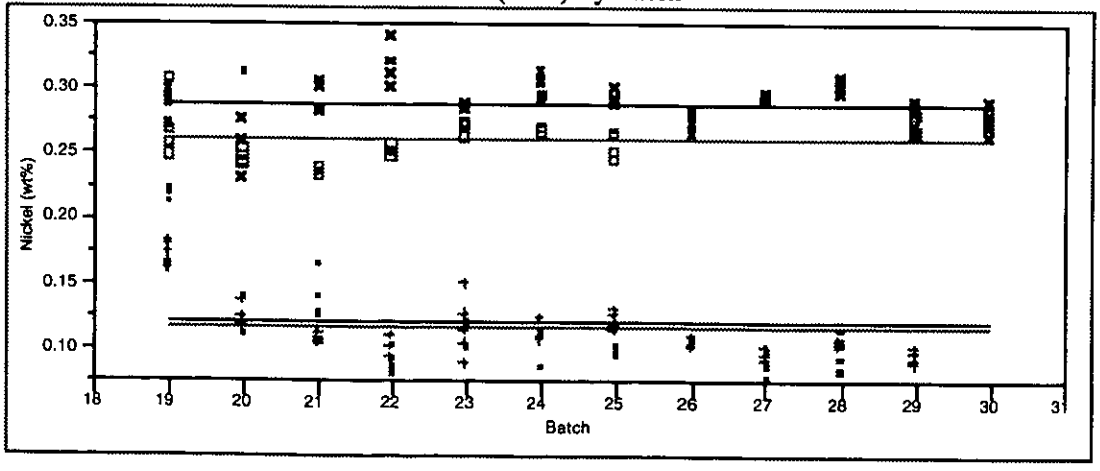
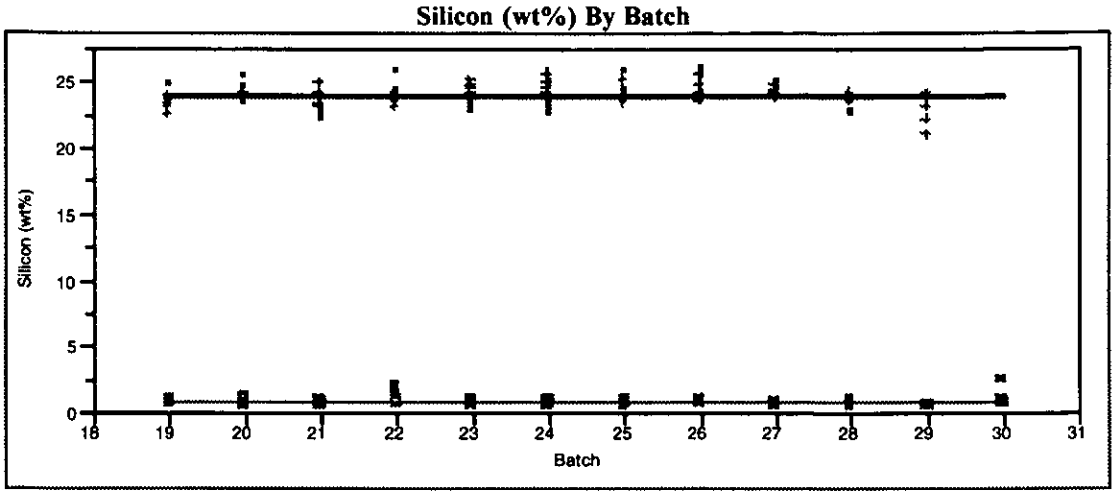
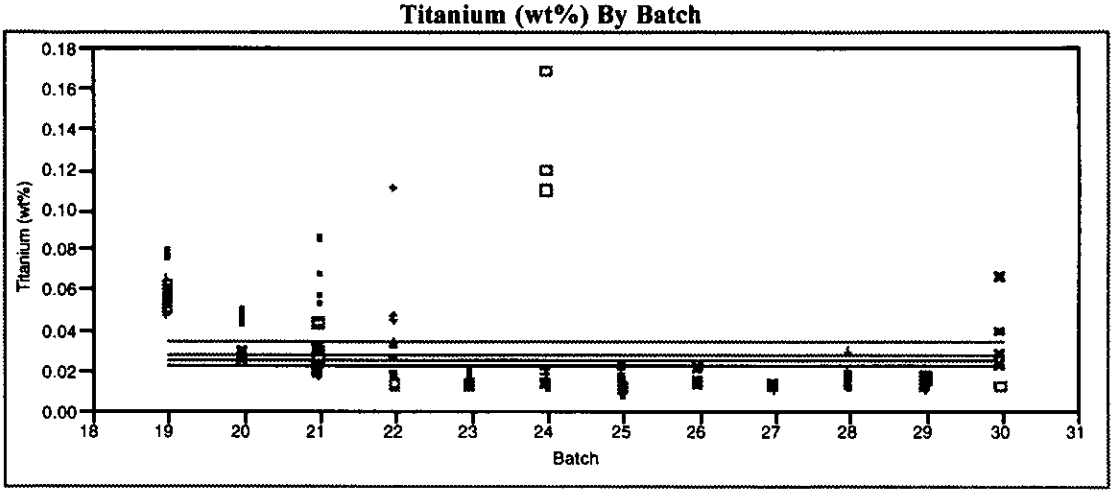


Exhibit 5: A Chart of Sample Measurements by Batch by Vessel
(Continued)
Small Box - MFT; Plus - SME; Open Box - SRAT Receipt; x's - SRAT Product





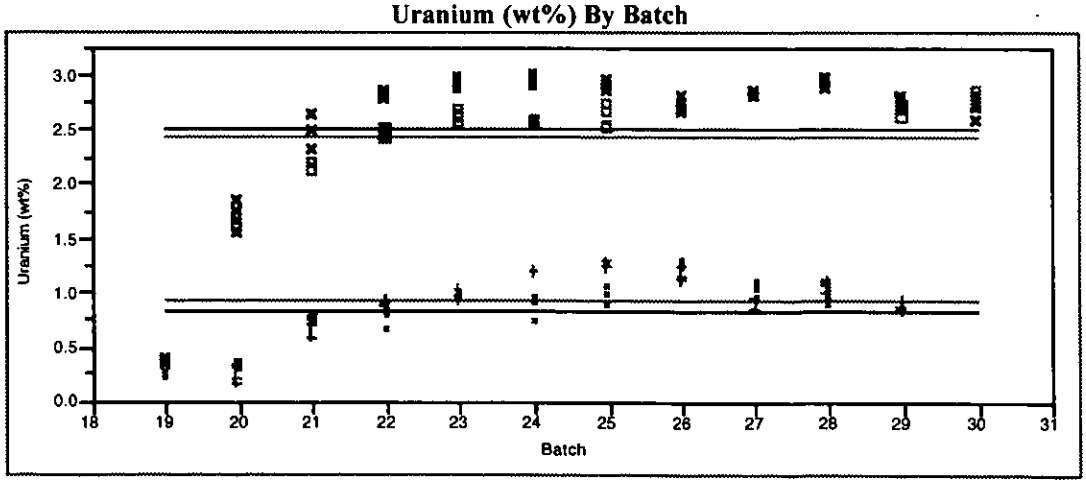
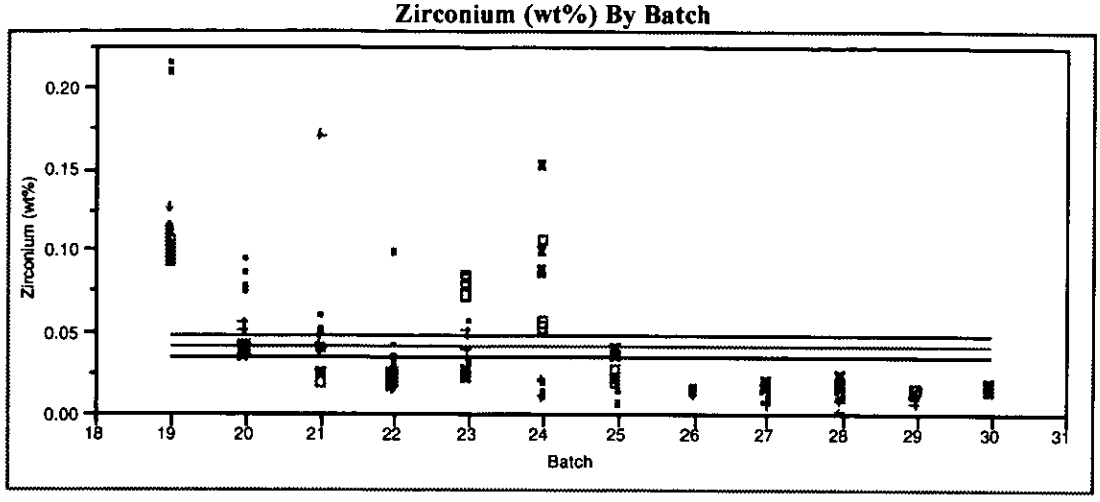
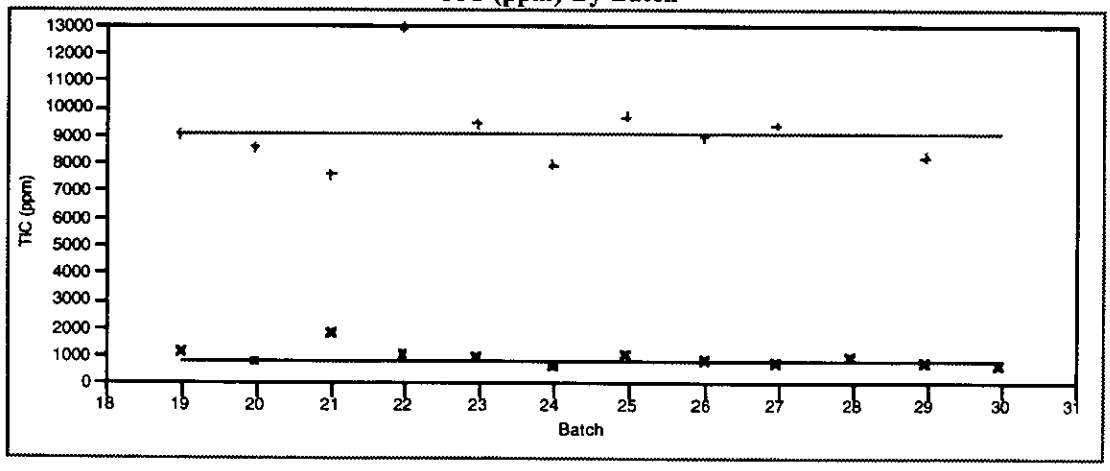


Exhibit 5: A Chart of Sample Measurements by Batch by Vessel
(Continued)

Small Box - MFT; Plus - SME; Open Box - SRAT Receipt; x's - SRAT Product





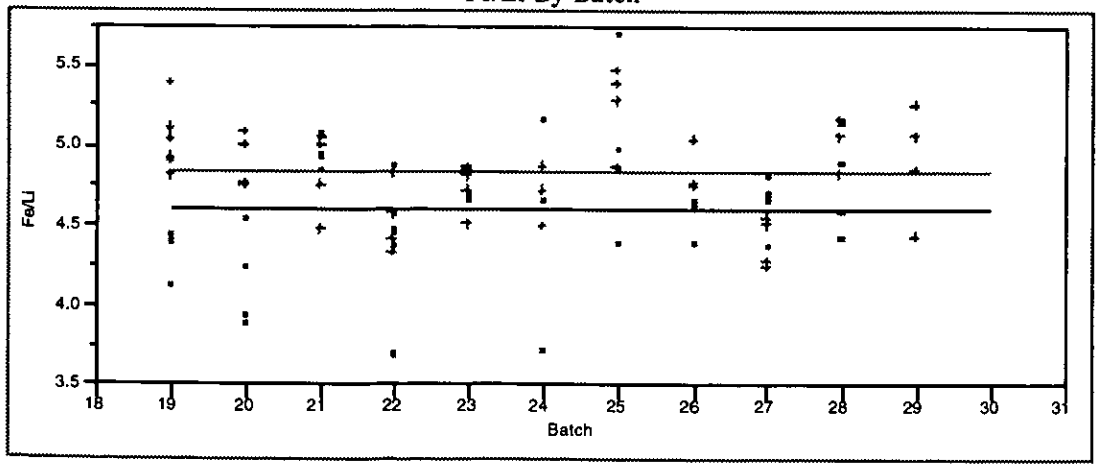


Exhibit 6: Random Effects Model for SRAT Receipt

Total Solids (wt %)

Response: Measurement

Summary of Fit

RSquare	0.803431
RSquare Adj	0.745188
Root Mean Square Error	0.249661
Mean of Response	15.79528
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.199373
Residual	0.062331

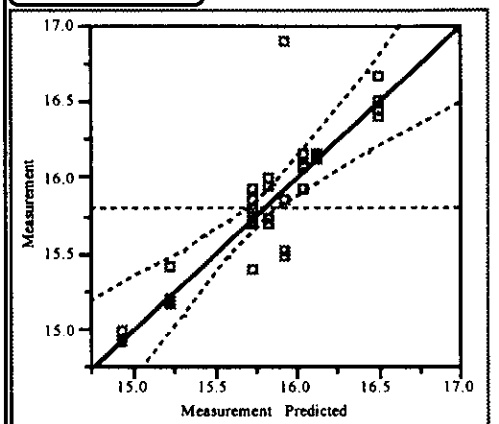
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	6.87857	0.85982	8	13.7945	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	6.8785722	0.859822	13.7945
Error	27	1.6829250	0.062331	Prob>F
C Total	35	8.5614972		<.0001

Calcined Solids (wt %)

Response: Measurement

Summary of Fit

RSquare	0.742755
RSquare Adj	0.664463
Root Mean Square Error	0.26839
Mean of Response	13.50839
Observations (or Sum Wgts)	31

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	3.87097

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.157931
Residual	0.072033

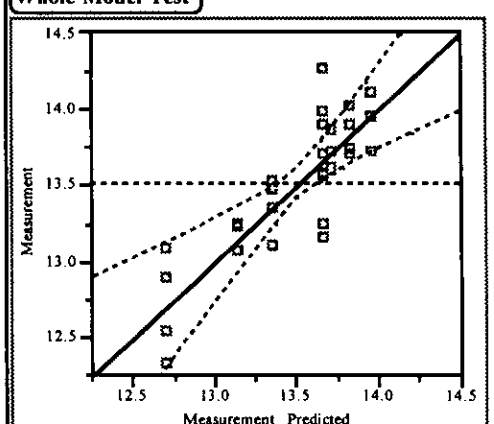
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	4.78365	0.68338	7	9.4870	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	4.7836527	0.683379	9.4870
Error	23	1.6567667	0.072033	Prob>F
C Total	30	6.4404194		<.0001

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Insoluble Solids (wt %)

Response: Measurement

Summary of Fit

RSquare	0.404922
RSquare Adj	0.256152
Root Mean Square Error	0.534938
Mean of Response	12.1125
Observations (or Sum Wgts)	16

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.123177
Residual	0.286158

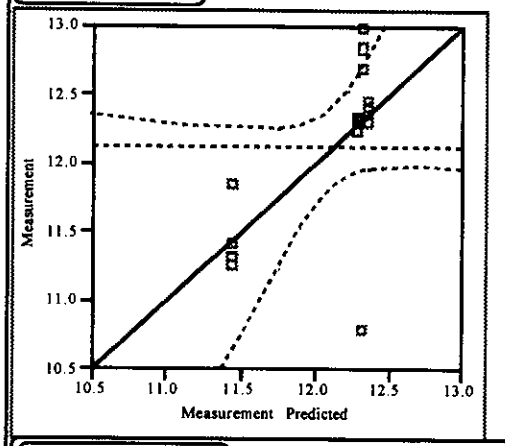
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	2.3366	0.77887	3	2.7218	0.0909

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	3	2.3366000	0.778867	2.7218
Error	12	3.4339000	0.286158	Prob>F
C Total	15	5.7705000		0.0909

Density (g/mL)

Response: Measurement

Summary of Fit

RSquare	0.847372
RSquare Adj	0.802149
Root Mean Square Error	0.014213
Mean of Response	1.087
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000896
Residual	0.000202

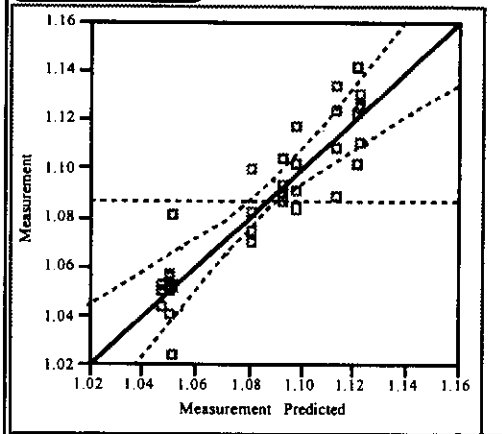
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.03028	0.00379	8	18.7376	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.03028000	0.003785	18.7376
Error	27	0.00545400	0.000202	Prob>F
C Total	35	0.03573400		<.0001

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Total Hydroxide (eq/L)

Response: Measurement

Summary of Fit

RSquare	0.929746
RSquare Adj	0.901644
Root Mean Square Error	0.005482
Mean of Response	0.170452
Observations (or Sum Wgts)	29

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	3.17241

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000304
Residual	0.00003

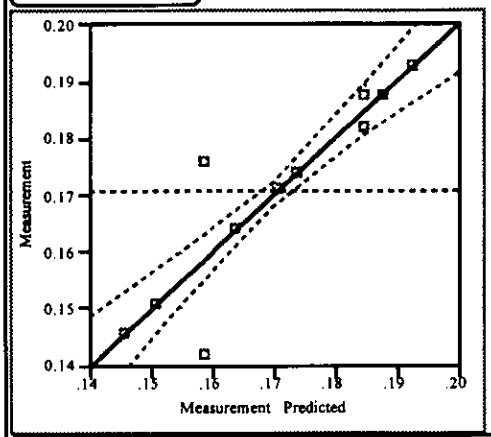
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00795	0.00099	8	33.0851	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.00795451	0.000994	33.0851
Error	20	0.00060107	0.000030	Prob>F
C Total	28	0.00855557		<.0001

Formate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.90266
RSquare Adj	0.873819
Root Mean Square Error	120.1504
Mean of Response	3190.833
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	109344.1
Residual	14436.11

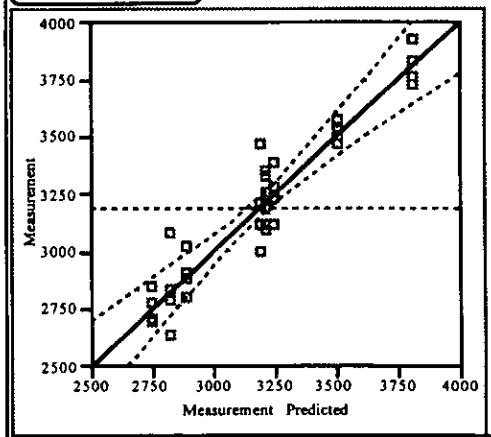
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	3614500	451813	8	31.2974	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	3614500.0	451812	31.2974
Error	27	389775.0	14436	Prob>F
C Total	35	4004275.0		<.0001

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Fluoride (ppm)

Response: Measurement

Summary of Fit

RSquare	0.376468
RSquare Adj	0.191717
Root Mean Square Error	92.87566
Mean of Response	1019.889
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	2237.795
Residual	8625.889

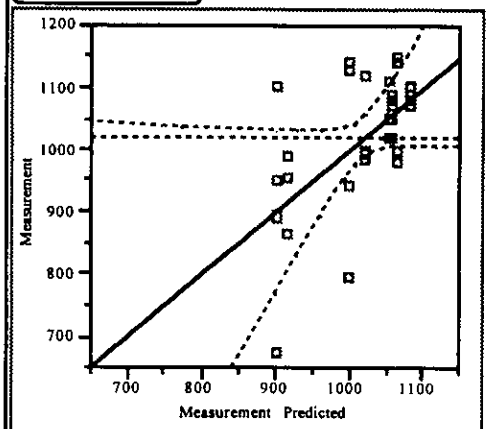
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	140617	17577.1	8	2.0377	0.0798

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	140616.56	17577.1	2.0377
Error	27	232899.00	8625.9	Prob>F
C Total	35	373515.56		0.0798

Chloride (ppm)

Response: Measurement

Summary of Fit

RSquare	0.376468
RSquare Adj	0.191717
Root Mean Square Error	92.87566
Mean of Response	1019.889
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	2237.795
Residual	8625.889

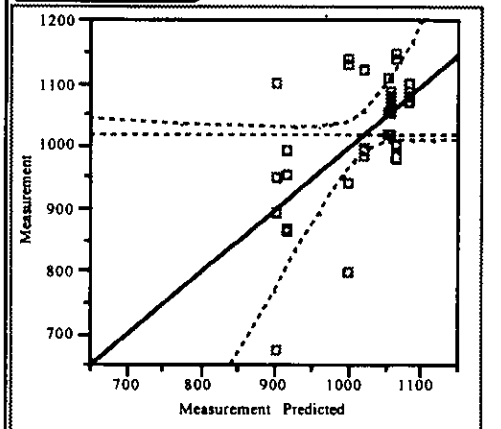
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	140617	17577.1	8	2.0377	0.0798

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	140616.56	17577.1	2.0377
Error	27	232899.00	8625.9	Prob>F
C Total	35	373515.56		0.0798

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Nitrate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.942233
RSquare Adj	0.925117
Root Mean Square Error	466.071
Mean of Response	13544.44
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	2935191
Residual	217222.2

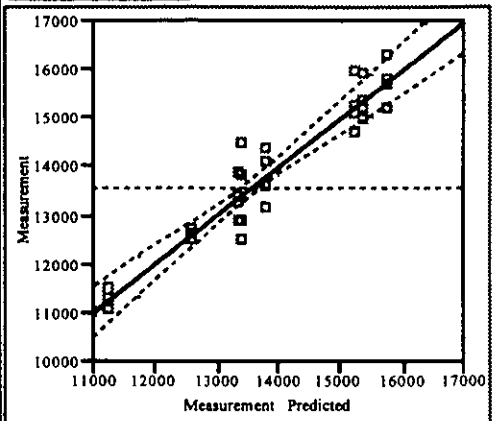
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	9.566e7	1.196e7	8	55.0496	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	95663889	11957986	55.0496
Error	27	5865000	217222.2	Prob>F
C Total	35	101528889		<.0001

Nitrite (ppm)

Response: Measurement

Summary of Fit

RSquare	0.807788
RSquare Adj	0.750836
Root Mean Square Error	160.4681
Mean of Response	6981.667
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	84870.31
Residual	25750

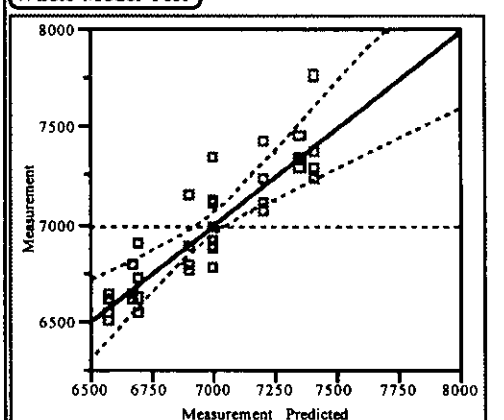
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	2921850	365231	8	14.1837	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	2921850.0	365231	14.1837
Error	27	695250.0	25750	Prob>F
C Total	35	3617100.0		<.0001

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Sulfate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.400474
RSquare Adj	0.222836
Root Mean Square Error	81.35132
Mean of Response	1023.833
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	2075.491
Residual	6618.037

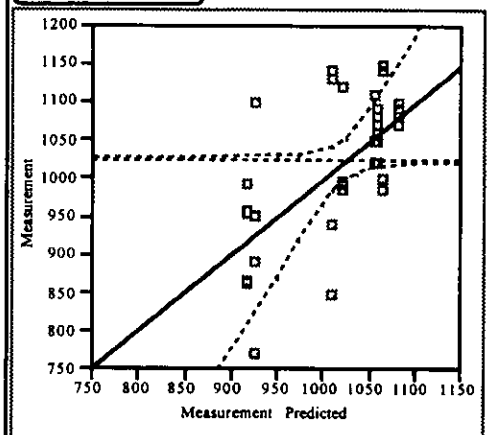
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	119360	14920	8	2.2544	0.0546

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	119360.00	14920.0	2.2544
Error	27	178687.00	6618.0	Prob>F
C Total	35	298047.00		0.0546

Aluminum (wt %)

Response: Measurement

Summary of Fit

RSquare	0.776673
RSquare Adj	0.710502
Root Mean Square Error	0.12244
Mean of Response	6.747
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.040243
Residual	0.014992

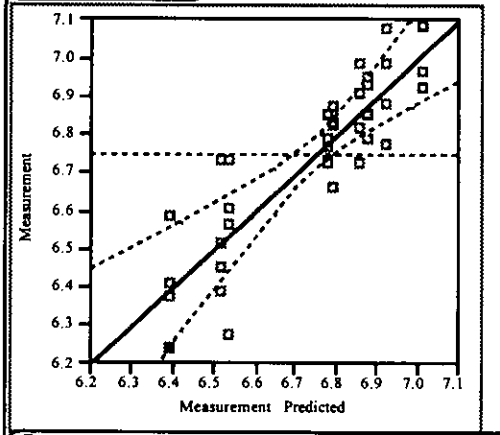
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	1.40769	0.17596	8	11.7374	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	1.4076940	0.175962	11.7374
Error	27	0.4047720	0.014992	Prob>F
C Total	35	1.8124660		<.0001

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Calcium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.819854
RSquare Adj	0.766478
Root Mean Square Error	0.068716
Mean of Response	2.505583
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.016951
Residual	0.004722

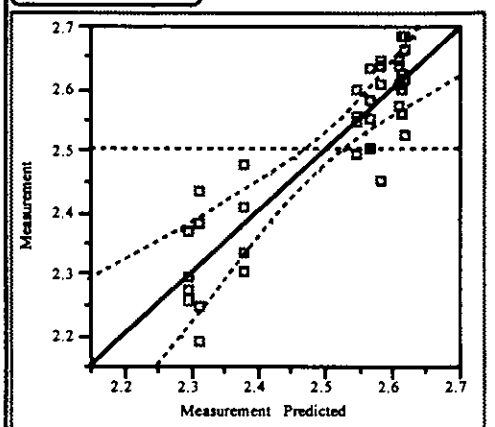
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.58021	0.07253	8	15.3598	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.58021150	0.072526	15.3598
Error	27	0.12748925	0.004722	Prob>F
C Total	35	0.70770075		<.0001

Chromium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.396181
RSquare Adj	0.217272
Root Mean Square Error	0.006311
Mean of Response	0.173917
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000012
Residual	0.00004

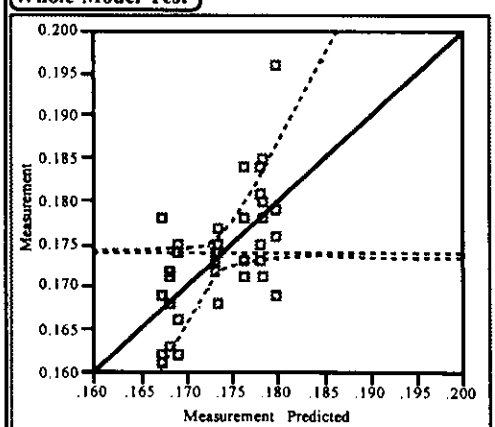
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00071	0.00009	8	2.2144	0.0586

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.00070550	0.000088	2.2144
Error	27	0.00107525	0.000040	Prob>F
C Total	35	0.00178075		0.0586

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Copper (wt %)

Response: Measurement

Summary of Fit

RSquare	0.904526
RSquare Adj	0.876238
Root Mean Square Error	0.007974
Mean of Response	0.270333
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000492
Residual	0.000064

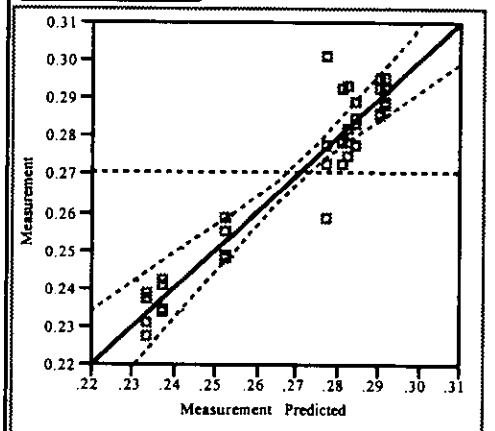
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.01627	0.00203	8	31.9750	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.01626700	0.002033	31.9750
Error	27	0.00171700	0.000064	Prob>F
C Total	35	0.01798400		<.0001

Iron (wt %)

Response: Measurement

Summary of Fit

RSquare	0.845655
RSquare Adj	0.799924
Root Mean Square Error	0.477368
Mean of Response	25.84289
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.996503
Residual	0.227881

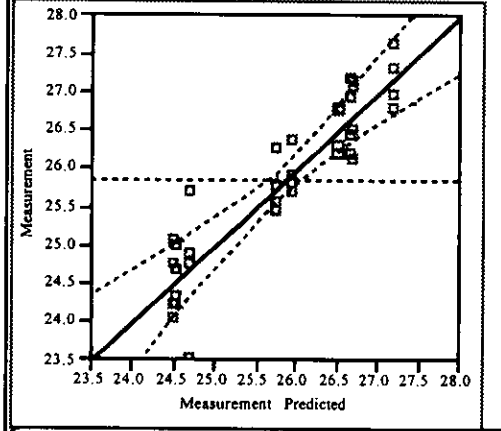
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	33.7111	4.21389	8	18.4917	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	33.711131	4.21389	18.4917
Error	27	6.152776	0.22788	Prob>F
C Total	35	39.863908		<.0001

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Potassium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.719923
RSquare Adj	0.636937
Root Mean Square Error	0.01572
Mean of Response	0.041
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000474
Residual	0.000247

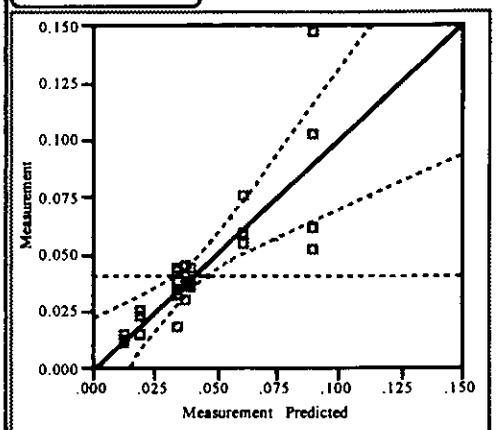
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.01715	0.00214	8	8.6752	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.01715000	0.002144	8.6752
Error	27	0.00667200	0.000247	Prob>F
C Total	35	0.02382200		<.0001

Magnesium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.789331
RSquare Adj	0.726911
Root Mean Square Error	0.036619
Mean of Response	1.280111
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.003904
Residual	0.001341

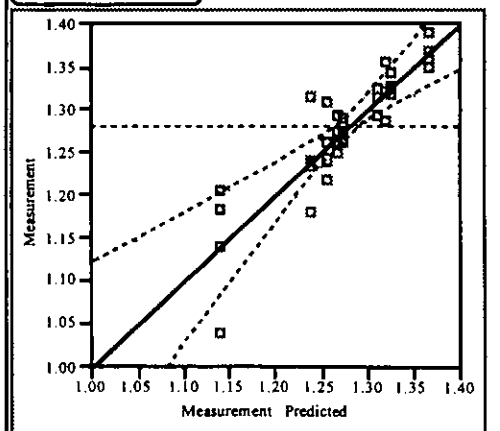
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.13565	0.01696	8	12.6454	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.13565256	0.016957	12.6454
Error	27	0.03620500	0.001341	Prob>F
C Total	35	0.17185756		<.0001

Exhibit 6: Random Effects Model for SRAT Receipt (Continued)

Manganese (wt %)

Response: Measurement

Summary of Fit

RSquare	0.849269
RSquare Adj	0.804607
Root Mean Square Error	0.047781
Mean of Response	2.727333
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.010283
Residual	0.002283

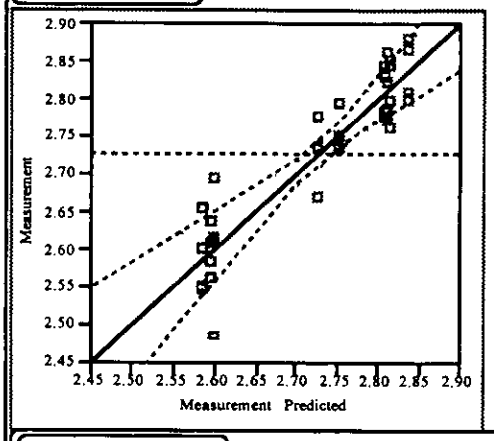
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.34731	0.04341	8	19.0158	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.34731350	0.043414	19.0158
Error	27	0.06164250	0.002283	Prob>F
C Total	35	0.40895600		<.0001

Sodium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.723524
RSquare Adj	0.641605
Root Mean Square Error	0.627225
Mean of Response	6.578472
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.770319
Residual	0.393411

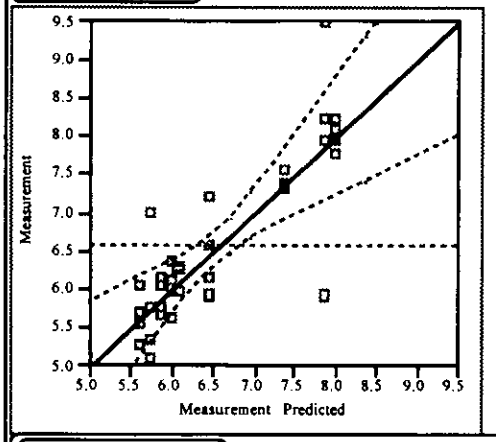
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	27.7975	3.47469	8	8.8322	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	27.797500	3.47469	8.8322
Error	27	10.622101	0.39341	Prob>F
C Total	35	38.419601		<.0001

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Nickel (wt %)

Response: Measurement

Summary of Fit

RSquare	0.766699
RSquare Adj	0.697573
Root Mean Square Error	0.008396
Mean of Response	0.292833
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000178
Residual	0.00007

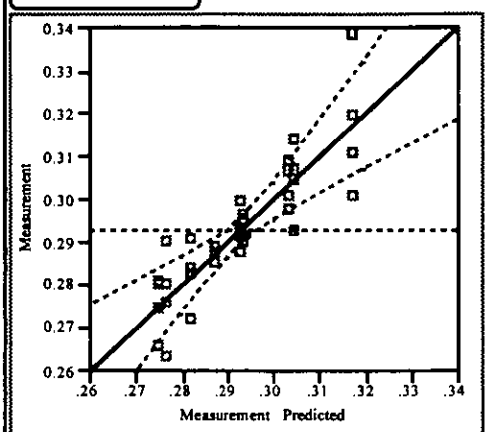
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00626	0.00078	8	11.0913	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.00625550	0.000782	11.0913
Error	27	0.00190350	0.000070	Prob>F
C Total	35	0.00815900		<.0001

Silicon (wt %)

Response: Measurement

Summary of Fit

RSquare	0.681124
RSquare Adj	0.586642
Root Mean Square Error	0.284016
Mean of Response	0.931194
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.125213
Residual	0.080665

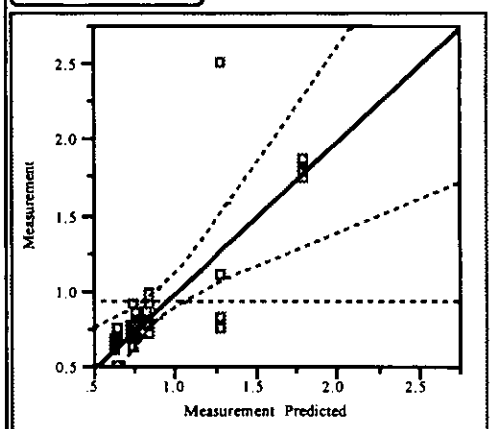
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	4.65214	0.58152	8	7.2090	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	4.6521439	0.581518	7.2090
Error	27	2.1779557	0.080665	Prob>F
C Total	35	6.8300996		<.0001

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Titanium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.625133
RSquare Adj	0.514061
Root Mean Square Error	0.007225
Mean of Response	0.018333
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.00006
Residual	0.000052

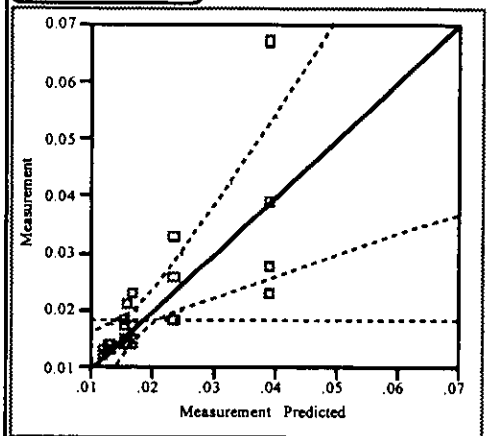
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00235	0.00029	8	5.6282	0.0003

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.00235050	0.000294	5.6282
Error	27	0.00140950	0.000052	Prob>F
C Total	35	0.00376000		0.0003

Uranium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.821325
RSquare Adj	0.768385
Root Mean Square Error	0.048731
Mean of Response	2.835972
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.008617
Residual	0.002375

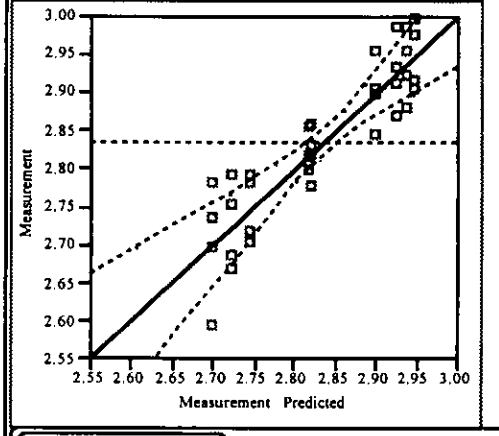
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.29474	0.03684	8	15.5141	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.29473672	0.036842	15.5141
Error	27	0.06411825	0.002375	Prob>F
C Total	35	0.35885497		<.0001

Exhibit 6: Random Effects Model for SRAT Receipt
(Continued)

Zirconium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.893748
RSquare Adj	0.862266
Root Mean Square Error	0.011093
Mean of Response	0.029139
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000843
Residual	0.000123

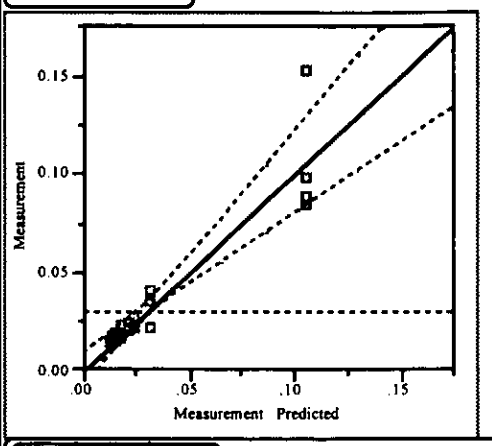
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.02795	0.00349	8	28.3891	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.02794956	0.003494	28.3891
Error	27	0.00332275	0.000123	Prob>F
C Total	35	0.03127231		<.0001

Exhibit 7: Random Effects Model for SRAT Product

Total Solids (wt %)

Response: Measurement

Summary of Fit

RSquare	0.59129
RSquare Adj	0.47019
Root Mean Square Error	0.885775
Mean of Response	22.46833
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.761586
Residual	0.784598

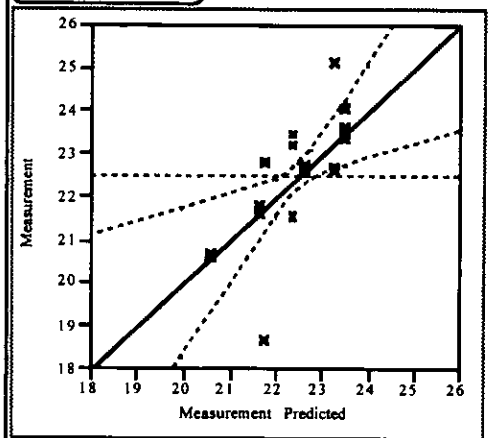
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	30.6475	3.83094	8	4.8827	0.0008

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	30.647550	3.83094	4.8827
Error	27	21.184150	0.78460	Prob>F
C Total	35	51.831700		0.0008

Calcined Solids (wt %)

Response: Measurement

Summary of Fit

RSquare	0.636948
RSquare Adj	0.529377
Root Mean Square Error	0.876325
Mean of Response	18.0525
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.9448
Residual	0.767945

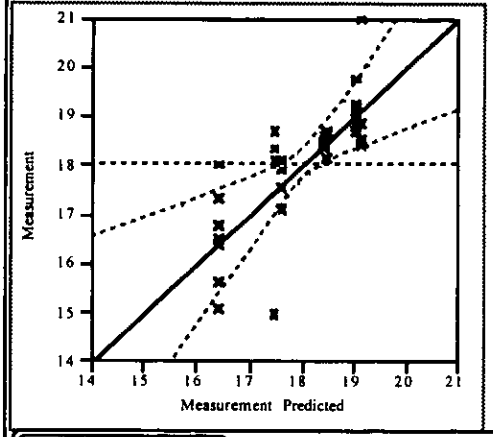
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	36.3772	4.54714	8	5.9212	0.0002

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	36.377150	4.54714	5.9212
Error	27	20.734525	0.76795	Prob>F
C Total	35	57.111675		0.0002

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Insoluble Solids (wt %)

Response: Measurement

Summary of Fit

RSquare	0.861678
RSquare Adj	0.820694
Root Mean Square Error	0.811234
Mean of Response	15.14583
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	3.294561
Residual	0.658101

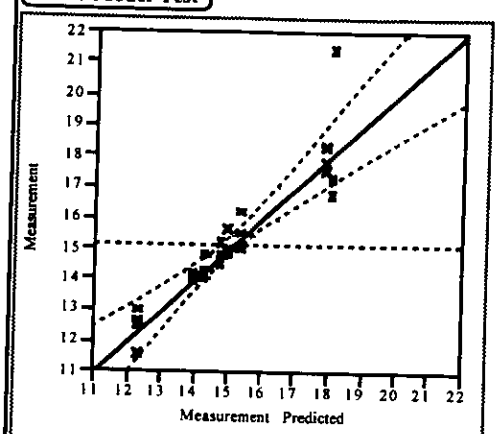
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	110.691	13.8363	8	21.0247	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	110.69075	13.8363	21.0247
Error	27	17.76873	0.6581	Prob>F
C Total	35	128.45948		<.0001

Density (g/mL)

Response: Measurement

Summary of Fit

RSquare	0.601928
RSquare Adj	0.483981
Root Mean Square Error	0.015543
Mean of Response	1.149722
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000248
Residual	0.000242

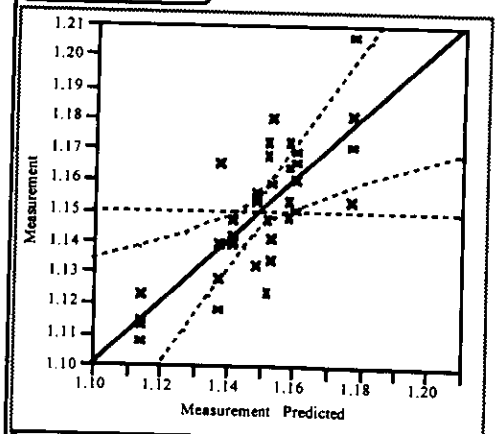
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00986	0.00123	8	5.1034	0.0006

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	0.00986272	0.001233	5.1034
Error	27	0.00652250	0.000242	Prob>F
C Total	35	0.01638522		0.0006

Exhibit 7: Random Effects Model for SRAT Product (Continued)

Formate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.938442
RSquare Adj	0.920203
Root Mean Square Error	409.7199
Mean of Response	14752.78
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	2117321
Residual	167870.4

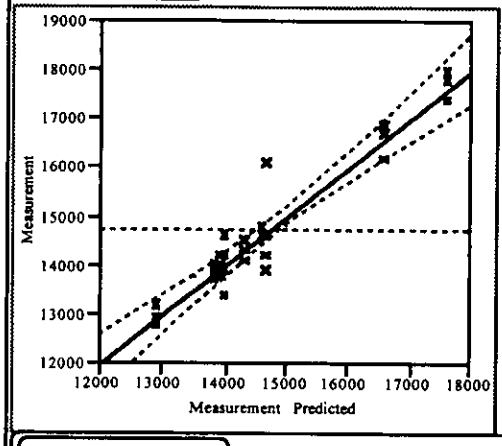
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	6.91e+7	8637153	8	51.4513	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	69097222	8637153	51.4513
Error	27	4532500	167870	Prob>F
C Total	35	73629722		<.0001

Chloride (ppm)

Response: Measurement

Summary of Fit

RSquare	0.474743
RSquare Adj	0.319112
Root Mean Square Error	120.8776
Mean of Response	1098.889
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	7489.905
Residual	14611.39

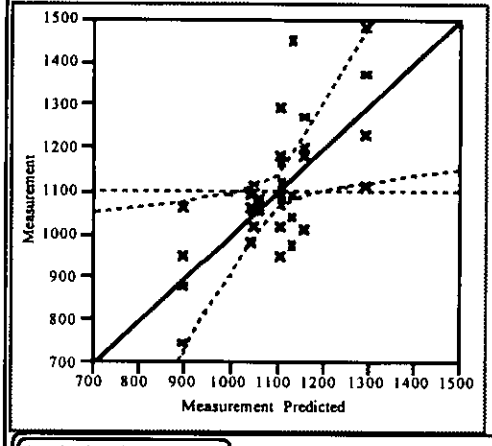
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	356568	44571	8	3.0504	0.0140

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	356568.06	44571.0	3.0504
Error	27	394507.50	14611.4	Prob>F
C Total	35	751075.56		0.0140

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Fluoride (ppm)

Response: Measurement

Summary of Fit

RSquare	0.474743
RSquare Adj	0.319112
Root Mean Square Error	120.8776
Mean of Response	1098.889
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	7489.905
Residual	14611.39

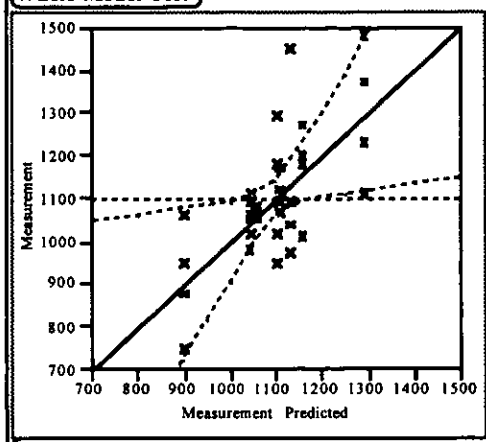
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	356568	44571	8	3.0504	0.0140

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	356568.06	44571.0	3.0504
Error	27	394507.50	14611.4	Prob>F
C Total	35	751075.56		0.0140

Nitrate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.96479
RSquare Adj	0.954357
Root Mean Square Error	1364.056
Mean of Response	40830.56
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	42551678
Residual	1860648

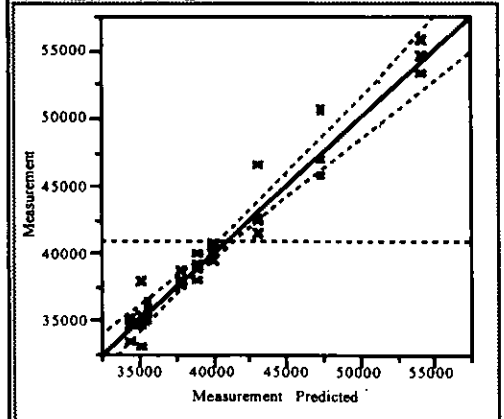
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	1.377e9	1.721e8	8	92.4771	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	1376538889	1.7207e8	92.4771
Error	27	50237500	1860648	Prob>F
C Total	35	1426776389		<.0001

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Nitrite (ppm)

Response: Measurement

Summary of Fit

RSquare	0.948159
RSquare Adj	0.932799
Root Mean Square Error	115.5795
Mean of Response	1238.056
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	202810.4
Residual	13358.61

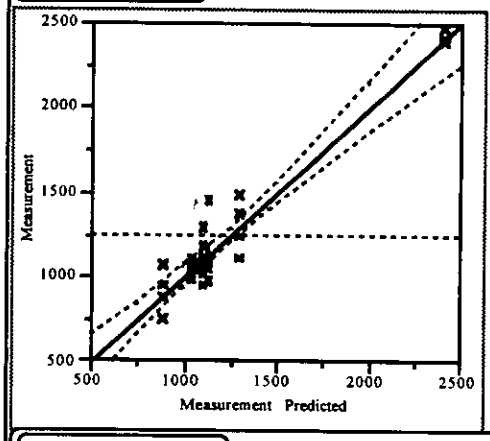
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	6596801	824600	8	61.7280	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	6596801.4	824600	61.7280
Error	27	360682.5	13359	Prob>F
C Total	35	6957483.9		<.0001

Phosphate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.326275
RSquare Adj	0.133782
Root Mean Square Error	126.3875
Mean of Response	1133.857
Observations (or Sum Wgts)	28

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	2775.44
Residual	15973.81

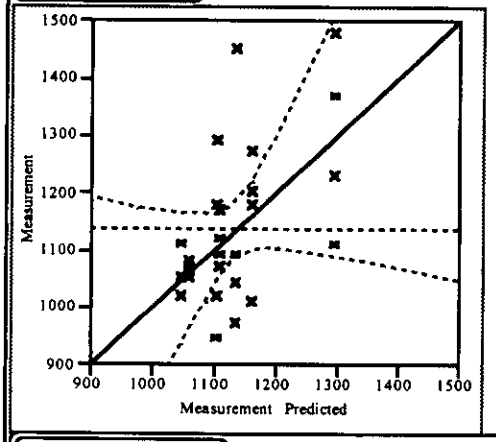
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	162453	27075.6	6	1.6950	0.1716

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	162453.43	27075.6	1.6950
Error	21	335450.00	15973.8	Prob>F
C Total	27	497903.43		0.1716

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Sulfate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.42636
RSquare Adj	0.256393
Root Mean Square Error	114.2187
Mean of Response	1126.694
Observations (or Sum Wgts)	36

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	4919.892
Residual	13045.92

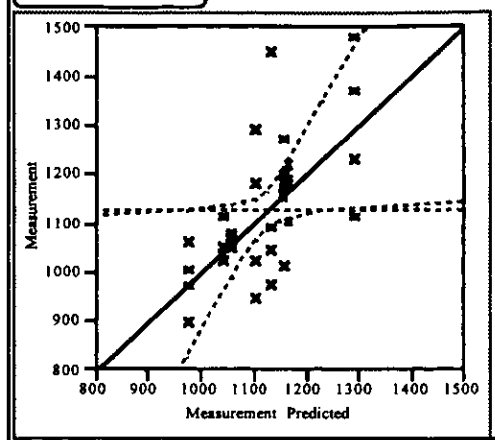
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	261804	32725.5	8	2.5085	0.0352

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	261803.89	32725.5	2.5085
Error	27	352239.75	13045.9	Prob>F
C Total	35	614043.64		0.0352

Aluminum (wt %)

Response: Measurement

Summary of Fit

RSquare	0.614377
RSquare Adj	0.507259
Root Mean Square Error	0.218001
Mean of Response	6.236042
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.056263
Residual	0.047524

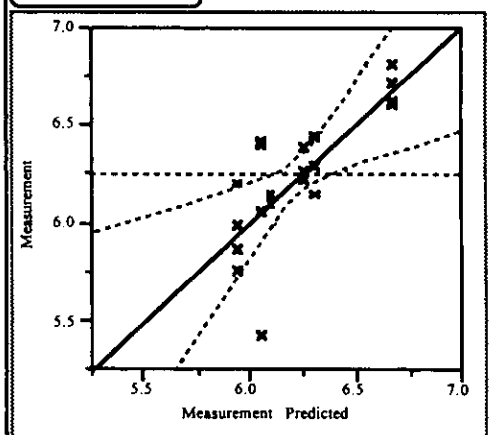
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	1.36289	0.27258	5	5.7355	0.0025

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	1.3628857	0.272577	5.7355
Error	18	0.8554373	0.047524	Prob>F
C Total	23	2.2183230		0.0025

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Response: Boron (wt%)

Summary of Fit

RSquare	0.175886
RSquare Adj	0.038533
Root Mean Square Error	0.031868
Mean of Response	0.0935
Observations (or Sum Wgts)	8

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000071
Residual	0.001016

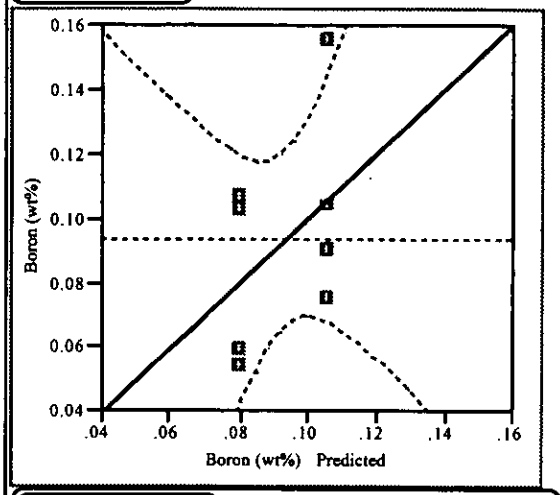
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.0013	0.0013	1	1.2805	0.3010

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	1	0.00130050	0.001301	1.2805
Error	6	0.00609350	0.001016	Prob>F
C Total	7	0.00739400		0.3010

Boron analysis is for all of the data; there is not enough data to analyze for batches 22^{+}.

Calcium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.845871
RSquare Adj	0.803058
Root Mean Square Error	0.059982
Mean of Response	1.934542
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.016871
Residual	0.003598

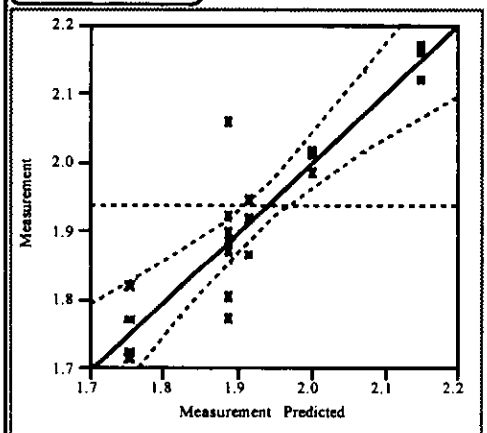
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.35541	0.07108	5	19.7571	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.35541471	0.071083	19.7571
Error	18	0.06476125	0.003598	Prob>F
C Total	23	0.42017596		<.0001

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Chromium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.748439
RSquare Adj	0.678561
Root Mean Square Error	0.003129
Mean of Response	0.164875
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000024
Residual	0.00001

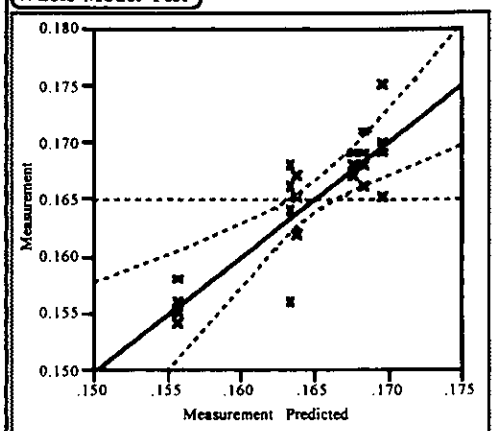
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00052	0.0001	5	10.7106	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.00052438	0.000105	10.7106
Error	18	0.00017625	0.000010	Prob>F
C Total	23	0.00070063		<.0001

Copper (wt %)

Response: Measurement

Summary of Fit

RSquare	0.888871
RSquare Adj	0.858002
Root Mean Square Error	0.021358
Mean of Response	0.926958
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.00317
Residual	0.000456

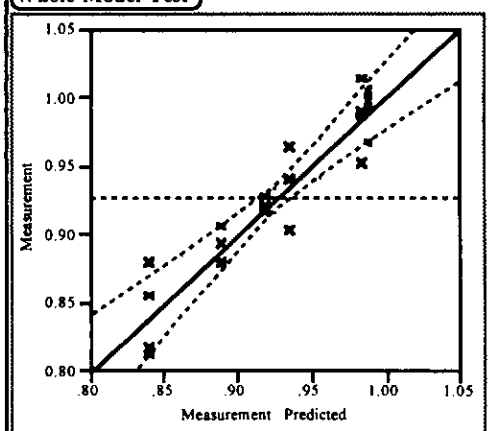
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.06567	0.01313	5	28.7948	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.06567421	0.013135	28.7948
Error	18	0.00821075	0.000456	Prob>F
C Total	23	0.07388496		<.0001

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Iron (wt %)

Response: Measurement

Summary of Fit

RSquare	0.634143
RSquare Adj	0.532516
Root Mean Square Error	0.400434
Mean of Response	23.44821
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.210052
Residual	0.160348

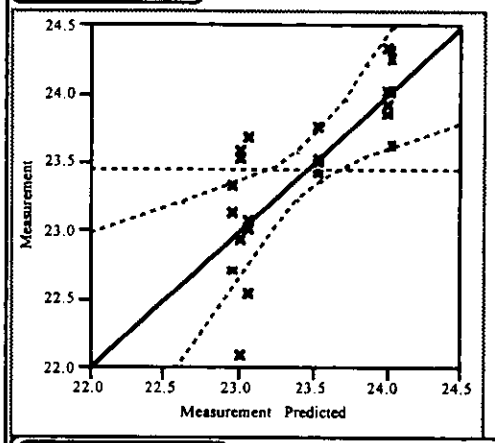
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	5.00278	1.00056	5	6.2399	0.0016

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	5.0027797	1.00056	6.2399
Error	18	2.8862583	0.16035	Prob>F
C Total	23	7.8890380		0.0016

Potassium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.804129
RSquare Adj	0.749721
Root Mean Square Error	0.008252
Mean of Response	0.042542
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000235
Residual	0.000068

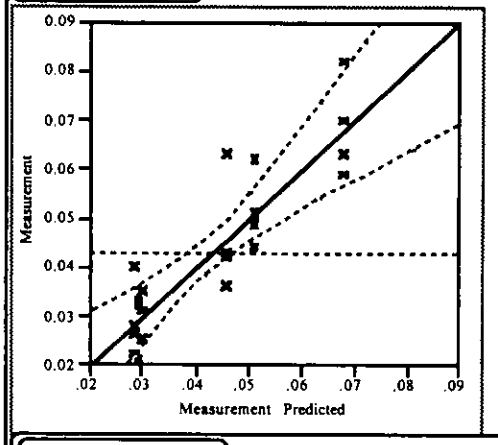
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00503	0.00101	5	14.7795	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.00503221	0.001006	14.7795
Error	18	0.00122575	0.000068	Prob>F
C Total	23	0.00625796		<.0001

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Magnesium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.859503
RSquare Adj	0.820476
Root Mean Square Error	0.044667
Mean of Response	0.897833
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.010486
Residual	0.001995

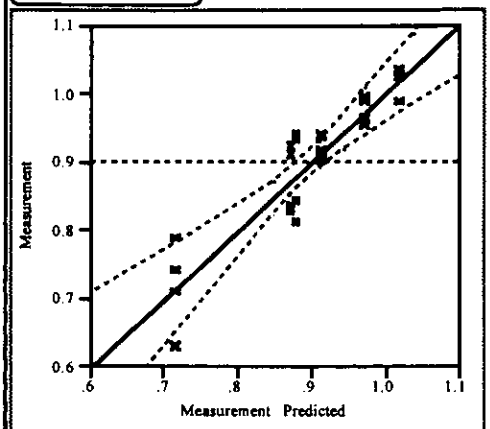
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.2197	0.04394	5	22.0233	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.21970033	0.043940	22.0233
Error	18	0.03591300	0.001995	Prob>F
C Total	23	0.25561333		<.0001

Manganese (wt %)

Response: Measurement

Summary of Fit

RSquare	0.892869
RSquare Adj	0.86311
Root Mean Square Error	0.044191
Mean of Response	2.463125
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.01416
Residual	0.001953

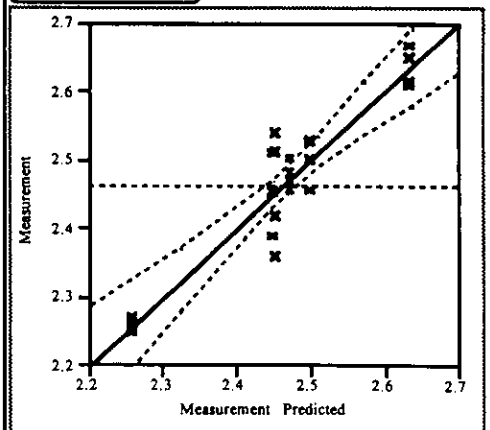
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.29297	0.05859	5	30.0036	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.29296688	0.058593	30.0036
Error	18	0.03515175	0.001953	Prob>F
C Total	23	0.32811863		<.0001

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Sodium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.784647
RSquare Adj	0.724827
Root Mean Square Error	0.30244
Mean of Response	6.426333
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.27708
Residual	0.09147

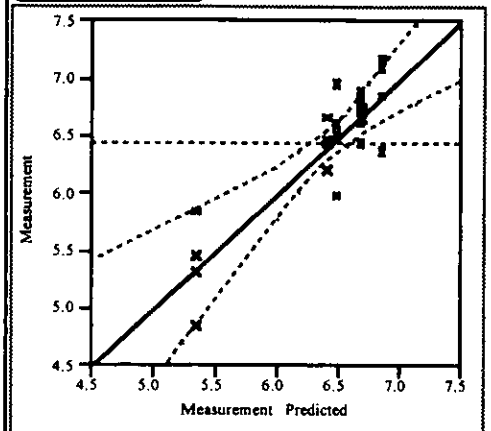
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	5.99895	1.19979	5	13.1168	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	5.9989508	1.19979	13.1168
Error	18	1.6464585	0.09147	Prob>F
C Total	23	7.6454093		<.0001

Nickel (wt %)

Response: Measurement

Summary of Fit

RSquare	0.627968
RSquare Adj	0.524625
Root Mean Square Error	0.008134
Mean of Response	0.266333
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000084
Residual	0.000066

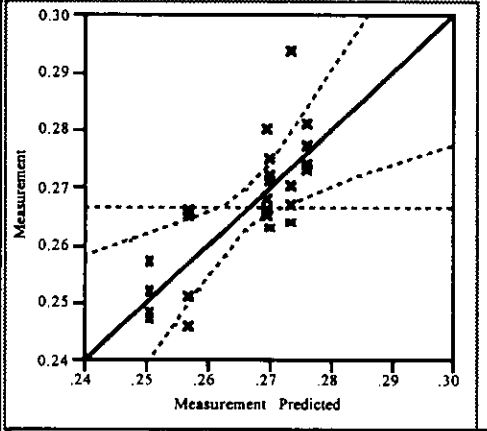
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00201	0.0004	5	6.0766	0.0018

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.00201033	0.000402	6.0766
Error	18	0.00119100	0.000066	Prob>F
C Total	23	0.00320133		0.0018

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Silicon (wt %)

Response: Measurement

Summary of Fit

RSquare	0.708596
RSquare Adj	0.62765
Root Mean Square Error	0.079388
Mean of Response	0.855167
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.012217
Residual	0.006302

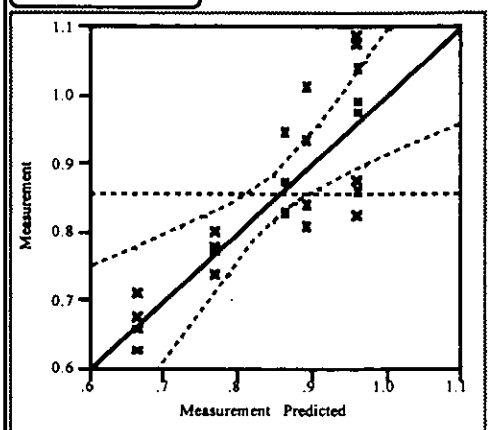
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.27586	0.05517	5	8.7540	0.0002

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.27585733	0.055171	8.7540
Error	18	0.11344400	0.006302	Prob>F
C Total	23	0.38930133		0.0002

Titanium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.946183
RSquare Adj	0.931234
Root Mean Square Error	0.011743
Mean of Response	0.032208
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.002148
Residual	0.000138

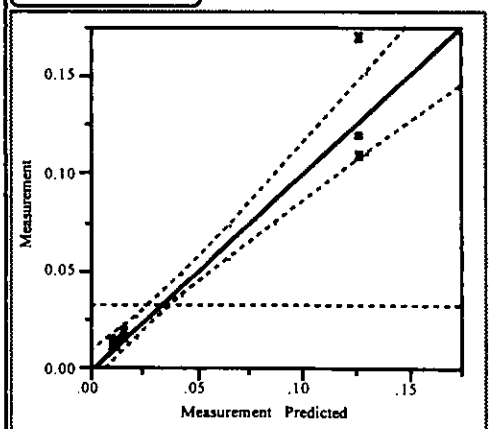
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.04364	0.00873	5	63.2934	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.04364171	0.008728	63.2934
Error	18	0.00248225	0.000138	Prob>F
C Total	23	0.04612396		<.0001

Exhibit 7: Random Effects Model for SRAT Product
(Continued)

Uranium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.792808
RSquare Adj	0.735255
Root Mean Square Error	0.060826
Mean of Response	2.631542
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.011817
Residual	0.0037

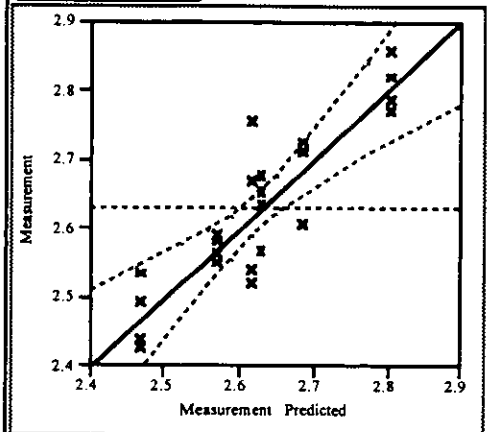
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.25483	0.05097	5	13.7752	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.25482921	0.050966	13.7752
Error	18	0.06659675	0.003700	Prob>F
C Total	23	0.32142596		<.0001

Zirconium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.876956
RSquare Adj	0.842777
Root Mean Square Error	0.011428
Mean of Response	0.036708
Observations (or Sum Wgts)	24

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000805
Residual	0.000131

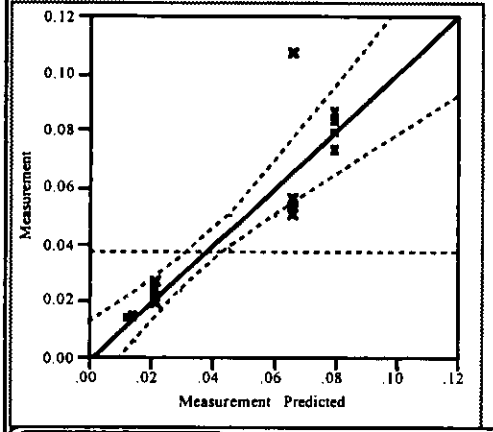
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.01675	0.00335	5	25.6578	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	0.01675421	0.003351	25.6578
Error	18	0.00235075	0.000131	Prob>F
C Total	23	0.01910496		<.0001

Exhibit 8: Random Effects Model for SME

(Continued)

Total Solids (wt %)

Response: Measurement

Summary of Fit

RSquare	0.868319
RSquare Adj	0.829912
Root Mean Square Error	0.828227
Mean of Response	49.89906
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	3.705605
Residual	0.685959

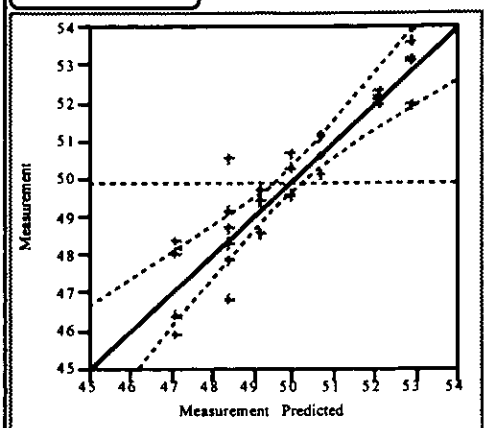
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	108.559	15.5084	7	22.6083	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	108.55865	15.5084	22.6083
Error	24	16.46303	0.6860	Prob>F
C Total	31	125.02167		<.0001

Calcined Solids (wt %)

Response: Measurement

Summary of Fit

RSquare	0.89335
RSquare Adj	0.862244
Root Mean Square Error	0.780071
Mean of Response	43.95844
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	4.216885
Residual	0.608511

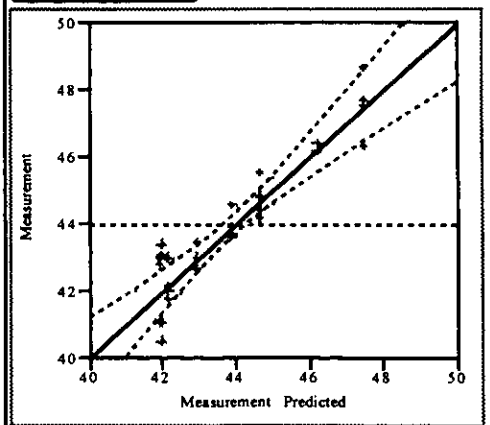
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	122.332	17.476	7	28.7193	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	122.33235	17.4760	28.7193
Error	24	14.60428	0.6085	Prob>F
C Total	31	136.93662		<.0001

Exhibit 8: Random Effects Model for SME

(Continued)

Insoluble Solids (wt %)

Response: Measurement

Summary of Fit

RSquare	0.927493
RSquare Adj	0.906345
Root Mean Square Error	0.66593
Mean of Response	41.78062
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	4.751395
Residual	0.443463

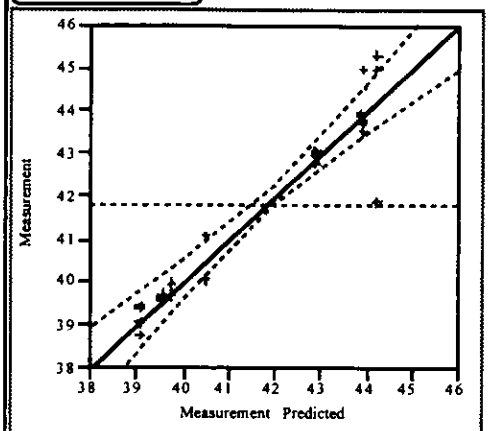
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	136.143	19.449	7	43.8572	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	136.14329	19.4490	43.8572
Error	24	10.64310	0.4435	Prob>F
C Total	31	146.78639		<.0001

Density (g/mL)

Response: Measurement

Summary of Fit

RSquare	0.909506
RSquare Adj	0.883113
Root Mean Square Error	0.016321
Mean of Response	1.452906
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.002228
Residual	0.000266

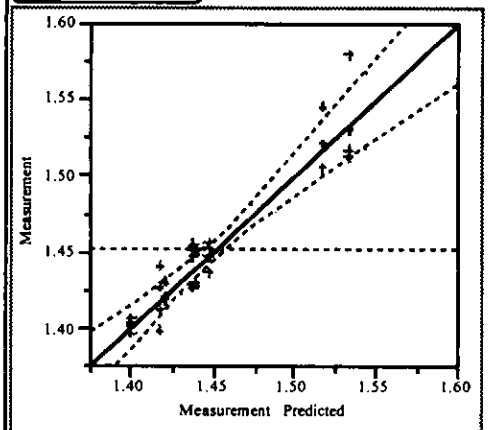
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.06426	0.00918	7	34.4589	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.06425547	0.009179	34.4589
Error	24	0.00639325	0.000266	Prob>F
C Total	31	0.07064872		<.0001

Exhibit 8: Random Effects Model for SME
(Continued)

Formate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.686812
RSquare Adj	0.595465
Root Mean Square Error	2351.551
Mean of Response	32337.5
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	9011838
Residual	5529792

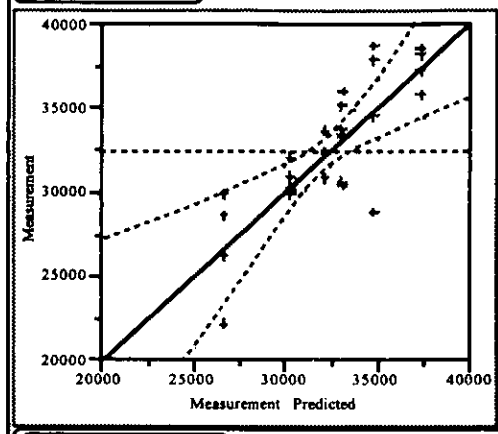
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	2.91e+8	4.158e7	7	7.5188	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	291040000	41577143	7.5188
Error	24	132715000	5529792	Prob>F
C Total	31	423755000		<.0001

Chloride (ppm)

Response: Measurement

Summary of Fit

RSquare	0.354603
RSquare Adj	0.166362
Root Mean Square Error	181.2234
Mean of Response	1061.125
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	7256.194
Residual	32841.94

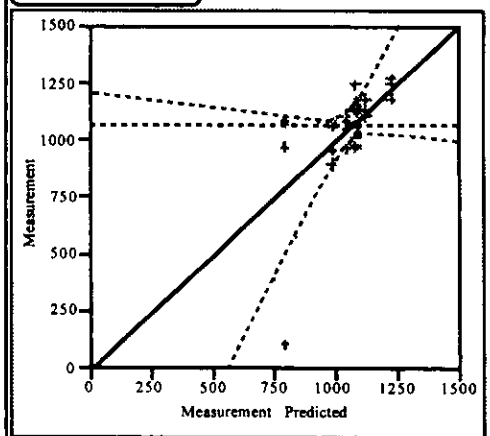
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	433067	61866.7	7	1.8838	0.1170

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	433067.0	61866.7	1.8838
Error	24	788206.5	32841.9	Prob>F
C Total	31	1221273.5		0.1170

Exhibit 8: Random Effects Model for SME
(Continued)

Fluoride (ppm)

Response: Measurement

Summary of Fit

RSquare	0.354603
RSquare Adj	0.166362
Root Mean Square Error	181.2234
Mean of Response	1061.125
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	7256.194
Residual	32841.94

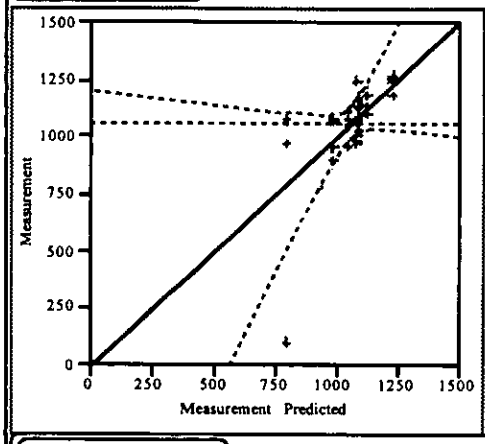
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	433067	61866.7	7	1.8838	0.1170

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	433067.0	61866.7	1.8838
Error	24	788206.5	32841.9	Prob>F
C Total	31	1221273.5		0.1170

Nitrate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.877331
RSquare Adj	0.841552
Root Mean Square Error	1783.81
Mean of Response	27109.38
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	18710923
Residual	3181979

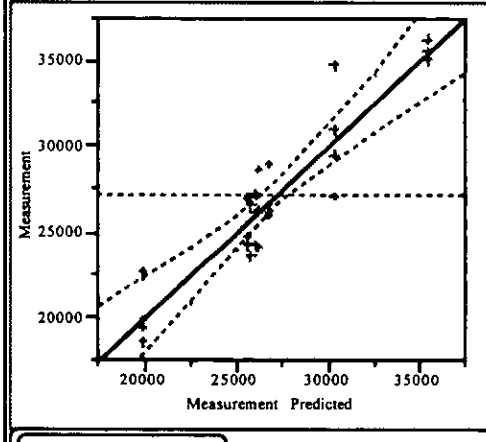
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	5.462e8	7.803e7	7	24.5211	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	546179688	78025670	24.5211
Error	24	76367500	3181979	Prob>F
C Total	31	622547188		<.0001

Exhibit 8: Random Effects Model for SME
(Continued)

Nitrite (ppm)

Response: Measurement

Summary of Fit

RSquare	0.354603
RSquare Adj	0.166362
Root Mean Square Error	181.2234
Mean of Response	1061.125
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	7256.194
Residual	32841.94

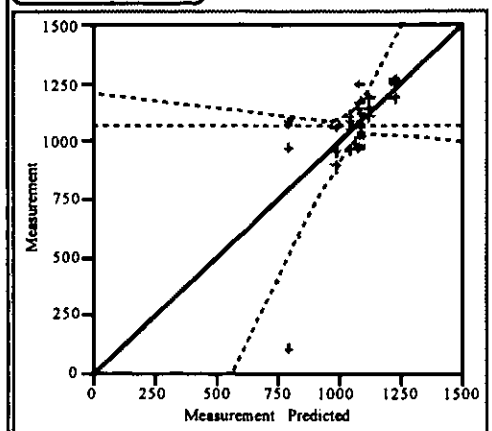
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	433067	61866.7	7	1.8838	0.1170

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	433067.0	61866.7	1.8838
Error	24	788206.5	32841.9	Prob>F
C Total	31	1221273.5		0.1170

Phosphate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.354603
RSquare Adj	0.166362
Root Mean Square Error	181.2234
Mean of Response	1061.125
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	7256.194
Residual	32841.94

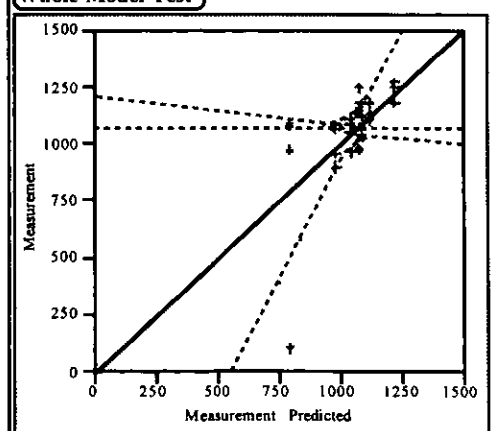
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	433067	61866.7	7	1.8838	0.1170

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	433067.0	61866.7	1.8838
Error	24	788206.5	32841.9	Prob>F
C Total	31	1221273.5		0.1170

Exhibit 8: Random Effects Model for SME
(Continued)

Sulfate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.354603
RSquare Adj	0.166362
Root Mean Square Error	181.2234
Mean of Response	1061.125
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	7256.194
Residual	32841.94

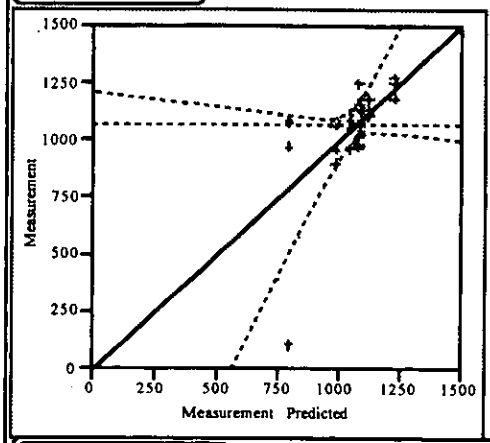
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	433067	61866.7	7	1.8838	0.1170

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	433067.0	61866.7	1.8838
Error	24	788206.5	32841.9	Prob>F
C Total	31	1221273.5		0.1170

Aluminum (wt %)

Response: Measurement

Summary of Fit

RSquare	0.795542
RSquare Adj	0.738294
Root Mean Square Error	0.087861
Mean of Response	2.360061
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.024156
Residual	0.00772

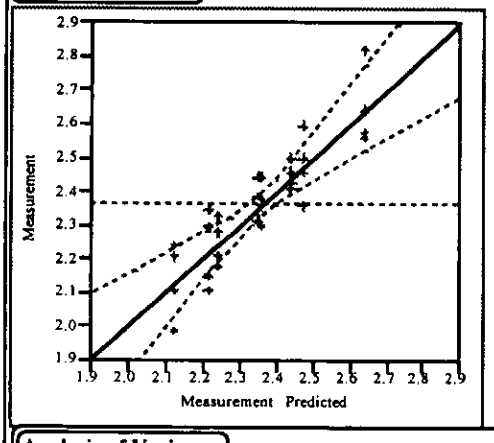
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.75092	0.10727	7	13.8963	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.75091508	0.107274	13.8963
Error	25	0.19298880	0.007720	Prob>F
C Total	32	0.94390388		<.0001

Exhibit 8: Random Effects Model for SME
(Continued)

Boron (wt %)

Response: Measurement

Summary of Fit

RSquare	0.579026
RSquare Adj	0.461153
Root Mean Square Error	0.134227
Mean of Response	2.718
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.017104
Residual	0.018017

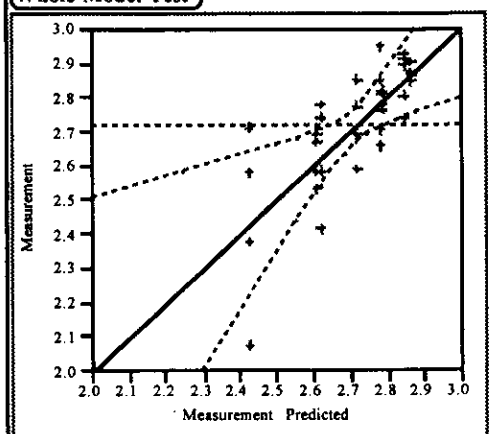
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.61953	0.0885	7	4.9123	0.0014

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.6195301	0.088504	4.9123
Error	25	0.4504220	0.018017	Prob>F
C Total	32	1.0699520		0.0014

Calcium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.781374
RSquare Adj	0.720158
Root Mean Square Error	0.047815
Mean of Response	0.820364
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.006526
Residual	0.002286

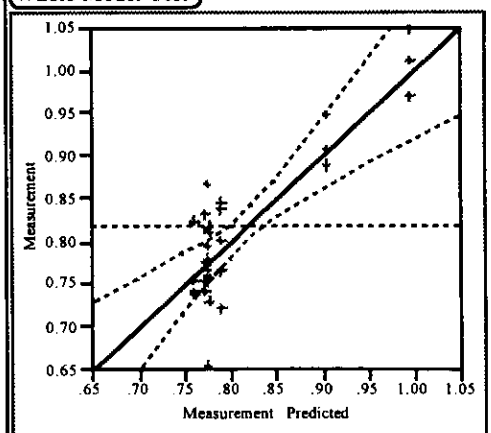
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.20428	0.02918	7	12.7643	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.20427739	0.029182	12.7643
Error	25	0.05715625	0.002286	Prob>F
C Total	32	0.26143364		<.0001

Exhibit 8: Random Effects Model for SME

(Continued)

Chromium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.59499
RSquare Adj	0.481587
Root Mean Square Error	0.013084
Mean of Response	0.075879
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000176
Residual	0.000171

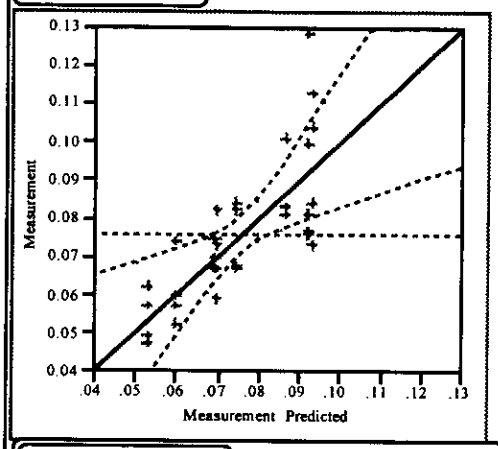
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00629	0.0009	7	5.2467	0.0009

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.00628757	0.000898	5.2467
Error	25	0.00427995	0.000171	Prob>F
C Total	32	0.01056752		0.0009

Copper (wt %)

Response: Measurement

Summary of Fit

RSquare	0.688844
RSquare Adj	0.60172
Root Mean Square Error	0.013183
Mean of Response	0.331061
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000291
Residual	0.000174

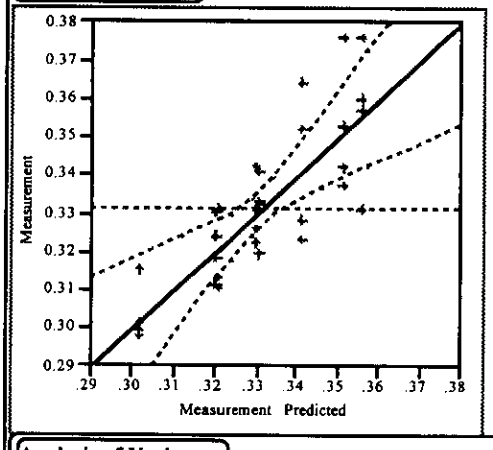
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00962	0.00137	7	7.9065	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.00961893	0.001374	7.9065
Error	25	0.00434495	0.000174	Prob>F
C Total	32	0.01396388		<.0001

Exhibit 8: Random Effects Model for SME

(Continued)

Iron (wt %)

Response: Measurement

Summary of Fit

RSquare	0.785865
RSquare Adj	0.725907
Root Mean Square Error	0.289416
Mean of Response	8.466879
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.246067
Residual	0.083762

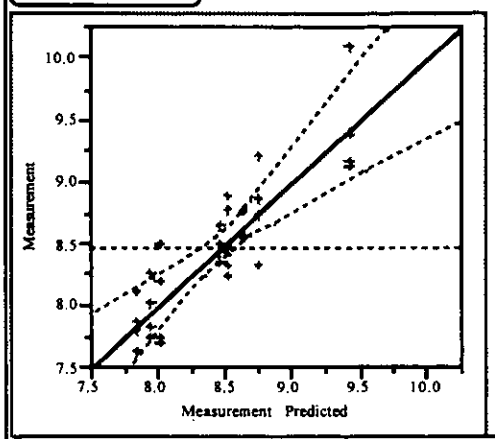
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	7.685	1.09786	7	13.1069	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	7.6850033	1.09786	13.1069
Error	25	2.0940382	0.08376	Prob>F
C Total	32	9.7790415		<.0001

Potassium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.490737
RSquare Adj	0.348143
Root Mean Square Error	0.028804
Mean of Response	0.069242
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000492
Residual	0.00083

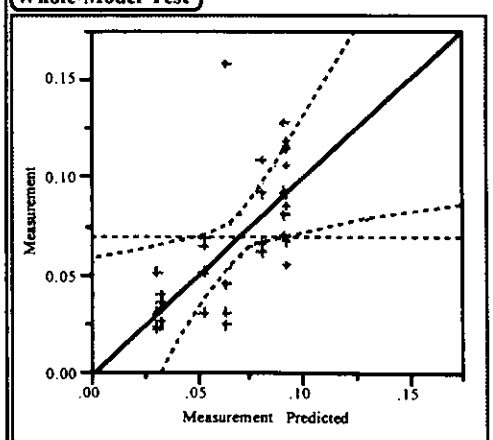
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.01999	0.00286	7	3.4415	0.0102

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.01998676	0.002855	3.4415
Error	25	0.02074130	0.000830	Prob>F
C Total	32	0.04072806		0.0102

Exhibit 8: Random Effects Model for SME

(Continued)

Lithium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.539491
RSquare Adj	0.410548
Root Mean Square Error	0.052748
Mean of Response	1.763515
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.00215
Residual	0.002782

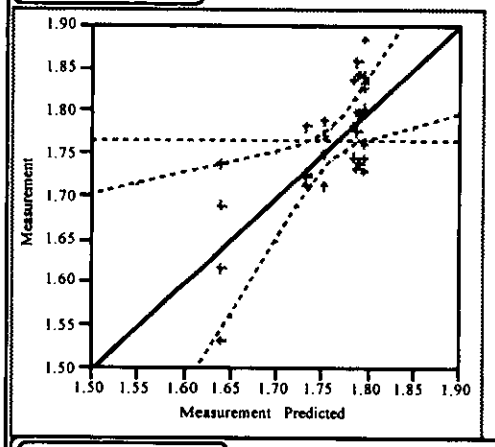
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.08149	0.01164	7	4.1840	0.0036

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.08149019	0.011641	4.1840
Error	25	0.06956005	0.002782	Prob>F
C Total	32	0.15105024		0.0036

Magnesium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.694605
RSquare Adj	0.609094
Root Mean Square Error	0.044942
Mean of Response	1.279182
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.003491
Residual	0.00202

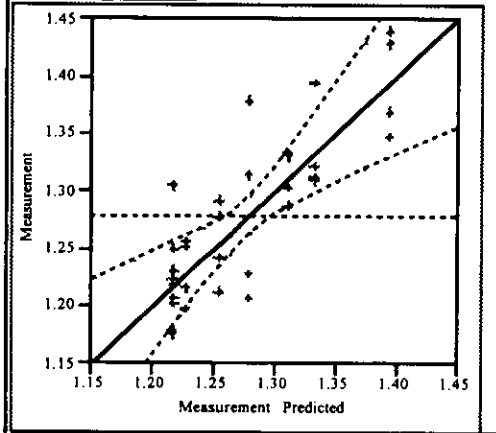
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.11485	0.01641	7	8.1230	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.11484521	0.016406	8.1230
Error	25	0.05049370	0.002020	Prob>F
C Total	32	0.16533891		<.0001

Exhibit 8: Random Effects Model for SME

(Continued)

Manganese (wt %)

Response: Measurement

Summary of Fit

RSquare	0.85912
RSquare Adj	0.819674
Root Mean Square Error	0.032307
Mean of Response	0.83097
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.005263
Residual	0.001044

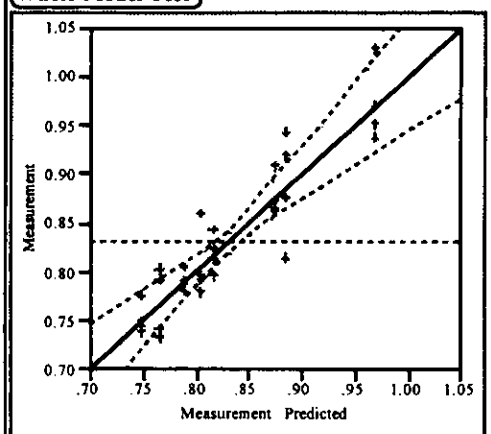
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.15912	0.02273	7	21.7795	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.15912192	0.022732	21.7795
Error	25	0.02609305	0.001044	Prob>F
C Total	32	0.18521497		<.0001

Sodium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.806949
RSquare Adj	0.752895
Root Mean Square Error	0.189606
Mean of Response	8.977818
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.121503
Residual	0.035951

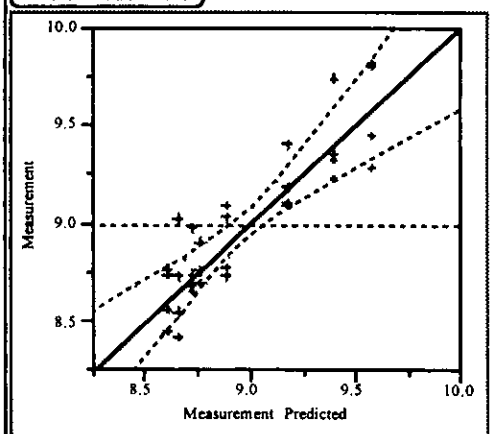
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	3.75682	0.53669	7	14.9285	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	3.7568185	0.536688	14.9285
Error	25	0.8987645	0.035951	Prob>F
C Total	32	4.6555829		<.0001

Exhibit 8: Random Effects Model for SME

(Continued)

Nickel (wt %)

Response: Measurement

Summary of Fit

RSquare	0.481657
RSquare Adj	0.336521
Root Mean Square Error	0.011001
Mean of Response	0.107303
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000068
Residual	0.000121

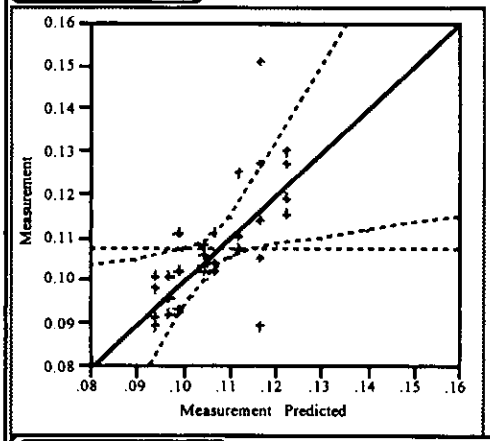
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00281	0.0004	7	3.3187	0.0123

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.00281142	0.000402	3.3187
Error	25	0.00302555	0.000121	Prob>F
C Total	32	0.00583697		0.0123

Silicon (wt %)

Response: Measurement

Summary of Fit

RSquare	0.509364
RSquare Adj	0.371986
Root Mean Square Error	0.729613
Mean of Response	24.16915
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.34976
Residual	0.532336

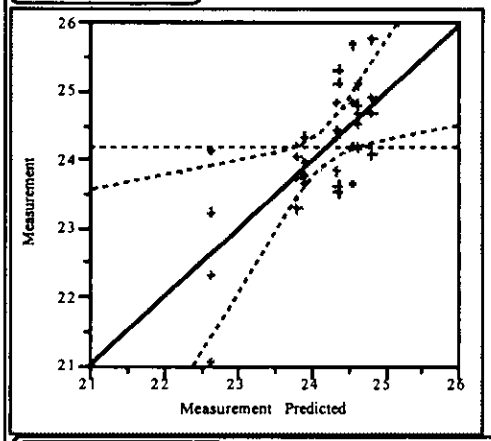
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	13.8164	1.97377	7	3.7078	0.0069

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	13.816408	1.97377	3.7078
Error	25	13.308393	0.53234	Prob>F
C Total	32	27.124800		0.0069

Exhibit 8: Random Effects Model for SME
(Continued)

Titanium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.655076
RSquare Adj	0.558497
Root Mean Square Error	0.012374
Mean of Response	0.020121
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000215
Residual	0.000153

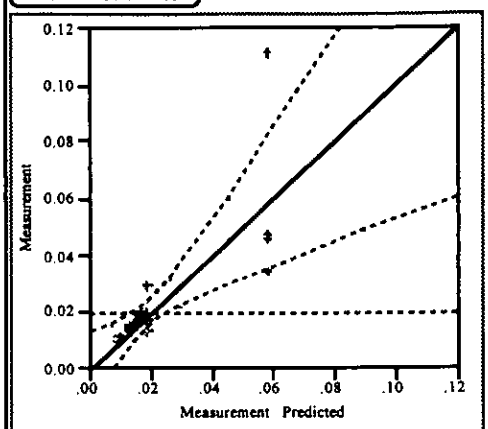
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00727	0.00104	7	6.7828	0.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.00726972	0.001039	6.7828
Error	25	0.00382780	0.000153	Prob>F
C Total	32	0.01109752		0.0001

Uranium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.936663
RSquare Adj	0.918929
Root Mean Square Error	0.040507
Mean of Response	1.037515
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.02063
Residual	0.001641

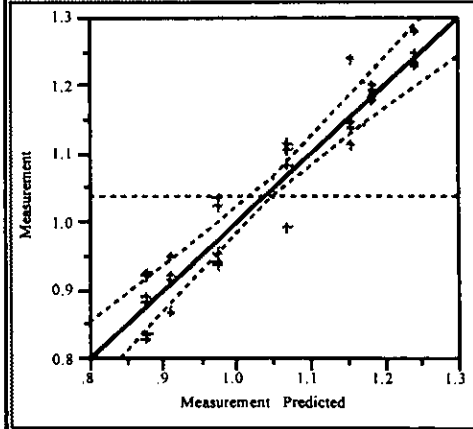
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.60663	0.08666	7	52.8166	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.60663399	0.086662	52.8166
Error	25	0.04102025	0.001641	Prob>F
C Total	32	0.64765424		<.0001

Exhibit 8: Random Effects Model for SME
(Continued)

Zirconium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.803783
RSquare Adj	0.748843
Root Mean Square Error	0.005705
Mean of Response	0.015545
Observations (or Sum Wgts)	33

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.12121

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000108
Residual	0.000033

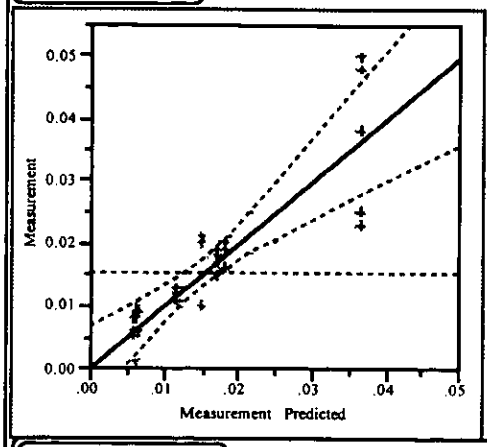
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00333	0.00048	7	14.6300	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	0.00333263	0.000476	14.6300
Error	25	0.00081355	0.000033	Prob>F
C Total	32	0.00414618		<.0001

Exhibit 9: Random Effects Model for MFT

Response: Total Solids (wt%)

Summary of Fit

RSquare	0.984307
RSquare Adj	0.960768
Root Mean Square Error	0.603262
Mean of Response	47.215
Observations (or Sum Wgts)	16

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	1.5

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	9.902646
Residual	0.363925

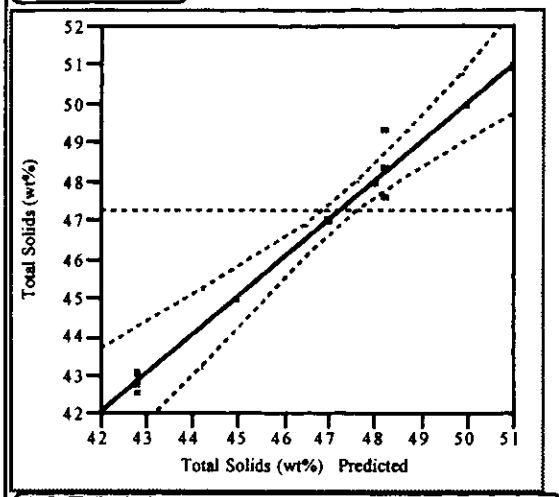
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	136.961	15.2179	9	41.8160	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	136.96105	15.2179	41.8160
Error	6	2.18355	0.3639	Prob>F
C Total	15	139.14460		<.0001

Total Solids analysis involves all the data; there is not sufficient data for batches 22^{+}.

Response: Calcined Solids (wt%)

Summary of Fit

RSquare	0.949543
RSquare Adj	0.79817
Root Mean Square Error	0.915442
Mean of Response	43.12154
Observations (or Sum Wgts)	13

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	1.23077

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	3.590326
Residual	0.838033

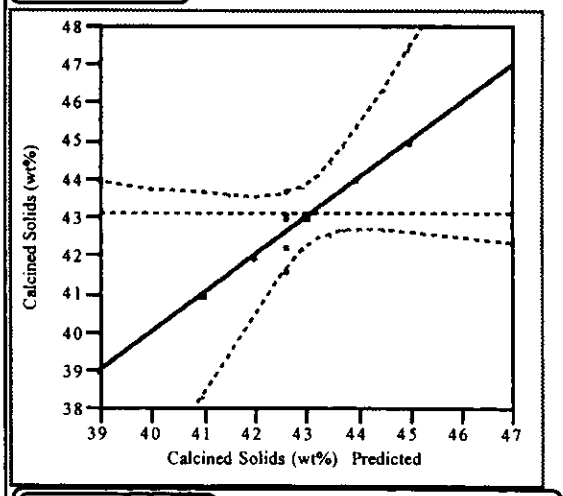
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	47.3121	5.2569	9	6.2729	0.0791

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	47.312069	5.25690	6.2729
Error	3	2.514100	0.83803	Prob>F
C Total	12	49.826169		0.0791

Calcined Solids analysis involves all the data; there is not sufficient data for batches 22^{+}.

Exhibit 9: Random Effects Model for MFT
(Continued)

Insoluble Solids (wt %)[6]

Response: Insoluble Solids (wt%)

Summary of Fit

RSquare	0.224345
RSquare Adj	-0.06653
Root Mean Square Error	6.421234
Mean of Response	39.49647
Observations (or Sum Wgts)	34

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	3.35294

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	-2.81256
Residual	41.23225

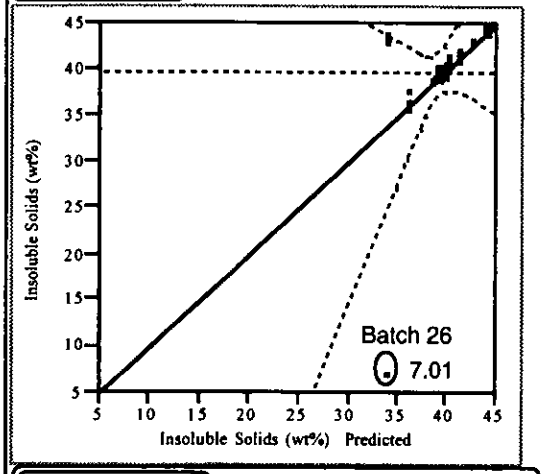
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	286.217	31.8019	9	0.7713	0.6436

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	286.2170	31.8019	0.7713
Error	24	989.5739	41.2322	Prob>F
C Total	33	1275.7910		0.6436

Insoluble Solids (wt %)

Response: Insoluble Solids (wt%)

Summary of Fit

RSquare	0.966519
RSquare Adj	0.956475
Root Mean Square Error	0.545316
Mean of Response	40.51259
Observations (or Sum Wgts)	27

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	3.85185

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	7.351689
Residual	0.29737

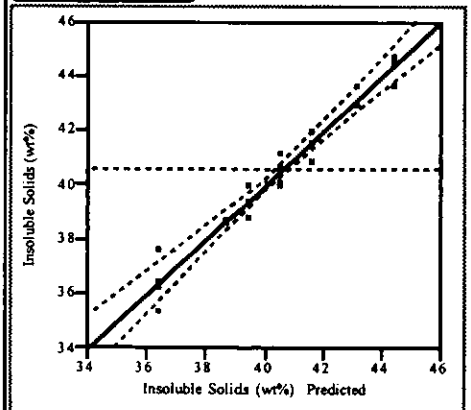
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	171.69	28.615	6	96.2269	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	171.68992	28.6150	96.2269
Error	20	5.94740	0.2974	Prob>F
C Total	26	177.63732		<.0001

[6]The top analysis includes all available data (batches 19-29 for the MFT). The point of interest is one of the values for Batch 26, 7.01 wt%, a probable outlier. The bottom analysis has this point removed and also uses only data after batch 21.

Exhibit 9: Random Effects Model for MFT
(Continued)

Format (ppm)

Response: Measurement

Summary of Fit

RSquare	0.859828
RSquare Adj	0.76638
Root Mean Square Error	1096.079
Mean of Response	32112.5
Observations (or Sum Wgts)	16

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	2.25

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	4379012
Residual	1201389

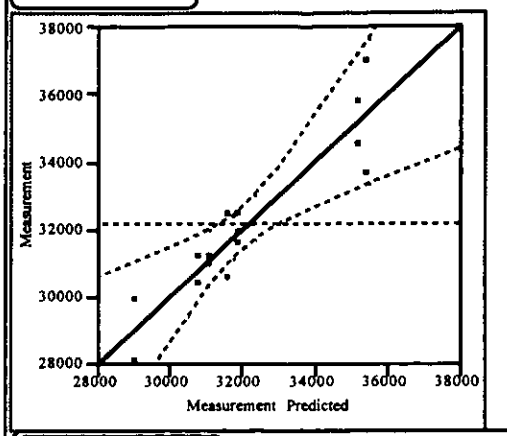
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	6.632e7	1.105e7	6	9.2012	0.0020

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	66325000	11054167	9.2012
Error	9	10812500	1201389	Prob>F
C Total	15	77137500		0.0020

Chloride (ppm)

Response: Measurement

Summary of Fit

RSquare	0.561907
RSquare Adj	0.269845
Root Mean Square Error	48.52348
Mean of Response	1067.188
Observations (or Sum Wgts)	16

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	2.25

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	966.8534
Residual	2354.528

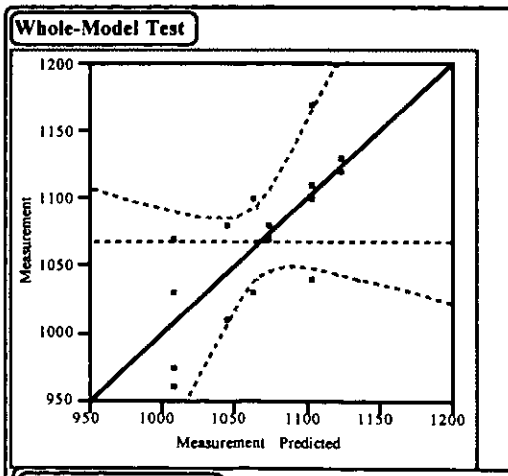
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	27179.7	4529.95	6	1.9239	0.1813

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	27179.687	4529.95	1.9239
Error	9	21190.750	2354.53	Prob>F
C Total	15	48370.438		0.1813

Exhibit 9: Random Effects Model for MFT
(Continued)

Fluoride (ppm)

Response: Measurement

Summary of Fit

RSquare	0.561907
RSquare Adj	0.269845
Root Mean Square Error	48.52348
Mean of Response	1067.188
Observations (or Sum Wgts)	16

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	2.25

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	966.8534
Residual	2354.528

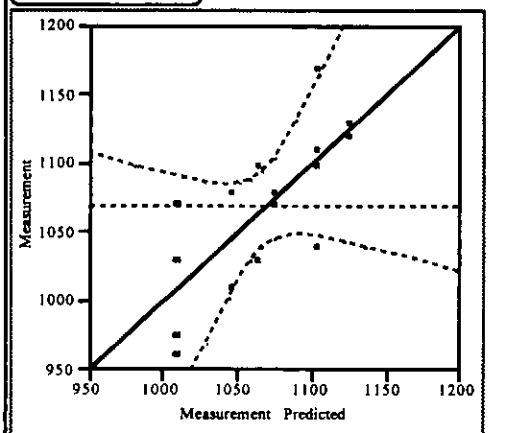
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	27179.7	4529.95	6	1.9239	0.1813

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	27179.687	4529.95	1.9239
Error	9	21190.750	2354.53	Prob>F
C Total	15	48370.438		0.1813

Nitrate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.882653
RSquare Adj	0.804422
Root Mean Square Error	1638.682
Mean of Response	25706.25
Observations (or Sum Wgts)	16

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	2.25

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	12271867
Residual	2685278

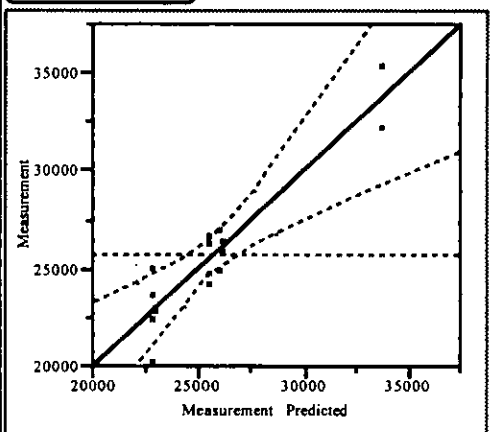
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	1.818e8	3.03e+7	6	11.2826	0.0009

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	181781875	30296979	11.2826
Error	9	24167500	2685278	Prob>F
C Total	15	205949375		0.0009

Exhibit 9: Random Effects Model for MFT

(Continued)

Sulfate (ppm)

Response: Measurement

Summary of Fit

RSquare	0.561907
RSquare Adj	0.269845
Root Mean Square Error	48.52348
Mean of Response	1067.188
Observations (or Sum Wgts)	16

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	2.25

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	966.8534
Residual	2354.528

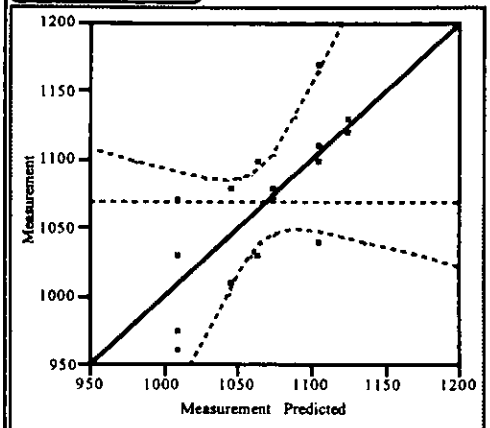
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	27179.7	4529.95	6	1.9239	0.1813

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	27179.687	4529.95	1.9239
Error	9	21190.750	2354.53	Prob>F
C Total	15	48370.438		0.1813

Aluminum (wt %)

Response: Measurement

Summary of Fit

RSquare	0.446631
RSquare Adj	0.302273
Root Mean Square Error	0.144155
Mean of Response	2.2978
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.010198
Residual	0.020781

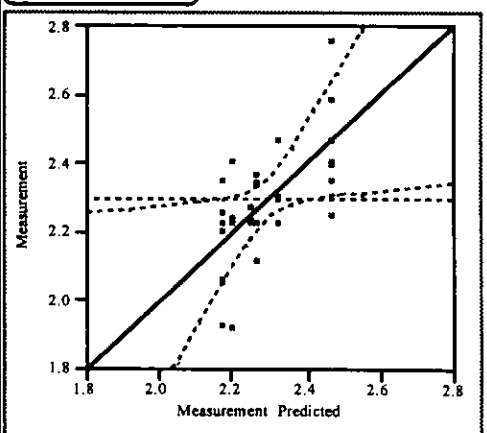
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.38576	0.06429	6	3.0939	0.0227

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.38576322	0.064294	3.0939
Error	23	0.47795558	0.020781	Prob>F
C Total	29	0.86371880		0.0227

Exhibit 9: Random Effects Model for MFT
(Continued)

Boron (wt %)

Response: Measurement

Summary of Fit

RSquare	0.586289
RSquare Adj	0.486999
Root Mean Square Error	0.120861
Mean of Response	2.712156
Observations (or Sum Wgts)	32

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.54167

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.015775
Residual	0.014607

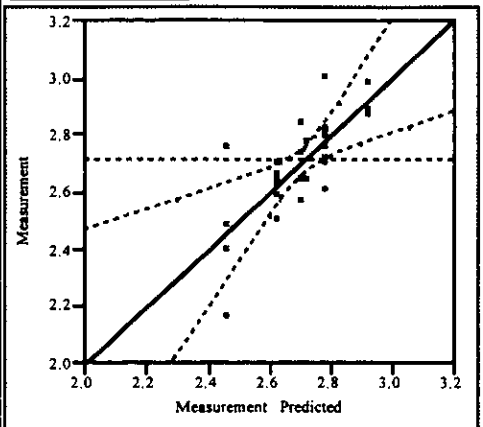
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.51752	0.08625	6	5.9048	0.0006

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.51751755	0.086253	5.9048
Error	25	0.36518267	0.014607	Prob>F
C Total	31	0.88270022		0.0006

Calcium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.34733
RSquare Adj	0.177068
Root Mean Square Error	0.087921
Mean of Response	0.808833
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.001884
Residual	0.00773

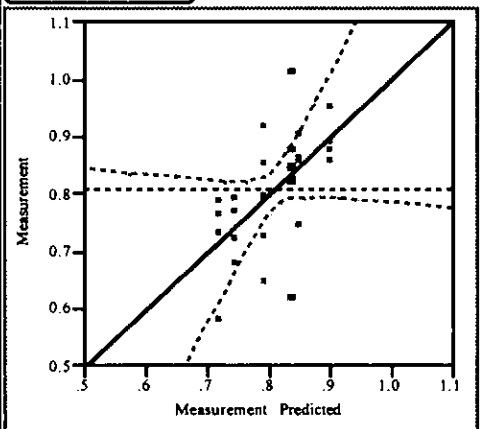
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.09462	0.01577	6	2.0400	0.1011

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.09461617	0.015769	2.0400
Error	23	0.17779400	0.007730	Prob>F
C Total	29	0.27241017		0.1011

Exhibit 9: Random Effects Model for MFT

(Continued)

Chromium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.612194
RSquare Adj	0.511027
Root Mean Square Error	0.013087
Mean of Response	0.073003
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000203
Residual	0.000171

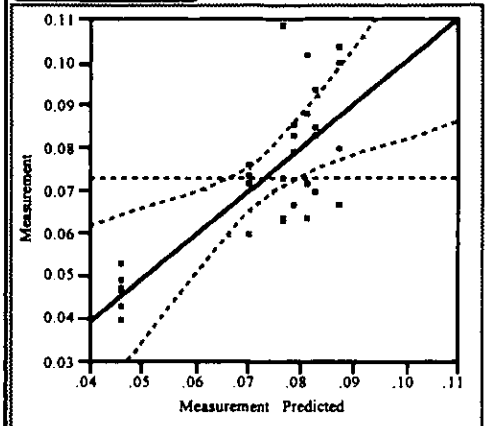
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00622	0.00104	6	6.0513	0.0006

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.00621892	0.001036	6.0513
Error	23	0.00393949	0.000171	Prob>F
C Total	29	0.01015841		0.0006

Copper (wt %)

Response: Measurement

Summary of Fit

RSquare	0.353314
RSquare Adj	0.184613
Root Mean Square Error	0.028119
Mean of Response	0.3238
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000203
Residual	0.000791

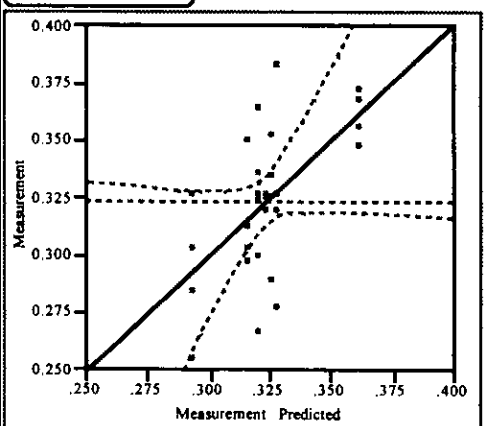
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	SS	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00994	0.00166	6	2.0943	0.0934

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.00993547	0.001656	2.0943
Error	23	0.01818533	0.000791	Prob>F
C Total	29	0.02812080		0.0934

Exhibit 9: Random Effects Model for MFT

(Continued)

Iron (wt %)

Response: Measurement

Summary of Fit

RSquare	0.336474
RSquare Adj	0.16338
Root Mean Square Error	0.533587
Mean of Response	8.229667
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.062985
Residual	0.284715

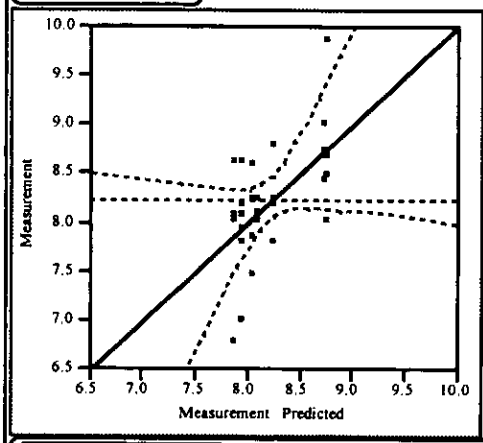
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	3.32071	0.55345	6	1.9439	0.1163

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	3.3207116	0.553452	1.9439
Error	23	6.5484391	0.284715	Prob>F
C Total	29	9.8691507		0.1163

Potassium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.696075
RSquare Adj	0.604897
Root Mean Square Error	0.023584
Mean of Response	0.105519
Observations (or Sum Wgts)	27

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	3.77778

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000977
Residual	0.000556

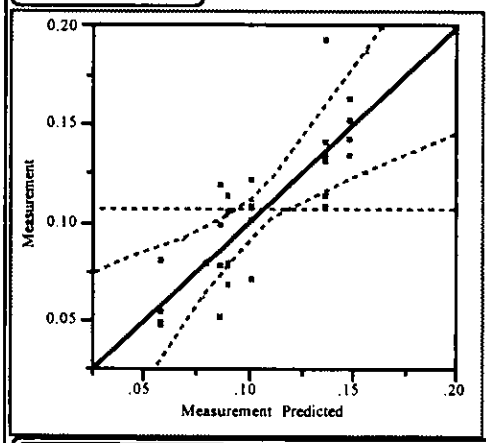
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.02548	0.00425	6	7.6343	0.0002

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.02547824	0.004246	7.6343
Error	20	0.01112450	0.000556	Prob>F
C Total	26	0.03660274		0.0002

Exhibit 9: Random Effects Model for MFT

(Continued)

Lithium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.686577
RSquare Adj	0.604815
Root Mean Square Error	0.048684
Mean of Response	1.773933
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.004109
Residual	0.00237

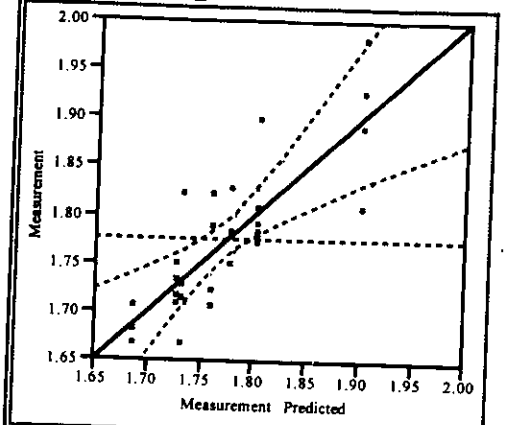
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.11942	0.0199	6	8.3972	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.11941628	0.019903	8.3972
Error	23	0.05451358	0.002370	Prob>F
C Total	29	0.17392987		<.0001

Magnesium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.574501
RSquare Adj	0.463502
Root Mean Square Error	0.040077
Mean of Response	1.266933
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.001572
Residual	0.001606

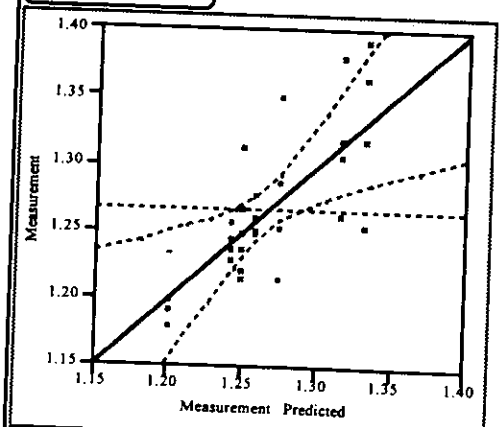
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.04988	0.00831	6	5.1757	0.0017

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.04987928	0.008313	5.1757
Error	23	0.03694258	0.001606	Prob>F
C Total	29	0.08682187		0.0017

Exhibit 9: Random Effects Model for MFT
(Continued)

Manganese (wt %)

Response: Measurement

Summary of Fit

RSquare	0.320672
RSquare Adj	0.143457
Root Mean Square Error	0.076165
Mean of Response	0.8061
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.001101
Residual	0.005801

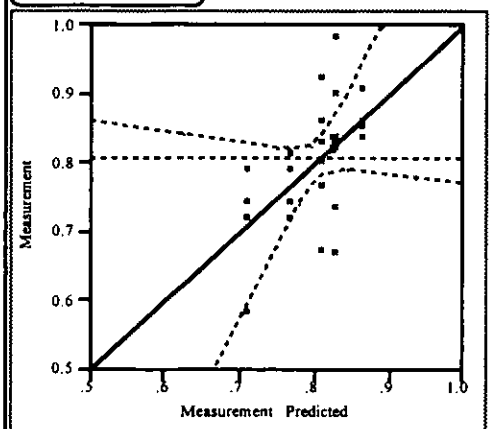
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.06298	0.0105	6	1.8095	0.1416

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.06298287	0.010497	1.8095
Error	23	0.13342583	0.005801	Prob>F
C Total	29	0.19640870		0.1416

Sodium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.772693
RSquare Adj	0.713395
Root Mean Square Error	0.238812
Mean of Response	8.916933
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.160811
Residual	0.057031

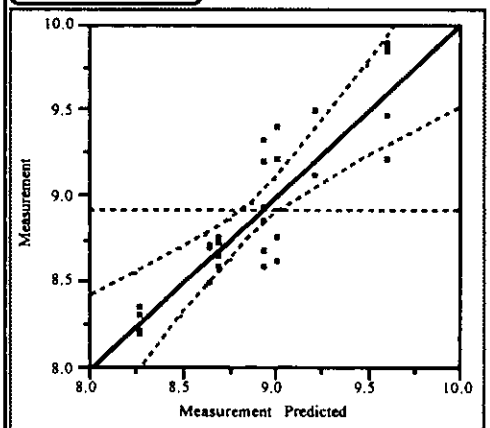
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	4.45896	0.74316	6	13.0308	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	4.4589576	0.743160	13.0308
Error	23	1.3117142	0.057031	Prob>F
C Total	29	5.7706719		<.0001

Exhibit 9: Random Effects Model for MFT
(Continued)

Nickel (wt %)

Response: Measurement

Summary of Fit

RSquare	0.445819
RSquare Adj	0.301249
Root Mean Square Error	0.010194
Mean of Response	0.100667
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000051
Residual	0.000104

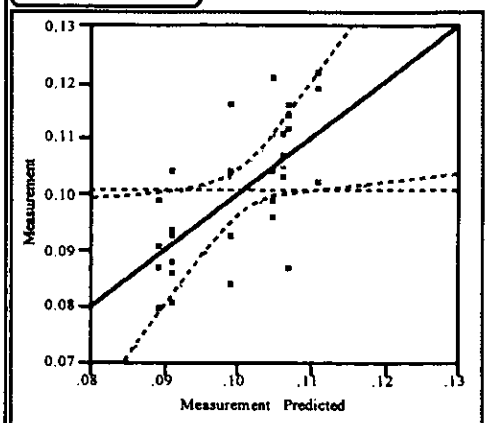
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00192	0.00032	6	3.0838	0.0230

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.00192267	0.000320	3.0838
Error	23	0.00239000	0.000104	Prob>F
C Total	29	0.00431267		0.0230

Silicon (wt %)

Response: Measurement

Summary of Fit

RSquare	0.570716
RSquare Adj	0.458729
Root Mean Square Error	0.726751
Mean of Response	24.32883
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.507073
Residual	0.528167

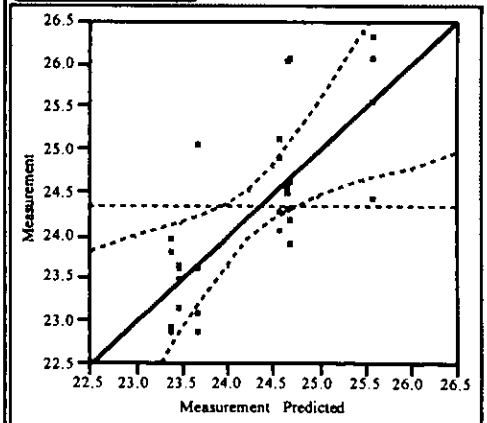
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	16.1501	2.69168	6	5.0963	0.0019

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	16.150080	2.69168	5.0963
Error	23	12.147846	0.52817	Prob>F
C Total	29	28.297926		0.0019

Exhibit 9: Random Effects Model for MFT
(Continued)

Titanium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.905882
RSquare Adj	0.881329
Root Mean Square Error	0.001331
Mean of Response	0.014633
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000015
Residual	0.000002

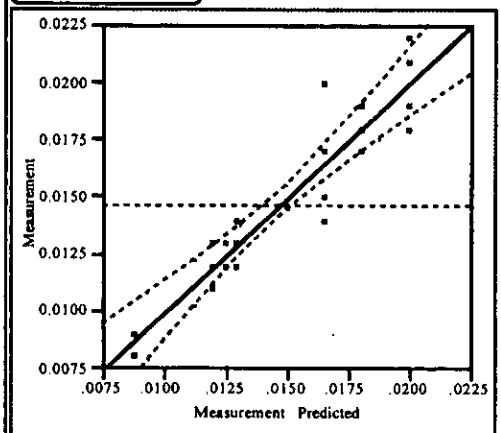
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00039	0.00007	6	36.8956	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.00039222	0.000065	36.8956
Error	23	0.00004075	0.000002	Prob>F
C Total	29	0.00043297		<.0001

Uranium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.790733
RSquare Adj	0.736141
Root Mean Square Error	0.084495
Mean of Response	0.997067
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.022564
Residual	0.007139

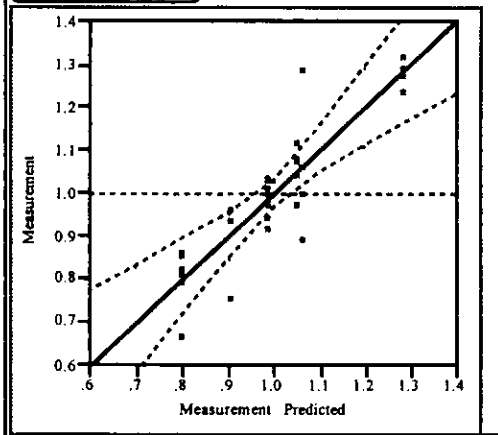
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.62047	0.10341	6	14.4845	<.0001

Whole-Model Test



Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.62047037	0.103412	14.4845
Error	23	0.16420750	0.007139	Prob>F
C Total	29	0.78467787		<.0001

Exhibit 9: Random Effects Model for MFT

(Continued)

Zirconium (wt %)

Response: Measurement

Summary of Fit

RSquare	0.640033
RSquare Adj	0.546129
Root Mean Square Error	0.013354
Mean of Response	0.022003
Observations (or Sum Wgts)	30

Parameter Estimates

Expected Mean Squares

The Mean Square per row by the Variance Component per column

EMS	Intercept	Batch
Intercept	0	0
Batch	0	4.26667

plus 1.0 times Residual Error Variance

Variance Component Estimates

Component	Var Comp Est
Batch	0.000243
Residual	0.000178

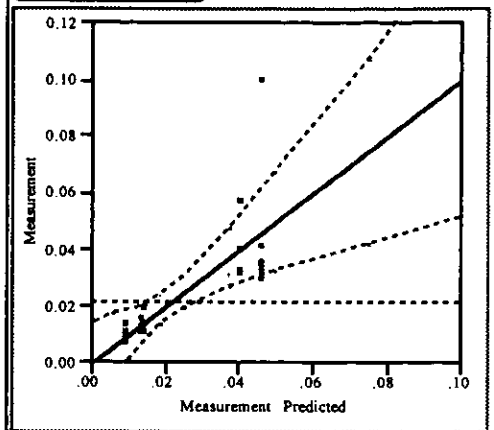
These estimates based on equating Mean Squares to Expected Value.

Test Denominator Synthesis

Tests wrt Random Effects

Source	S S	MS Num	DF Num	F Ratio	Prob>F
Batch	0.00729	0.00122	6	6.8158	0.0003

Whole-Model Test

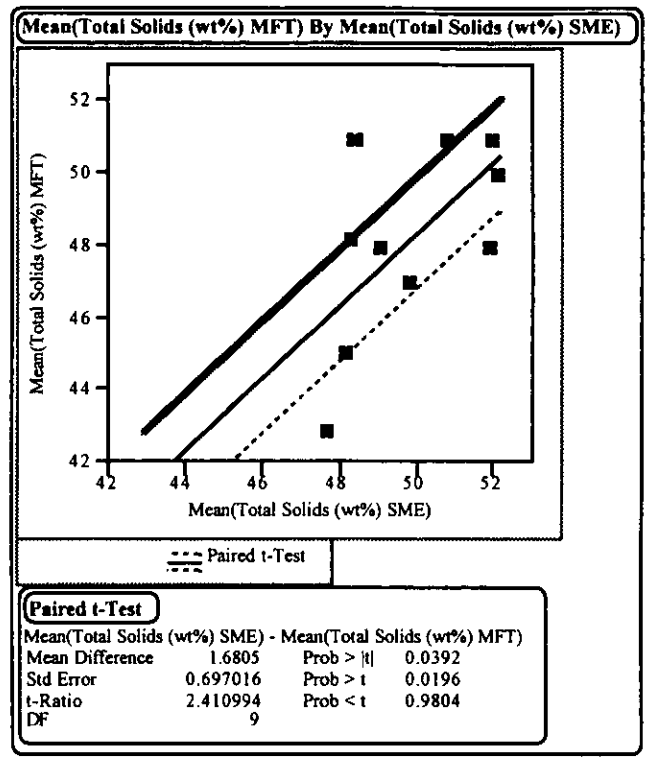


Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	6	0.00729242	0.001215	6.8158
Error	23	0.00410139	0.000178	Prob>F
C Total	29	0.01139381		0.0003

Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements

Total Solids (wt%)



Calcined Solids (wt%)

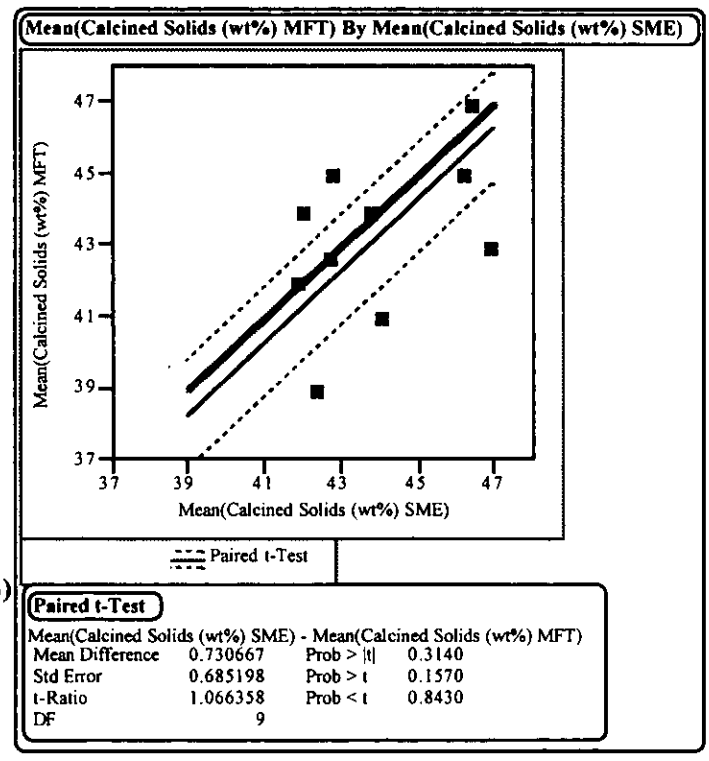
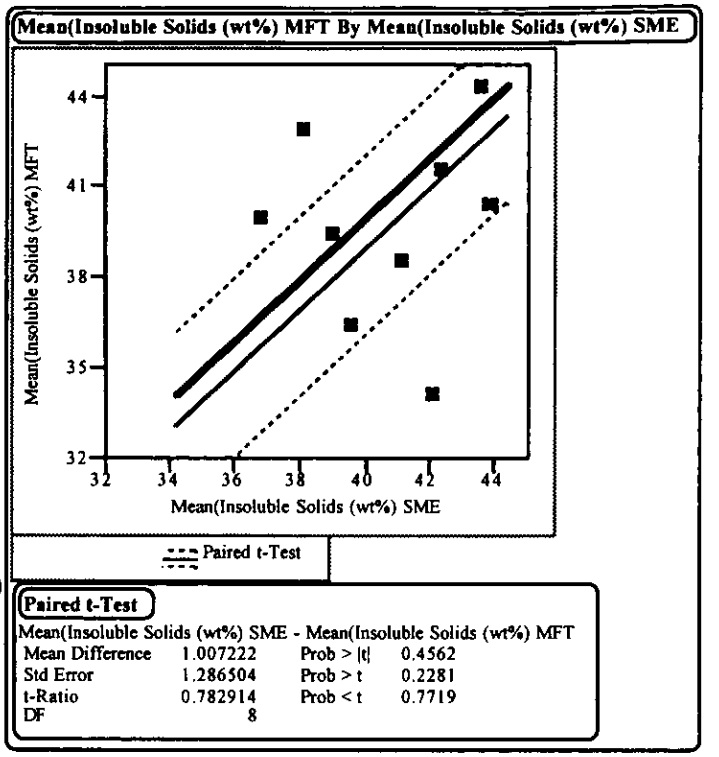


Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

Insoluble Solids (wt%)



Density (g/mL)

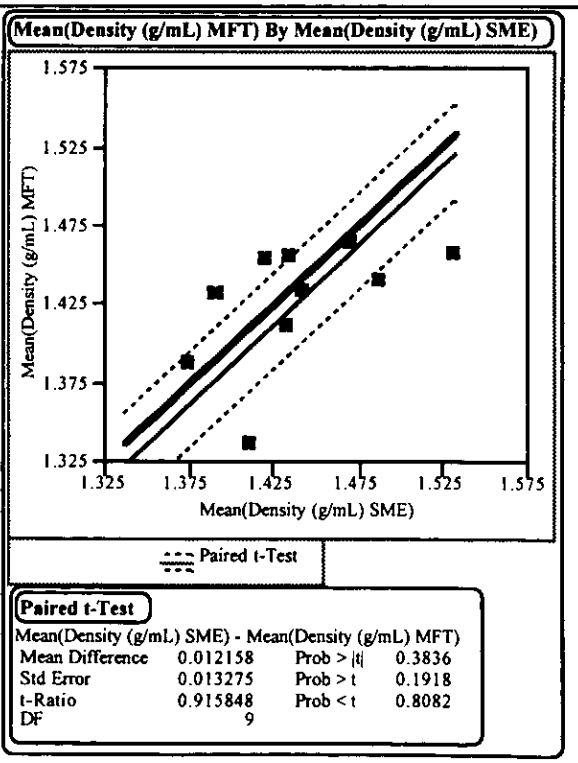
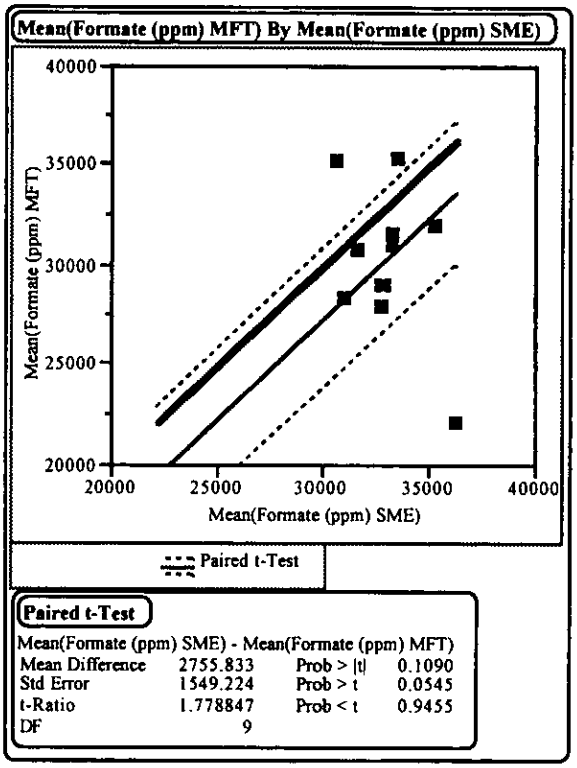


Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

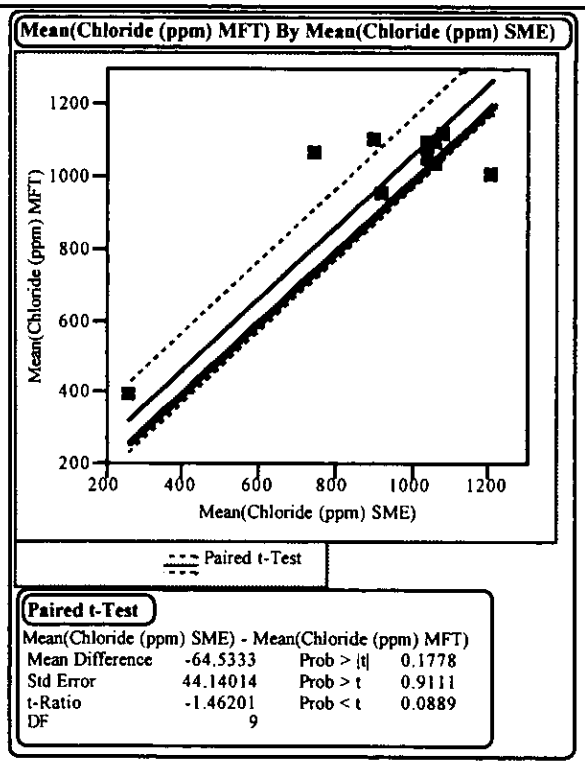
Formate (ppm)



Paired t-Test

Mean(Formate (ppm) SME) - Mean(Formate (ppm) MFT)			
Mean Difference	2755.833	Prob > |t|	0.1090
Std Error	1549.224	Prob > t	0.0545
t-Ratio	1.778847	Prob < t	0.9455
DF	9		

Chloride (ppm)

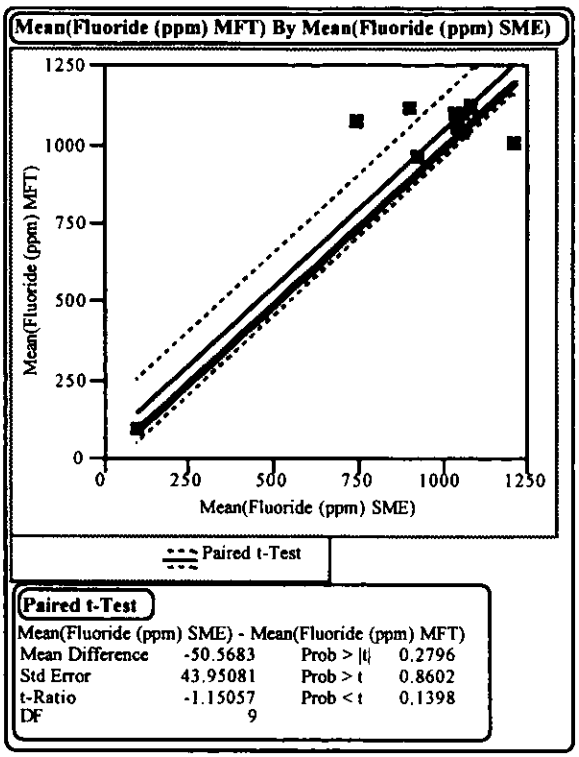


Paired t-Test

Mean(Chloride (ppm) SME) - Mean(Chloride (ppm) MFT)			
Mean Difference	-64.5333	Prob > |t|	0.1778
Std Error	44.14014	Prob > t	0.9111
t-Ratio	-1.46201	Prob < t	0.0889
DF	9		

Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

Fluoride (ppm)

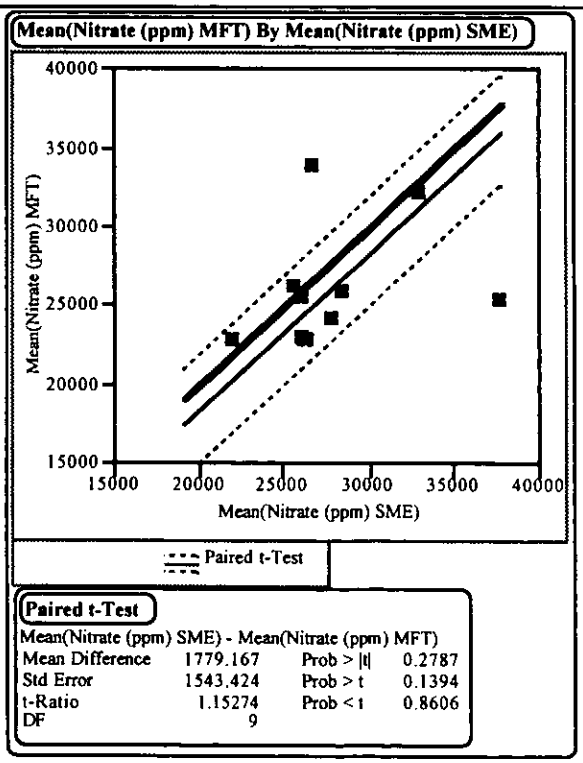


Paired t-Test

Mean(Fluoride (ppm) SME) - Mean(Fluoride (ppm) MFT)

Mean Difference	-50.5683	Prob > |t|	0.2796
Std Error	43.95081	Prob > t	0.8602
t-Ratio	-1.15057	Prob < t	0.1398
DF	9		

Nitrate (ppm)



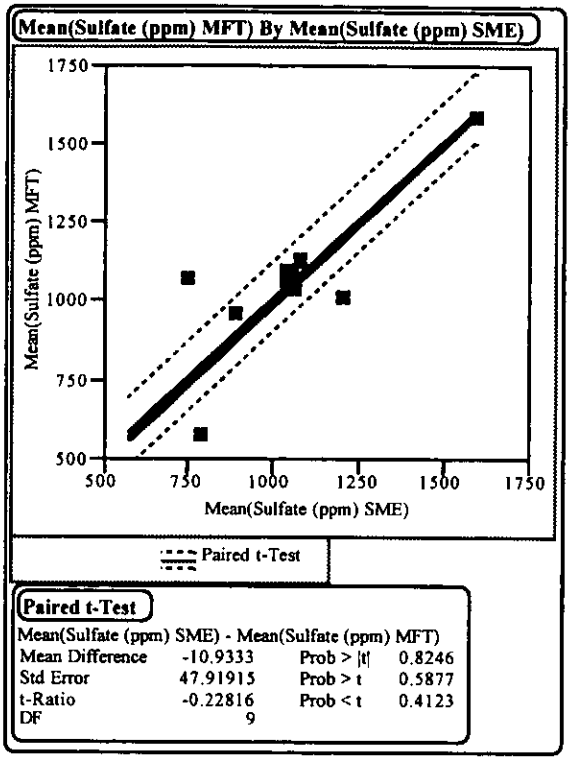
Paired t-Test

Mean(Nitrate (ppm) SME) - Mean(Nitrate (ppm) MFT)

Mean Difference	1779.167	Prob > |t|	0.2787
Std Error	1543.424	Prob > t	0.1394
t-Ratio	1.15274	Prob < t	0.8606
DF	9		

Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

Sulfate (ppm)

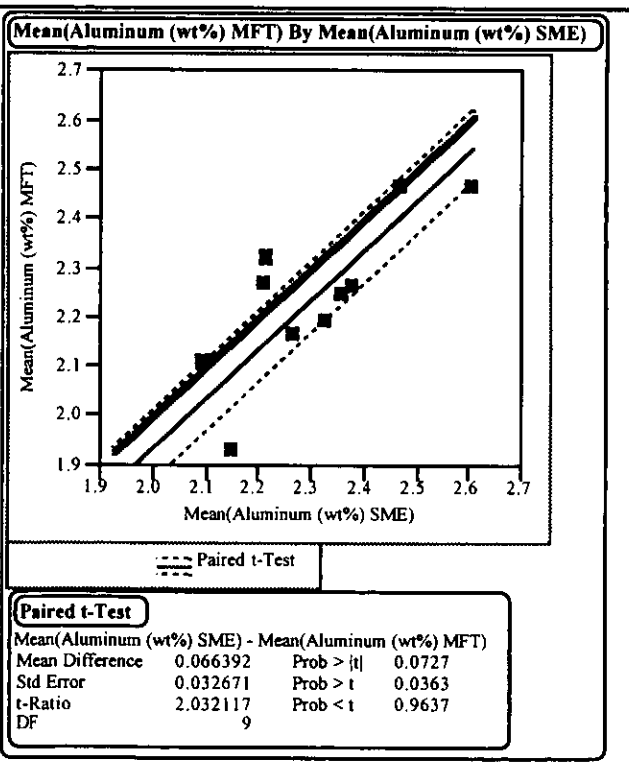


Paired t-Test

Mean(Sulfate (ppm) SME) - Mean(Sulfate (ppm) MFT)

Mean Difference	-10.9333	Prob > |t|	0.8246
Std Error	47.91915	Prob > t	0.5877
t-Ratio	-0.22816	Prob < t	0.4123
DF	9		

Aluminum (wt%)



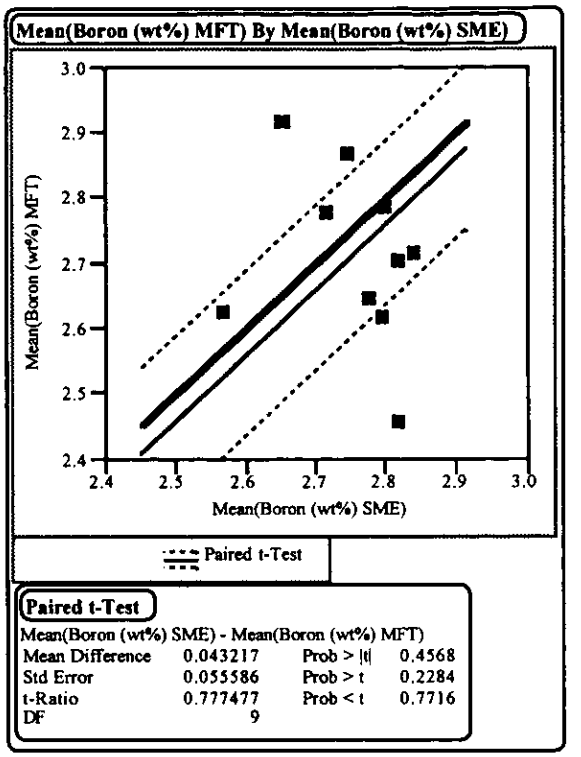
Paired t-Test

Mean(Aluminum (wt%) SME) - Mean(Aluminum (wt%) MFT)

Mean Difference	0.066392	Prob > |t|	0.0727
Std Error	0.032671	Prob > t	0.0363
t-Ratio	2.032117	Prob < t	0.9637
DF	9		

Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

Boron (wt%)

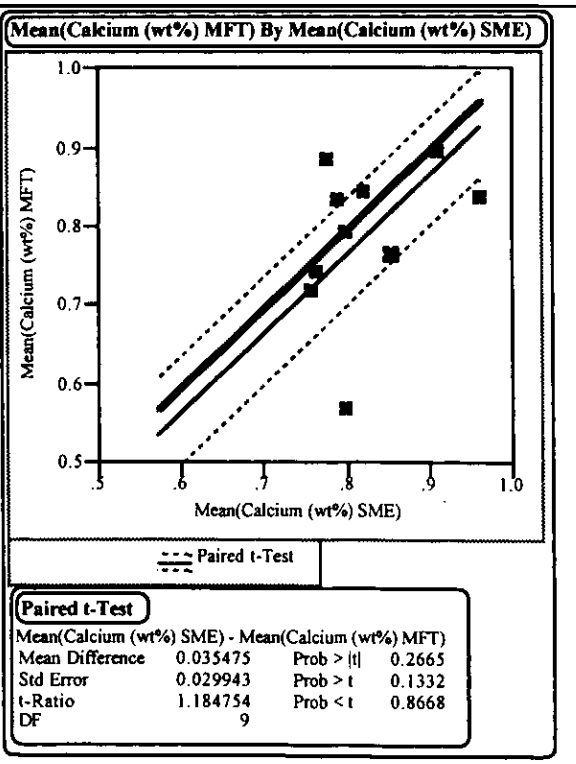


Paired t-Test

Mean(Boron (wt%) SME) - Mean(Boron (wt%) MFT)

Mean Difference	0.043217	Prob > |t|	0.4568
Std Error	0.055586	Prob > t	0.2284
t-Ratio	0.777477	Prob < t	0.7716
DF	9		

Calcium (wt%)



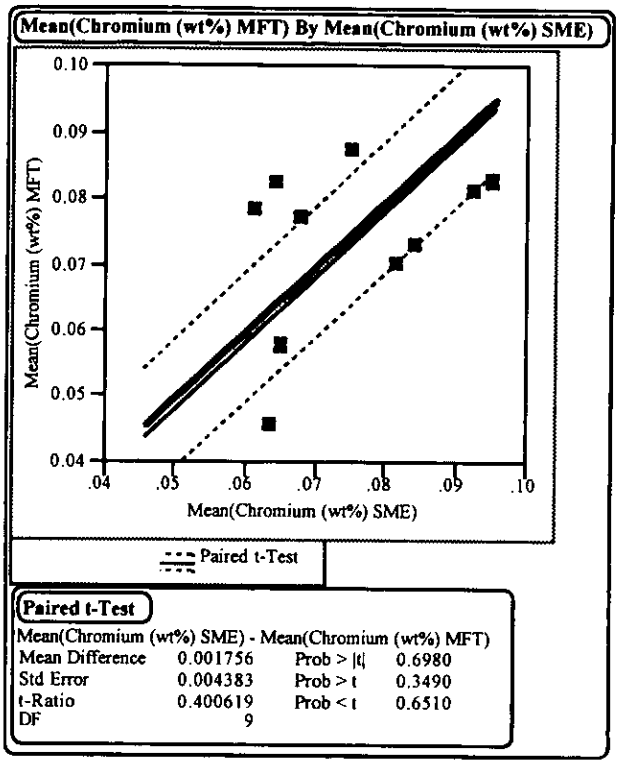
Paired t-Test

Mean(Calcium (wt%) SME) - Mean(Calcium (wt%) MFT)

Mean Difference	0.035475	Prob > |t|	0.2665
Std Error	0.029943	Prob > t	0.1332
t-Ratio	1.184754	Prob < t	0.8668
DF	9		

Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

Chromium (wt%)

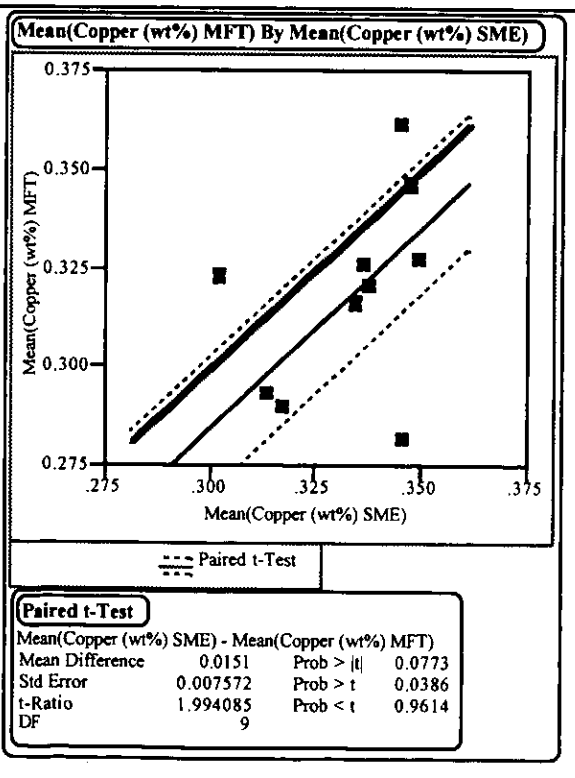


Paired t-Test

Mean(Chromium (wt%) SME) - Mean(Chromium (wt%) MFT)

Mean Difference	0.001756	Prob > |t|	0.6980
Std Error	0.004383	Prob > t	0.3490
t-Ratio	0.400619	Prob < t	0.6510
DF	9		

Copper (wt%)



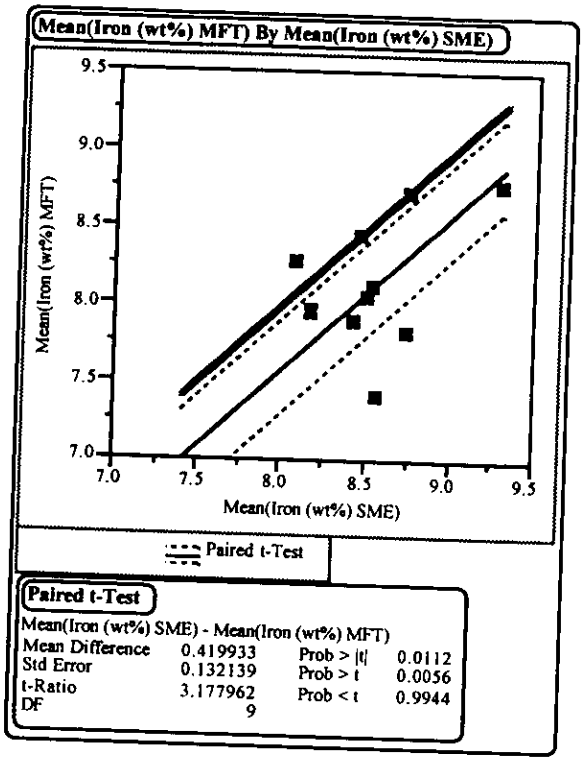
Paired t-Test

Mean(Copper (wt%) SME) - Mean(Copper (wt%) MFT)

Mean Difference	0.0151	Prob > |t|	0.0773
Std Error	0.007572	Prob > t	0.0386
t-Ratio	1.994085	Prob < t	0.9614
DF	9		

Exhibit 10: **Paired-t Tests for Differences Between SME and MFT Measurements**
(Continued)

Iron (wt%)

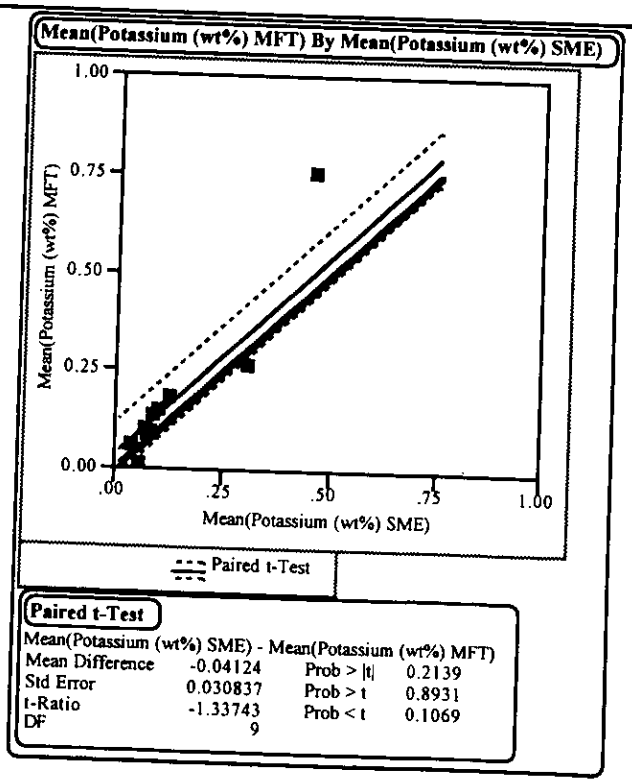


Paired t-Test

Mean(Iron (wt%) SME) - Mean(Iron (wt%) MFT)

Mean Difference	0.419933	Prob > |t|	0.0112
Std Error	0.132139	Prob > t	0.0056
t-Ratio	3.177962	Prob < t	0.9944
DF	9		

Potassium (wt%)



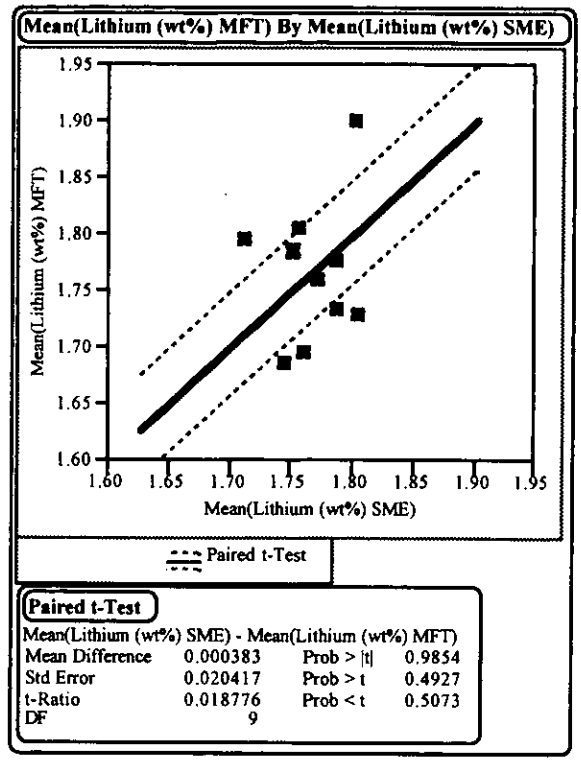
Paired t-Test

Mean(Potassium (wt%) SME) - Mean(Potassium (wt%) MFT)

Mean Difference	-0.04124	Prob > |t|	0.2139
Std Error	0.030837	Prob > t	0.8931
t-Ratio	-1.33743	Prob < t	0.1069
DF	9		

Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

Lithium (wt%)

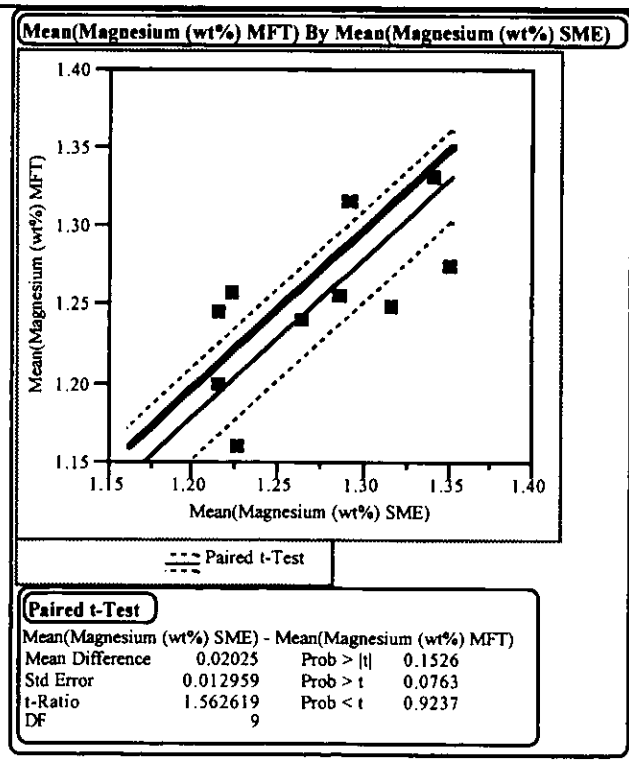


Paired t-Test

Mean(Lithium (wt%) SME) - Mean(Lithium (wt%) MFT)

Mean Difference	0.000383	Prob > |t|	0.9854
Std Error	0.020417	Prob > t	0.4927
t-Ratio	0.018776	Prob < t	0.5073
DF	9		

Magnesium (wt%)



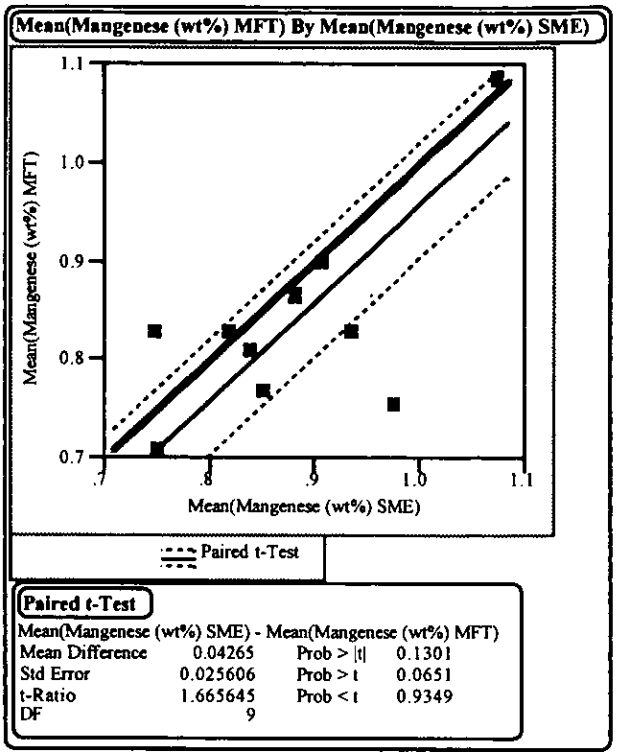
Paired t-Test

Mean(Magnesium (wt%) SME) - Mean(Magnesium (wt%) MFT)

Mean Difference	0.02025	Prob > |t|	0.1526
Std Error	0.012959	Prob > t	0.0763
t-Ratio	1.562619	Prob < t	0.9237
DF	9		

Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

Manganese (wt%)

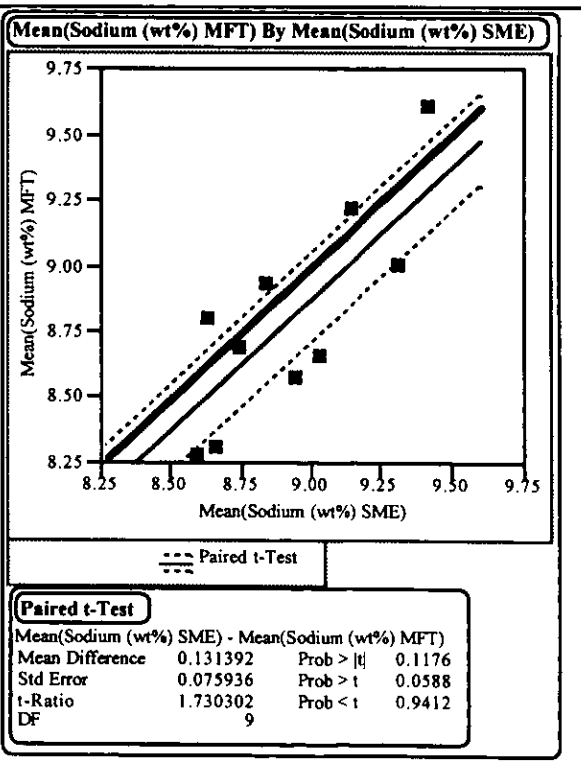


Paired t-Test

Mean(Mangenese (wt%) SME) - Mean(Mangenese (wt%) MFT)

Mean Difference	0.04265	Prob > |t|	0.1301
Std Error	0.025606	Prob > t	0.0651
t-Ratio	1.665645	Prob < t	0.9349
DF	9		

Sodium (wt%)



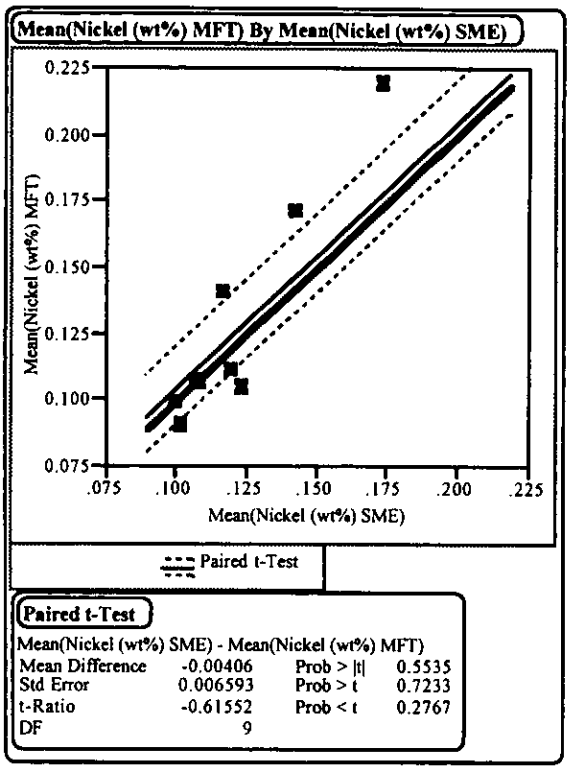
Paired t-Test

Mean(Sodium (wt%) SME) - Mean(Sodium (wt%) MFT)

Mean Difference	0.131392	Prob > |t|	0.1176
Std Error	0.075936	Prob > t	0.0588
t-Ratio	1.730302	Prob < t	0.9412
DF	9		

Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

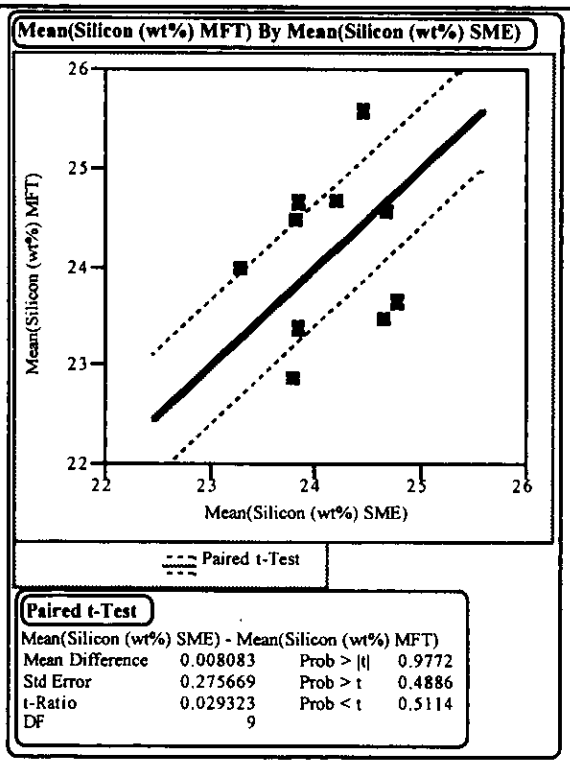
Nickel (wt%)



Paired t-Test

Mean(Nickel (wt%) SME) - Mean(Nickel (wt%) MFT)			
Mean Difference	-0.00406	Prob > |t|	0.5535
Std Error	0.006593	Prob > t	0.7233
t-Ratio	-0.61552	Prob < t	0.2767
DF	9		

Silicon (wt%)

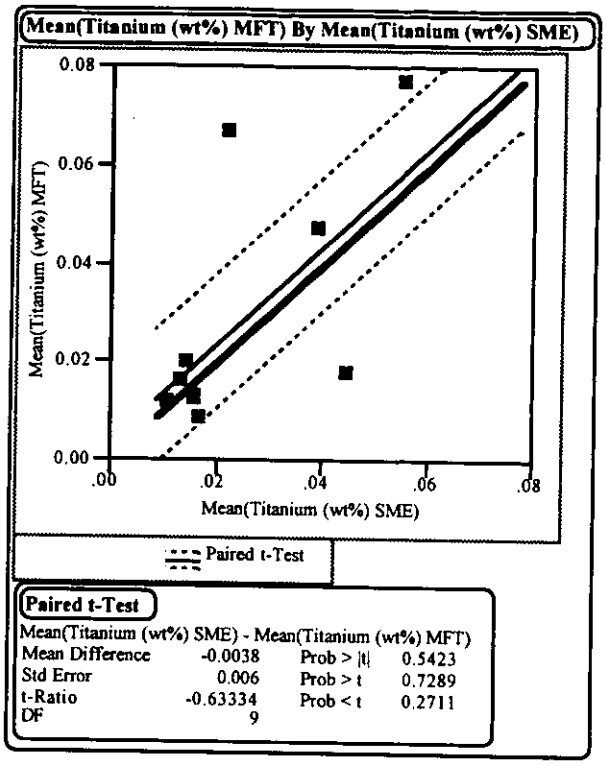


Paired t-Test

Mean(Silicon (wt%) SME) - Mean(Silicon (wt%) MFT)			
Mean Difference	0.008083	Prob > |t|	0.9772
Std Error	0.275669	Prob > t	0.4886
t-Ratio	0.029323	Prob < t	0.5114
DF	9		

Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

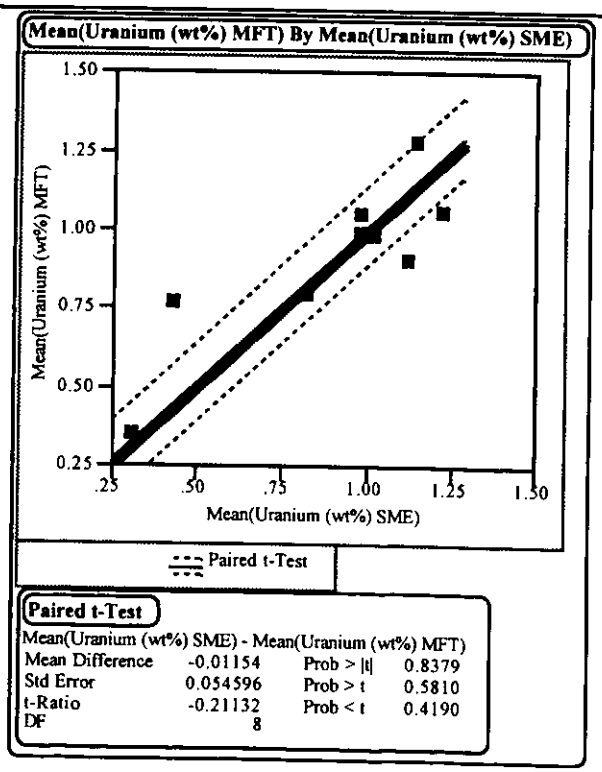
Titanium (wt%)



Paired t-Test

Mean(Titanium (wt%) SME) - Mean(Titanium (wt%) MFT)			
Mean Difference	-0.0038	Prob > |t|	0.5423
Std Error	0.006	Prob > t	0.7289
t-Ratio	-0.63334	Prob < t	0.2711
DF	9		

Uranium (wt%)

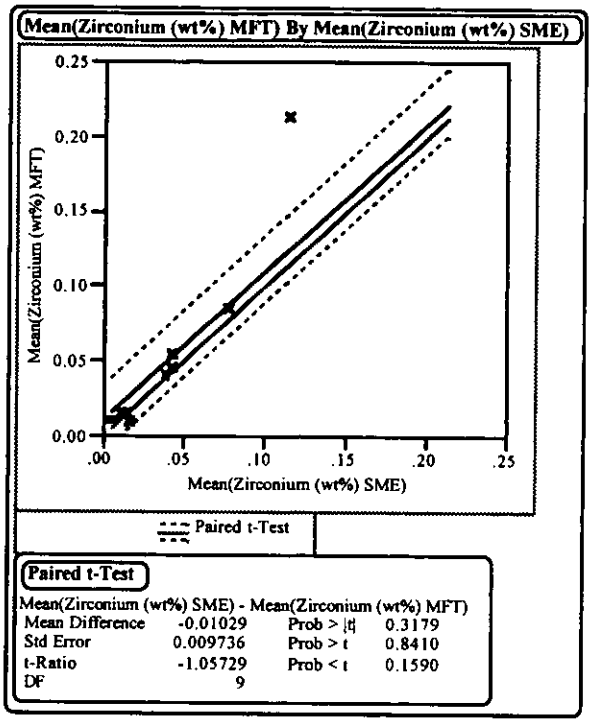


Paired t-Test

Mean(Uranium (wt%) SME) - Mean(Uranium (wt%) MFT)			
Mean Difference	-0.01154	Prob > |t|	0.8379
Std Error	0.054596	Prob > t	0.5810
t-Ratio	-0.21132	Prob < t	0.4190
DF	8		

Exhibit 10: Paired-t Tests for Differences Between SME and MFT Measurements
(Continued)

Zirconium (wt%)

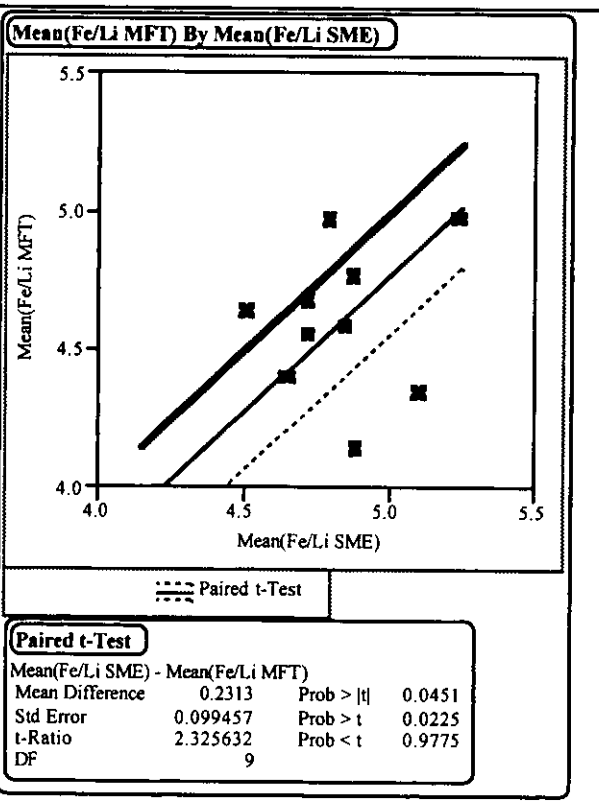


Paired t-Test

Mean(Zirconium (wt%) SME) - Mean(Zirconium (wt%) MFT)

Mean Difference	-0.01029	Prob > |t|	0.3179
Std Error	0.009736	Prob > t	0.8410
t-Ratio	-1.05729	Prob < t	0.1590
DF	9		

Fe/Li



Paired t-Test

Mean(Fe/Li SME) - Mean(Fe/Li MFT)

Mean Difference	0.2313	Prob > |t|	0.0451
Std Error	0.099457	Prob > t	0.0225
t-Ratio	2.325632	Prob < t	0.9775
DF	9		

Exhibit 11: **SRAT Receipt Scatterplot Matrix Using Batch Averages**

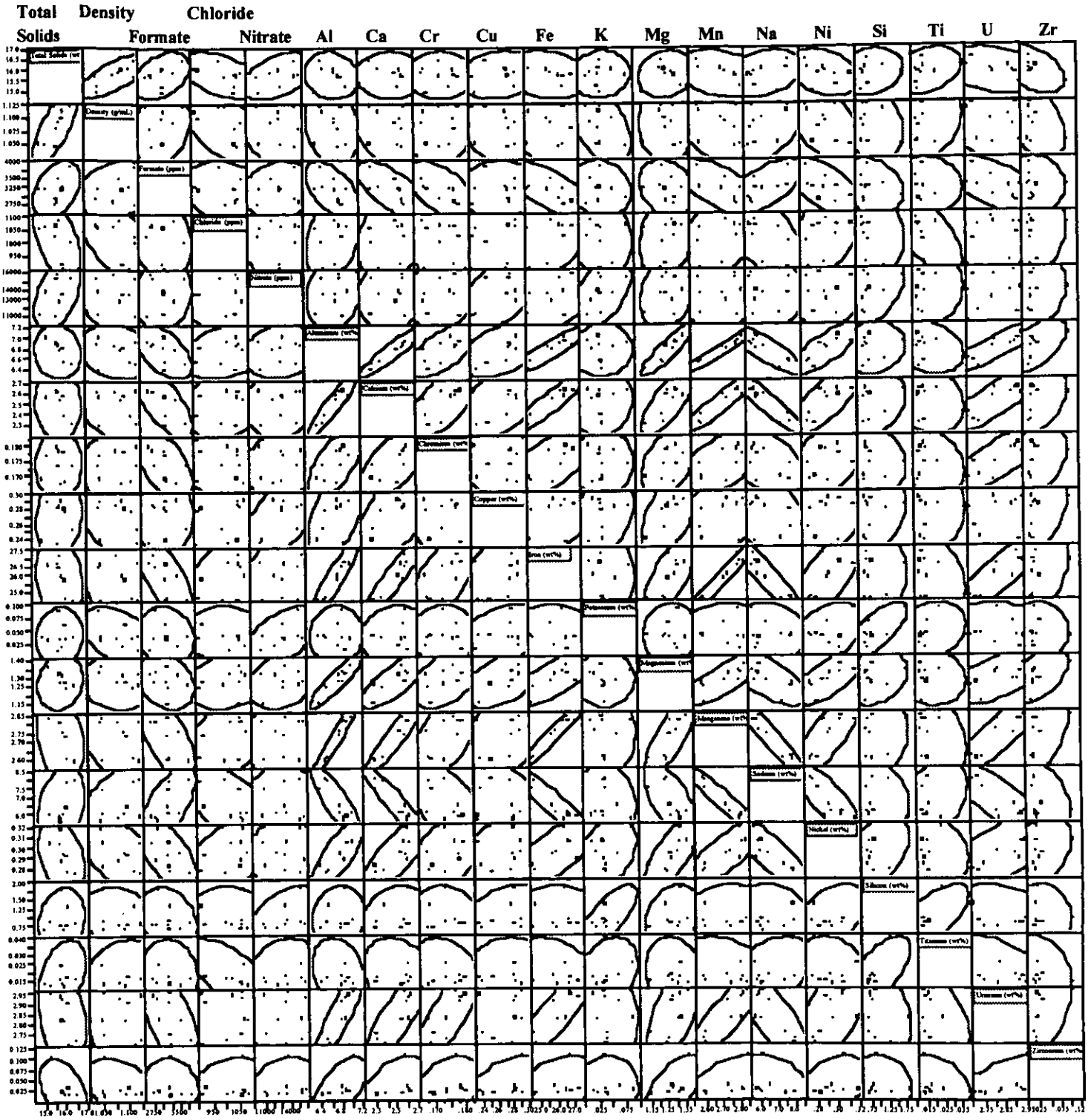


Exhibit 11: SRAT Product ScatterPlot Matrix Using Batch Averages (Continued)

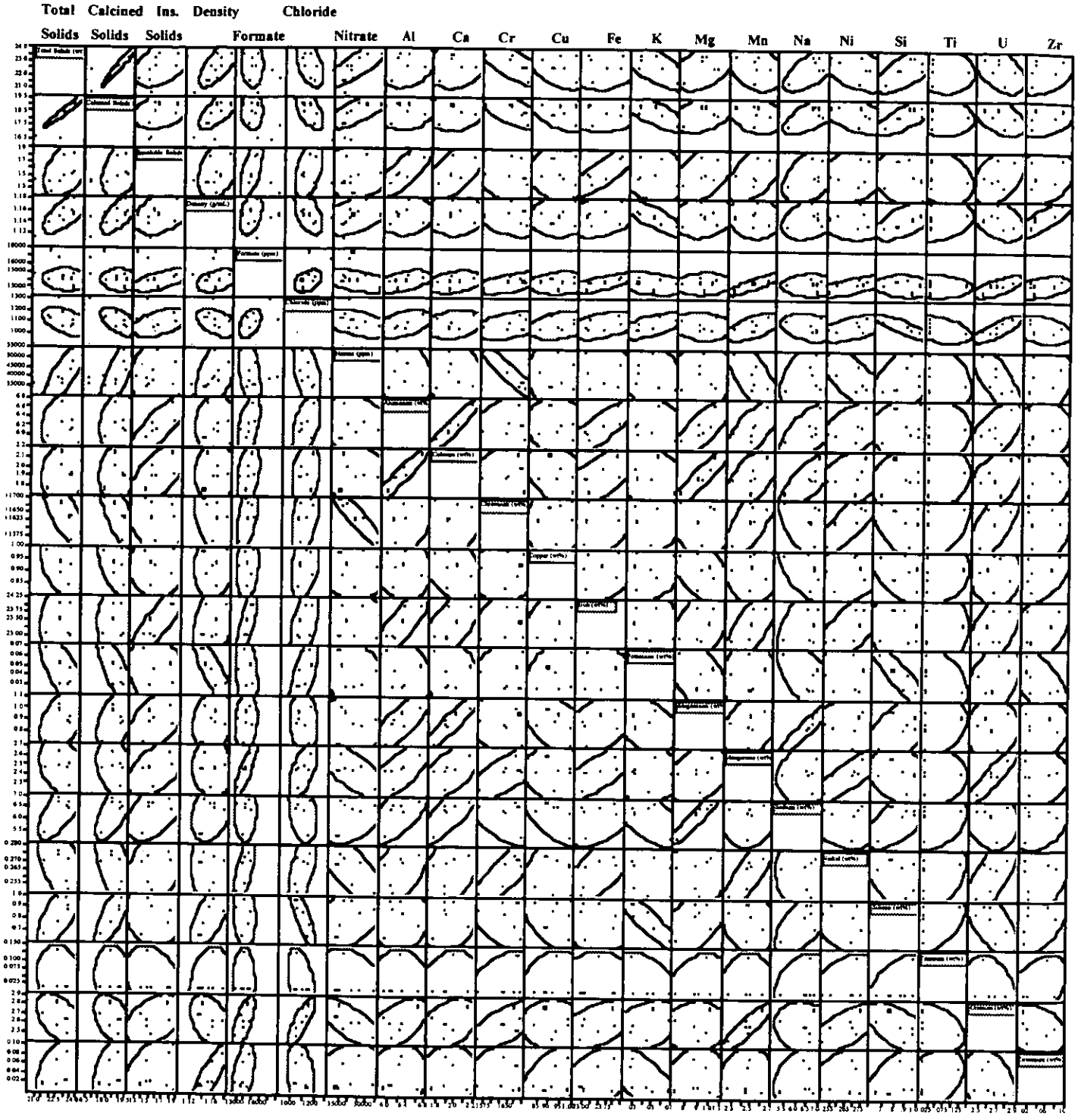


Exhibit 11: SME ScatterPlot Matrix Using Batch Averages (Continued)

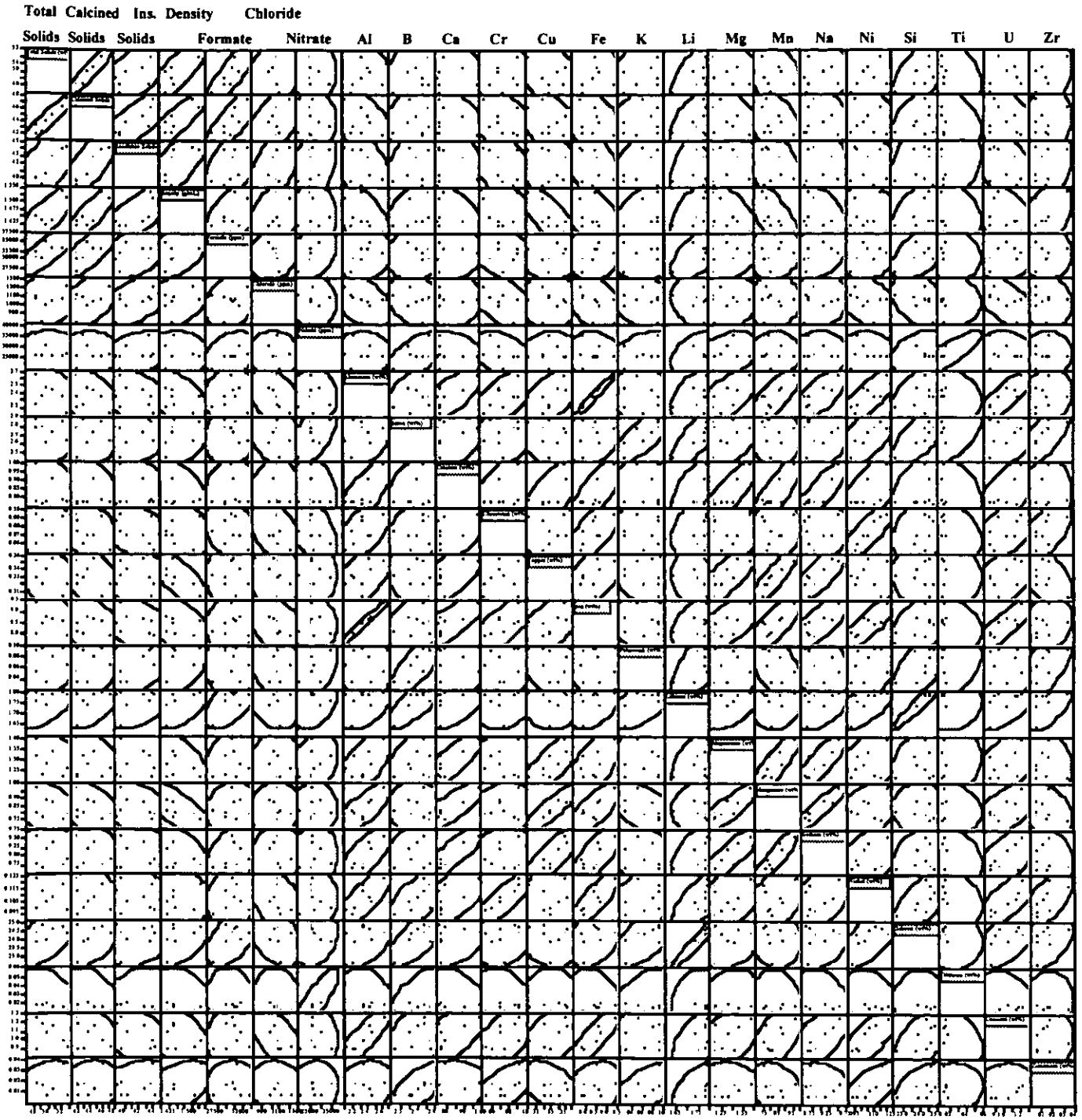
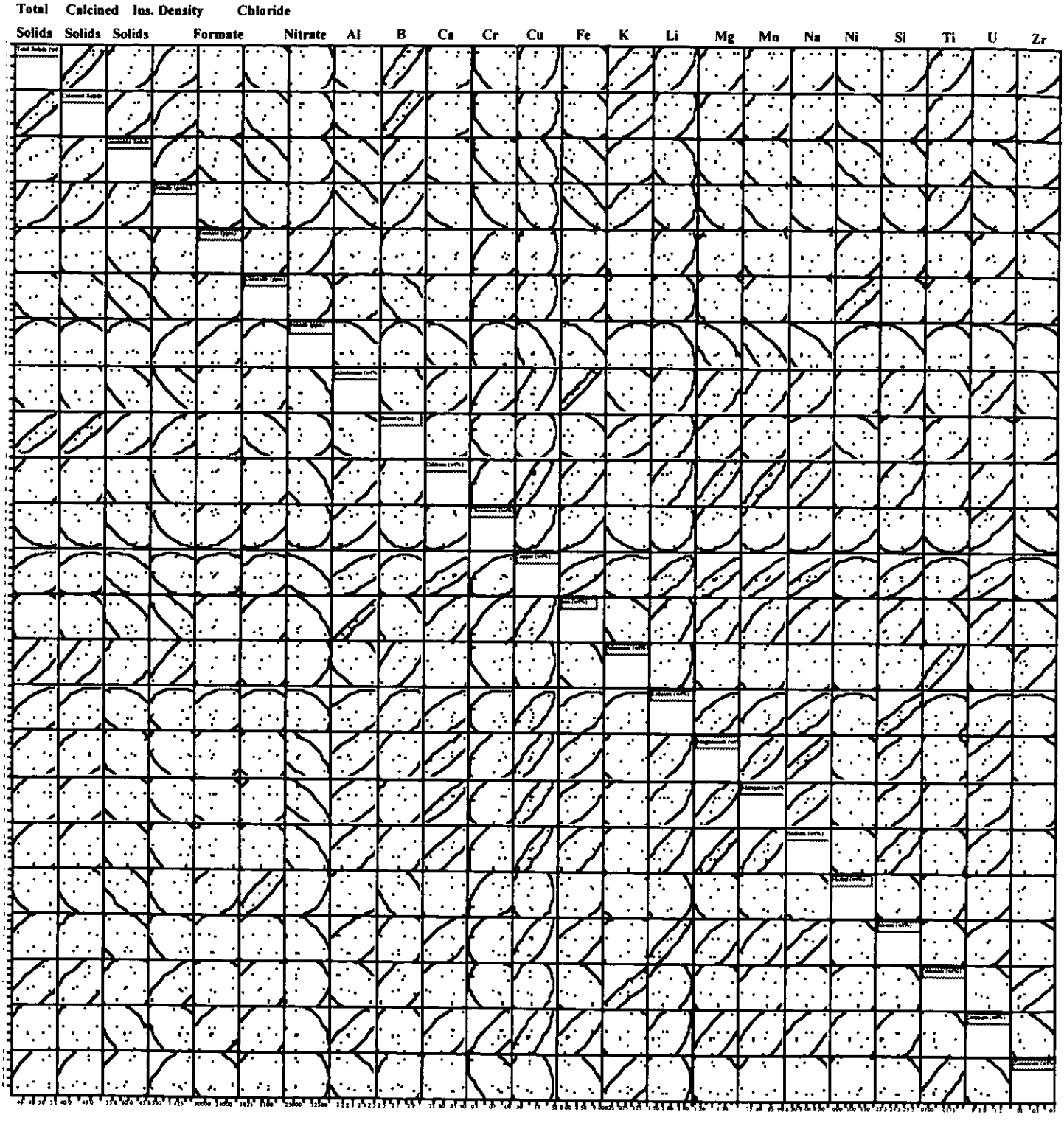


Exhibit 11: MFT ScatterPlot Matrix Using Batch Averages (Continued)



DISTRIBUTION

K. G. Brown, 704-1T
J. T. Carter, 704-25S
J. N. Chen, 704-25S
R. E. Edwards, 704-25S
T. B. Edwards, 773-42A
E. W. Holtzscheiter, 773-A
D. Moore-Shedrow, 773-A
M. R. Norton, 704-27S
J. E. Occhipinti, 704-27S
J. F. Ortaldo, 704-S
S. F. Piccolo, 704-S
C. T. Randall, 704-T
J. W. Ray, 704-35S
C. P. Reeve, 773-42A
M. J. Swain, 704-S
R. C. Tuckfield, 773-42A
K. R Wells, 210-S
J. W. Wilson, 210-S