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Results of the Comparison Analyses of the Two Tank 40H Sludge Batch 2 Qualification Samples

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SUMMARY

Two sets of six samples each of Sludge Batch 2 material were pulled from Tank 40H after completion of the transfer of the contents of Tank 8F to Tank 40H. At the request of Defense Waste Processing Facility (DWPF) personnel, these two sets of samples were analyzed to verify that there were no significant differences between the two sets due to differences in slurry pump operation time prior to pulling the samples.

The results of those analyses indicate that the two samples are within 1.2% of each other for weight percent total solids in the slurry and weight percent dissolved solids in the supernate. Elemental analyses of the total slurry by Inductively Coupled Plasma-Mass Spectrometry (ICP-ES) gave differences of less than 2%. Analyses of selected fission product isotopes and actinides produced differences of generally less than 4%, though a couple of isotopes showed differences of up to 6%. With the exception of a few of the elemental analyses, whose differences were less than 1.5%, and Cs-137, whose concentration difference between the two samples was found to be about 3%, none of these differences was found to be statistically significant. This differences were compared to a criteria of <5% difference.

The differences in the Na and Al concentrations in the supernate were found to be 6 – 8 wt %. However, because of the analytical variability, these differences were not considered to be statistically significant.

Based on these results, the samples are considered to be essentially the same.

INTRODUCTION

A task technical and quality assurance plan was previously prepared for the characterization and washing of the Sludge Batch 2 Qualification Sample.[1] The twelve Tank 40H samples needed for this work were pulled in two groups of six samples each. The first group of six samples was pulled on June 29, 2001 after running the slurry pumps continuously for 32 hours. The second group of six samples was pulled on July 5, 2001, after running the slurry pumps continuously for 60 hours. All previous sludge batch qualification samples were pulled after running the slurry pumps for at least 48 hours, though not always continuously. Concerns were raised about whether the first set six samples subjected to only 32 hours of slurry pump operation was representative of the Tank 40H contents as a whole. DWPF personnel requested separate analysis and comparison of the two sets of samples to verify that both sets are representative of the tank contents.[2] The intent of this comparison was to ensure that Tank 8 sludge was thoroughly mixed with Tank 40 sludge by comparison of the major species and that the sludge was properly suspended in the tank by comparison of the sludge and supernate ratios between the two sample sets. Once aliquots were pulled from the two composite samples, the two sets of sludge were combined and the washing of the sludge for qualification proceeded in parallel with the verification of the samples.[1] A final decision to proceed to completion of the Sludge Batch 2 qualification using the current samples or to pull new samples was made after completion of the work documented herein.

DISCUSSION

Task Description

Twelve 200-mL samples of sludge slurry from Tank 40H (containing blended sludge from Tanks 40H and 8F) were transported to the SRTC Shielded Cells Facility in two sets of six. Each set of six samples was composited. The following operations were conducted on these samples.

1. An aliquot of each composite slurry was filtered. The filtrate from this aliquot was analyzed for density and weight percent dissolved solids. The dried solids from the weight percent solids measurements were then redissolved in aqua regia and submitted to Analytical Development Section (ADS) for analysis by Inductively Coupled Plasma – Emission Spectrometry (ICP-ES) for Ag, Fe, Al, Na, Mg and Mn, by Inductively Coupled Plasma – Mass Spectrometry (ICP-MS) for Rh, Ru, Pd, and U and by gamma scan for detectable gamma emitting radionuclides such as Cs-137 and Am-241. Seven replicates of each analysis were required for each sample to verify whether the samples differed statistically by 5% or more. Ten replicates of each analysis, except density were run for each composite sample to allow for lost samples or bad results.

2. The density was measured on a sample of each composite slurry. Since density measurements are not required by the TTR, only 3 replicate measurements were made for each slurry. Ten aliquots of each slurry were dried to constant weight to determine the weight percent total solids. The remaining dried solids from each weight percent solids determination was dissolved in aqua regia. In addition, four aliquots of analytical reference glass (ARG) were dissolved in aqua regia. The 26 dissolved solids samples (twenty samples, four ARG standards and two blanks) were submitted to ADS for ICP-ES, ICP-MS and gamma scan for detectable gamma emitting radionuclides such as Cs-137 and Am-241. These samples were run in a specified order to ensure systematic errors did not cause a false difference to appear.

3. The results of these analyses for each of the two composite samples were compared to check for any statistical differences in composition. Based on those results, a decision was made to proceed with the current samples instead of pulling a new sample for the glass qualification run.

Results

The measurements generated by the Analytical Development Section (ADS) and Shielded Cells Operations (SCO) are presented in this section. Table A1 in the Appendix provides the weight percent (wt%) total solids for each of 20 samples. Table A2 in the Appendix provides the analyses of elemental concentrations (in wt% wet solids) for 20 samples by ICP-ES. These analyses were completed over 2 calibrations of the ICP. The calibration is provided as a column in this table. Also, samples of ARG-1 and a blank were included in each analytical block along with the composite samples for analysis by ICP-ES. The results from these standards also are provided in Table A2.

The last column of Table A2 contains values for the ratio of the iron to sodium measurements for each sample and standard. This ratio provides a quantity for comparison across the study samples that is insensitive to some of variations that might affect individual elemental concentration measurements such as variations in recorded weights.

Table A3 in the Appendix provides ICP-MS elemental concentrations in weight percent of slurry for selected fission products and actinides by mass number for the Tank 40 samples along with ARG-1 and blank samples. Table A4 in the Appendix provides measurements (via Gamma scan) of the radioactivity of cobalt-60 and cesium-137 in dpm per gram of slurry for 10 samples of each of the Tank 40 composites. Measurements from samples of ARG-1 and blanks are also presented in this table, and as to be expected, the results from these samples were all below the detection limits of the analytical process.

Analyses were also conducted on supernate samples of each of the Tank 40 composite samples. Table A5 provides weight percent (wt%) solids for the supernate samples, and Table A6 provides elemental concentrations for Al and Na in grams of analyte per gram of filtered supernate.

STATISTICAL ANALYSES

The information presented in the Tables A1 through A6 provides the basis for the statistical comparisons of the two composite samples of Tank 40. The data in each of these tables is reviewed in turn. The statistical comparisons for these measurements were conducted using JMP® Version 4.0, a commercially available statistical software package from SAS Institute, Inc[3].

Weight Percent Solids of the Slurry

Plots of the slurry weight percent total solids data in Table A1 by type of composite are provided in Exhibit A1 of the Appendix. There is no indication of outliers in these two datasets; nor is there an indication of different variances for the two datasets. The JMP results show a statistically significant difference (at the 5% significance level) of 0.3272 wt% between the means of the two types of composites. The 32-hr composite average wt% solids value (26.35 wt%) is 1.2% below the 60-hr average (26.68 wt%). Although statistically significant, this 1.2% difference is seen as being of little practical concern.

Elemental Analyses of the Slurry from ICP-ES

Key elemental analyses were conducted on slurry samples from each of the composites using an aqua regia dissolution method and ICP-ES. As discussed above, these results are provided in Table A2 in the Appendix. Two calibrations of the ICP-ES were required to complete these analyses. Plots of these elemental concentrations (as wet wt%'s of slurry) by type of composite and calibration are provided in Exhibit A2 in the Appendix. These plots indicate a significant effect due to ICP-ES calibration for many of the results. Also, there appear to be potential outliers in these data. The initial statistical analyses conducted on these results use all of the data. To make sure that the potential outliers are not driving the conclusions, an analysis with potential outliers removed is also conducted.

Measurements of ARG-1 and blanks are also presented in Table A2. Table 1 provides a summary of the information for ARG-1. The calibration of the ICP-ES again had an impact on the resulting elemental concentration measurements. Also in this table, are the reference values for the elemental concentrations and percent differences between the measured and reference values.

Table 1. ARG-1 Elemental Concentrations (as wt%'s) by ICP-ES Calibration Blocks

LIMS #	Composite Type	Calibration	Al	Ca	Fe	Mg	Mn	Na	U	Fe/Na
300166375	ARG-1/1	1	2.51		10.73	0.57	1.61	8.65	0.29	1.24
300166384	ARG-1/1	1	2.50		10.63	0.56	1.55	8.54	0.29	1.25
300166392	ARG-1/2	2	2.36		10.12	0.54	1.54	8.50	0.00	1.19
300166396	ARG-1/2	2	2.37		10.01	0.54	1.51	8.51	0.00	1.18
		Average	2.43		10.37	0.55	1.55	8.55	0.14	1.21
	ARG -1	Reference	2.5		9.79	0.52	1.46	8.52	0	1.15
		% Difference	-2.70%		6.00%	6.00%	6.40%	0.30%		5.60%

Exhibit A3 in the Appendix provides the details of a statistical analysis of variance using the full set of measurements for each element of interest. This analysis investigates for both composite and calibration effects. Table 2 summarizes the results from these analyses. As seen in Table 2, there are no statistically significant (at the 5% level) differences between the means of the two composites for the elements measured using ICP-ES. The differences expressed as percentages of the 60-hr averages are all less than 1%. The sensitivity of each of these statistical comparisons is explored in Exhibit A4 in the Appendix. The information in this exhibit is complemented by the last column of Table 2, which provides the percent difference between the averages from the two composites that would have been detected with a power of 90% (i.e., with a 90% probability) based upon the variation seen in the measurements and the number of measurements conducted.♠

Table 2. Average Elemental Concentrations(as wet wt%'s of slurry) by Type of Composite

Sample Type **N Rows**	**32** **10**	**60** **10**	**Difference**	**Percent (%) Difference**	**Statistically Significant At the 5% Level**	**% Difference Detectable With 90% Power**
Ag	7.84E-03	7.85E-03	-1.00E-05	-0.13%	No	7.37%
Al	1.39	1.39	1.20E-04	0.01%	No	6.90%
Ca	0.498	0.501	-2.36E-03	-0.47%	No	4.92%
Fe	5.14	5.13	9.37E-03	0.18%	No	7.37%
Mg	0.414	0.413	1.14E-03	0.28%	No	7.46%
Mn	0.702	0.699	2.80E-03	0.40%	No	7.52%
Na	4.20	4.18	2.43E-02	0.58%	No	6.38%
U	1.58	1.59	-1.12E-02	-0.70%	No	3.69%
Fe/Na	1.22	1.23	-4.69E-03	-0.38%	No	2.26%

Exhibit A5 in the Appendix provides the details of a statistical analysis of variance using the measurements for each element of interest with potential outliers removed. The LIMS numbers of the excluded measurements are given as part of the information of the exhibit. The outliers were identified by a simple review of the plots presented in Exhibit A1. Although this is a subjective process and other ways of removing potential problem data might be used, this approach does provide some protection from drawing conclusions that are overly sensitive to only a few of the measurements from these samples. The analysis in Exhibit A5 investigates for both composite and calibration effects for the screened data. Table 3 summarizes the results from these analyses. As seen in Table 3, a few of the analytes (Al, Ca, and Na) show a statistically significant (at the 5% level) difference between the means of the two composites. However, each of the differences expressed as percentages of the 60-hr averages is less than 2%.

The sensitivity of each of these statistical comparisons in the form of power details is explored as part of the information provided in Exhibit A5. The power of each of these comparisons to detect a 5% difference in the two composite means is provided. The smallest power is that for Ag (89.7%), while all of the other elements show a power greater than 90%. This information is complemented by the last column of Table 3, which provides the percent difference between the averages from the two composites that would have been detected with a power of 90% (i.e., with a 90% probability) based upon the variation seen and the number observations remaining in the screened data.

♠ These power calculations were conducted using the "Design of Experiments" platform of JMP® Version 4.0 [3].

Table 3. Average Elemental Concentrations (as wet wt%'s of slurry) of the Screened Measurements by Type of Composite

Sample Type N Rows	32 10	60 10	Difference	Percent (%) Difference	Statistically Significant At the 5% Level	% Difference Detectable With 90% Power
Ag	7.72E-03	7.79E-03	-7.00E-05	-0.86%	No	5.02%
Al	1.35	1.37	-1.90E-02	-1.38%	Yes	1.55%
Ca	0.490	0.498	-7.26E-03	-1.46%	Yes	1.26%
Fe	5.05	5.10	-4.52E-02	-0.89%	No	3.83%
Mg	0.403	0.410	-6.80E-03	-1.66%	No	3.25%
Mn	0.684	0.695	-1.15E-02	-1.66%	No	3.28%
Na	4.11	4.15	-4.12E-02	-0.99%	Yes	1.23%
U	1.57	1.58	-7.00E-03	-0.44%	No	3.31%
Fe/Na	1.22	1.23	-8.59E-03	-0.70%	No	2.10%

Even though Al, Ca, and Na show a statistically significant difference between the two Tanks 40 composites, these differences for the ICP-ES measurements are all less than 2% and deemed to be of no practical significance. Thus, the overall conclusions for the ICP-ES data are that there are no differences of practical concern between the two composites.

Elemental Analyses from ICP-MS

Analyses of selected fission products and actinides were conducted on samples from each of the composite using an aqua regia dissolution method and ICP-MS. As discussed above, these results are provided by mass number in Table A3 of the Appendix. Two calibrations of the ICP-MS were required to complete these analyses. Samples with LIMS numbers 300166387 and 300177388 were measured at the end of the first calibration block and again at the beginning of the second calibration block. The values for these samples over the two calibrations in Table A3 suggest the potential for calibration effects, as was seen in the ICP-ES results. Only the measurements for these two samples generated during the second ICP-MS calibration are included in the analyses that follow.

Plots of these concentrations (as micrograms per gram of slurry) for each mass number of interest by type of composite and ICP-MS calibration are provided in Exhibit A6 in the Appendix. These plots indicate a significant effect due to ICP-MS calibration for many of the results. Also, there appear to be potential outliers in these data. The initial statistical analyses conducted on these results use all of the data. To make sure that the potential outliers are not driving the conclusions, an analysis with potential outliers removed is also conducted.

Exhibit A7 in the Appendix provides the details of a statistical analysis of variance using the full set of measurements for each mass number of interest. This analysis investigates for both composite and calibration effects. Table 4 summarizes the results from these analyses. As seen in Table 4, there are no statistically significant differences (at the 5% level) between the means of the two composites for the selected fission products and actinides measured using ICP-MS. The differences expressed as percentages of the 60-hr averages are all less than 7%. The sensitivity of each of these statistical comparisons is explored in Exhibit A8 in the Appendix. The information in this exhibit is complemented by the last column of Table 4, which provides the percent difference between the averages from the two composites that would have been detected with a power of 90% (i.e., with a 90% probability) based upon the variation seen in the data and the number of measurements.

Table 4. Average Concentrations (as micrograms/gram of slurry)for Each Mass Number of Interest by Type Composite

Sample Type	32	60		Percent (%)	Statistically Significant At the	% Difference Detectable With
N Rows	10	10	Difference	Difference	5% Level	90% Power
Tc-99	1.75	1.69	0.051	3.01%	No	14.13%
Ru-101	26.6	26.0	0.614	2.36%	No	4.66%
Ru-102	25.2	24.8	0.330	1.33%	No	5.31%
Rh-103	16.8	16.5	0.270	1.63%	No	4.84%
Ru-104	16.9	16.4	0.480	2.93%	No	4.98%
Pd-105	1.22	1.30	-0.081	-6.23%	No	13.00%
Ag-107	10.2	9.836	0.319	3.25%	No	9.16%
Ag-109	9.83	9.48	0.356	3.76%	No	10.73%
U-235	55.3	54.6	0.711	1.30%	No	4.77%
U-238	1.35E+04	1.34E+04	40.1	0.30%	No	6.71%
Pu-239	21.8	20.9	0.919	4.40%	No	7.49%

Exhibit A9 in the Appendix provides the details of a statistical analysis of variance using the measurements for each element of interest with potential outliers removed. The LIMS numbers of the excluded measurements are given as part of the information of the exhibit. The outliers were identified by a simple review of the plots presented in Exhibit A6. Although this is a subjective process and other ways of removing potential problem data might be used, this approach does provide some protection from drawing conclusions that are overly sensitive to only a few of the measurements from these samples. The analysis in Exhibit A9 investigates for both composite and calibration effects for the screened data. Table 5 summarizes the results from these analyses. As seen in Table 5, none of these analytes show a statistically significant difference (at the 5% level) between the means of the two composites. In addition, all of the differences expressed as percentages of the 60-hr averages are less than 6%.

The sensitivity of each of these statistical comparisons in the form of a power calculation is explored by the last column of Table 5, which provides the percent difference between the averages from the two composites that would have been detected with a power of 90% (i.e., with a 90% probability) based upon the variation seen and the number of observations remaining in the screened ICP-MS data. For about half of these analytes, the sensitivity attained is comparable to the detection of a 5% difference with a 90% probability that was targeted for most of the comparisons outlined in the TT&QA plan. The worst sensitivity is that attained for Pd-105 (14.14%). As suggested in the TT&QA plan, the sensitivity of the ICP-MS analyses was considered to be more uncertain than the sensitivity of the ICP-ES analyses because the species analyzed by ICP-MS were closer to the instrument detection limit.

Table 5. Average Mass Concentrations (in micrograms per gram of slurry) of the Screened Measurements by Type Composite

Sample Type N Rows	32 10	60 10	Difference	Percent (%) Difference	Statistically Significant At the 5% Level	% Difference Detectable With 90% Power
Tc-99	1.79	1.69	0.101	5.94%	No	10.5%
Ru-101	26.6	26.3	0.321	1.22%	No	3.64%
Ru-102	25.2	25.1	0.046	0.18%	No	3.74%
Rh-103	16.8	16.7	0.089	0.53%	No	3.19%
Ru-104	16.9	16.5	0.324	1.96%	No	3.94%
Pd-105	1.22	1.28	-0.055	-4.35%	No	14.1%
Ag-107	10.0	9.84	0.209	2.12%	No	8.82%
Ag-109	9.71	9.48	0.230	2.43%	No	10.3%
U-235	55.3	55.2	0.077	0.14%	No	2.72%
U-238	1.32E+04	1.34E+04	-2.21E+02	-1.65%	No	5.52%
Pu-239	21.8	21.1	0.719	3.41%	No	7.08%

Radioactivity Measured by Gamma Scan

Cobalt and cesium radioactivity (in dpm per gram of slurry) was measured on samples from each of the composite by gamma scan. As discussed above, these results are provided in Table A4 in the Appendix. Two calibrations of the instrumentation were required to complete these analyses. Plots of these activities (in dpm per gram of slurry) by type composite and calibration are provided in Exhibit A10 in the Appendix. These plots indicate little to no effect due to instrument calibration for these results. Once again, statistical analyses will be conducted on both the full set and the screened data to make sure that any potential outliers are not driving the conclusions.

Exhibit A11 in the Appendix provides the details of a statistical analysis of variance using the full set of cobalt and cesium radioactivity measurements. This analysis investigates for both composite and calibration effects. Table 6 summarizes the results from these analyses. As seen in Table 6, there are no statistically significant (at the 5% level) differences between the means of the two composites for these measurements. The differences expressed as percentages of the 60-hr averages are all less than 4%. The sensitivity of each of these statistical comparisons is explored in Exhibit A12 in the Appendix. The information in this exhibit is complemented by the last column of Table 6, which provides the percent difference between the averages from the two composites that would have been detected with a power of 90% (i.e., with a 90% probability) based upon the variation seen in the data and the number of measurements.

Table 6. Average Cobalt and Cesium Radioactivity (in dpm per gram of slurry) by Type Composite

Sample Type N Rows	32 10	60 10	Difference	Percent (%) Difference	Statistically Significant At the 5% Level	% Difference Detectable With 90% Power
^{60}Co	2.70E+06	2.62E+06	8.10E+04	3.09%	No	9.26%
^{137}Cs	1.87E+08	1.83E+08	4.50E+06	2.46%	No	7.23%

Exhibit A13 in the Appendix provides the details of a statistical analysis of variance using the radioactivity measurements for each element of interest with potential outliers removed. The LIMS numbers of the excluded measurements are given as part of the information of the exhibit. The outliers were identified by a simple review the plots presented in Exhibit A10. Although this is a subjective process and other ways of removing potential problem data might be used, this approach does provide some protection from drawing conclusions that are overly sensitive to only a few of the measurements from these samples. The analysis in Exhibit A13 investigates for both composite and calibration effects for the screened data. Table 7 summarizes the results from these analyses. As seen in Table 7, only Cs-137 shows a statistically significant difference (at the 5% level) between the means of the two composites for these radioactivity measurements. The Cs-137 difference is only 3.28%, and the Co-60 difference is only 1.76%.

The sensitivity of each of these statistical comparisons in the form of a power calculation is provided by the last column of Table 5, which gives the percent differences between the averages from the two composites that would have been detected with a power of 90% (i.e., with a 90% probability) based upon the variation seen and the number of measurements remaining in the screened data.

Table 7. Average Screened Cobalt and Cesium Activity (in dpm per gram of slurry) by Type Composite

Sample Type N Rows	32 10	60 10	Difference	Percent (%) Difference	Statistically Significant At the 5% Level	% Difference Detectable With 90% Power
^{60}Co	2.76E+06	2.71E+06	4.76E+04	1.76%	No	5.39%
^{137}Cs	1.93E+08	1.87E+08	6.14E+06	3.28%	Yes	3.92%

Although statistically significant, the difference between the two Tank 40 composites for the Cs-137 radioactivity is deemed to be of no practical concern.

Weight Percent Soluble Solids of the Supernate

Plots of the weight percent soluble solids data in Table A5 by type of composite are provided in Exhibit A14 of the Appendix. There is an indication of two outliers for the 30-hr values. The JMP results provided as part of Exhibit A14 show a statistically significant difference (at the 5% significance level) of 1.2% between the means of the two types of composites. The 32-hr composite average wt% soluble solids value (11.58 wt%) is 1.2% above the 60-hr average (11.44 wt%).

Exhibit A15 in the Appendix provides comparisons between the two Tank 40 composites with the 2 questionable values for the 32-hr results removed. The results presented in this exhibit also indicate a statistically significant difference (at the 5% significance level) between the means of the two types of composites. For these data, the difference is only 0.7%. Although statistically significant, these differences (1.2% for all of the data and 0.7% for the screened data) are seen as being of little practical concern.

Elemental Analyses of Supernate from ICP-ES

Al and Na elemental analyses were conducted on supernate samples from each of the composite using an aqua regia dissolution method and ICP-ES. As discussed above, these results are provided in Table A6 in the Appendix.

Plots of these elemental concentrations (as grams/gram of slurry) by type of composite and ICP calibration are provided in Exhibit A16 in the Appendix. These plots indicate the potential for a pair of outliers for Al and Na in the 32-hour composite samples for the first ICP block. Initial statistical analyses were conducted on these results using all of the data. To make sure that the potential outliers are not driving the conclusions, an analysis with these values removed was also conducted.

Exhibit A17 in the Appendix provides the details of a statistical analysis of variance using the full set of Al and Na measurements. This analysis investigates for both composite and calibration effects. Table 8 summarizes the results from these analyses. As seen in Table 8, there are no statistically significant (at the 5% level) differences between the means of the two composites for these elements measured using ICP-ES. The differences expressed as percentages of the 60-hr averages are –6.32% for Al and –7.71% for Na. The sensitivity of each of these statistical comparisons is explored in Exhibit A18 in the Appendix. The information in this exhibit is complemented by the last column of Table 8, which provides the percent difference between the averages from the two composites that would have been detected with a power of 90% (i.e., with a 90% probability) based upon the variation seen in the data and the number measurements.

Table 8. Average Al and Na Concentrations (as grams/gram of supernate) in the Supernate by Type of Composite

Sample Type N Rows	32 10	60 10	Difference	Percent (%) Difference	Statistically Significant At the 5% Level	% Difference Detectable With 90% Power
Al	2.05E-03	2.18E-03	-1.40E-04	-6.32%	No	16.4%
Na	3.91E-02	4.24E-02	-3.27E-03	-7.71%	No	17.0%

Exhibit A19 in the Appendix provides the details of a statistical analysis of variance for the set of Al and Na measurements with the potential outliers removed. This analysis investigates for both composite and calibration effects. Table 9 summarizes the results from these analyses. As seen in Table 9, there are no statistically significant (at the 5% level) differences between the means of the two composites for the elements measured using ICP-ES. The differences expressed as percentages of the 60-hr averages are both less than 1%. A measure of the sensitivity of each of these statistical comparisons is provided by the last column of Table 9, which gives the percent difference between the averages from the two composites that would have been detected with a power of 90% (i.e., with a 90% probability) based upon the variation seen and the number of measurements remaining in the screened data.

Table 9. Average Screened Al and Na Concentrations (as wt% dried solids) in the Supernate by Type Composite

Sample Type N Rows	32 10	60 10	Difference	Percent (%) Difference	Statistically Significant At the 5% Level	% Difference Detectable With 90% Power
Al	2.18E-03	2.18E-03	-4.00E-06	-0.17%	No	2.92%
Na	4.21E-02	4.24E-02	-2.51E-04	-0.59%	No	2.18%

Summary of Results and Conclusions

A summary of the results from the statistical comparisons discussed in this technical report are presented in Table 10. The results from Table 10 may be summarized as follows:

- Using all of the measurement data,
    - The difference between the weight percent (wt%) slurry solids for the two Tank 40 samples was statistically significant at the 5% level (i.e., with 95% confidence). However, the difference was only 1.23%, which is judged to be small enough to be of no practical concern.
    - The difference between the weight percent (wt%) soluble solids in the supernate for the two Tank 40 samples was statistically significant at the 5% level (i.e., with 95% confidence). However, the difference was only 1.21%, which is judged to be small enough to be of no practical concern.

Table 10. Summary of Comparisons Between of the Two Composites

	Unit of Measure	Type of Composite 32-hr	60-hr	Difference	Percent (%) Difference	Statistically Significant At the 5% Level	% Difference Detectable With 90% Power
Wt% Slurry Solids	wt%	2.64E+01	2.67E+01	-3.27E-01	-1.23%	Yes	0.38%
Elemental							
Ag	wet wt% in slurry	7.84E-03	7.85E-03	-1.00E-05	-0.13%	No	7.37%
Al	wet wt% in slurry	1.39E+00	1.39E+00	1.20E-04	0.01%	No	6.90%
Ca	wet wt% in slurry	4.98E-01	5.01E-01	-2.36E-03	-0.47%	No	4.92%
Fe	wet wt% in slurry	5.14E+00	5.13E+00	9.37E-03	0.18%	No	7.37%
Mg	wet wt% in slurry	4.14E-01	4.13E-01	1.14E-03	0.28%	No	7.46%
Mn	wet wt% in slurry	7.02E-01	6.99E-01	2.80E-03	0.40%	No	7.52%
Na	wet wt% in slurry	4.20E+00	4.18E+00	2.43E-02	0.58%	No	6.38%
U	wet wt% in slurry	1.58E+00	1.59E+00	-1.12E-02	-0.70%	No	3.69%
Fe/Na	wet wt% in slurry	1.22E+00	1.23E+00	-4.69E-03	-0.38%	No	2.26%
Elemental (scrnd)							
Ag	wet wt% in slurry	7.72E-03	7.79E-03	-7.00E-05	-0.86%	No	5.02%
Al	wet wt% in slurry	1.35E+00	1.37E+00	-1.90E-02	-1.38%	Yes	1.55%
Ca	wet wt% in slurry	4.90E-01	4.98E-01	-7.26E-03	-1.46%	Yes	1.26%
Fe	wet wt% in slurry	5.05E+00	5.10E+00	-4.52E-02	-0.89%	No	3.83%
Mg	wet wt% in slurry	4.03E-01	4.10E-01	-6.80E-03	-1.66%	No	3.25%
Mn	wet wt% in slurry	6.84E-01	6.95E-01	-1.15E-02	-1.66%	No	3.28%
Na	wet wt% in slurry	4.11E+00	4.15E+00	-4.12E-02	-0.99%	Yes	1.23%
U	wet wt% in slurry	1.57E+00	1.58E+00	-7.00E-03	-0.44%	No	3.31%
Fe/Na	wet wt% in slurry	1.22E+00	1.23E+00	-8.59E-03	-0.70%	No	2.10%
Selected Fission Products & Actinides							
Tc-99	µgrams/gram of slurry	1.75E+00	1.69E+00	5.10E-02	3.01%	No	14.13%
Ru-101	µgrams/gram of slurry	2.66E+01	2.60E+01	6.14E-01	2.36%	No	4.66%
Ru-102	µgrams/gram of slurry	2.52E+01	2.48E+01	3.30E-01	1.33%	No	5.31%
Rh-103	µgrams/gram of slurry	1.68E+01	1.65E+01	2.70E-01	1.63%	No	4.84%
Ru-104	µgrams/gram of slurry	1.69E+01	1.64E+01	4.80E-01	2.93%	No	4.98%
Pd-105	µgrams/gram of slurry	1.22E+00	1.30E+00	-8.10E-02	-6.23%	No	13.00%
Ag-107	µgrams/gram of slurry	1.02E+01	9.84E+00	3.19E-01	3.25%	No	9.16%
Ag-109	µgrams/gram of slurry	9.83E+00	9.48E+00	3.56E-01	3.76%	No	10.73%
U-235	µgrams/gram of slurry	5.53E+01	5.46E+01	7.11E-01	1.30%	No	4.77%
U-238	µgrams/gram of slurry	1.35E+04	1.34E+04	4.01E+01	0.30%	No	6.71%
Pu-239	µgrams/gram of slurry	2.18E+01	2.09E+01	9.19E-01	4.40%	No	7.49%
Selected Fission Products & Actinides (scrnd)							
Tc-99	µgrams/gram of slurry	1.79E+00	1.69E+00	1.01E-01	5.94%	No	10.52%
Ru-101	µgrams/gram of slurry	2.66E+01	2.63E+01	3.21E-01	1.22%	No	3.64%
Ru-102	µgrams/gram of slurry	2.52E+01	2.51E+01	4.60E-02	0.18%	No	3.74%
Rh-103	µgrams/gram of slurry	1.68E+01	1.67E+01	8.90E-02	0.53%	No	3.19%
Ru-104	µgrams/gram of slurry	1.69E+01	1.65E+01	3.24E-01	1.96%	No	3.94%
Pd-105	µgrams/gram of slurry	1.22E+00	1.28E+00	-5.50E-02	-4.35%	No	14.14%
Ag-107	µgrams/gram of slurry	1.00E+01	9.84E+00	2.09E-01	2.12%	No	8.82%
Ag-109	µgrams/gram of slurry	9.71E+00	9.48E+00	2.30E-01	2.43%	No	10.30%
U-235	µgrams/gram of slurry	5.53E+01	5.52E+01	7.70E-02	0.14%	No	2.72%
U-238	µgrams/gram of slurry	1.32E+04	1.34E+04	-2.21E+02	-1.65%	No	5.52%
Pu-239	µgrams/gram of slurry	2.18E+01	2.11E+01	7.19E-01	3.41%	No	7.08%
Cobalt-60	dpm/gram of slurry	2.70E+06	2.62E+06	8.10E+04	3.09%	No	9.26%
Cesium-137	dpm/gram of slurry	1.87E+08	1.83E+08	4.50E+06	2.46%	No	7.23%
Cobalt-60 (scrnd)	dpm/gram of slurry	2.76E+06	2.71E+06	4.76E+04	1.76%	No	5.39%
Cesium-137 (scrnd)	dpm/gram of slurry	1.93E+08	1.87E+08	6.14E+06	3.28%	Yes	3.92%
Supernate							
Soluble Solids	wt%	1.16E+01	1.14E+01	1.38E-01	1.21%	Yes	1.48%
Sol. Solids (scrnd)	wt%	1.15E+01	1.14E+01	8.60E-02	0.75%	Yes	0.97%
Al	gram/gram of supernate	2.05E-03	2.18E-03	-1.40E-04	-6.32%	No	16.41%
Na	gram/gram of supernate	3.91E-02	4.24E-02	-3.27E-03	-7.71%	No	16.96%
Al (scrnd)	gram/gram of supernate	2.18E-03	2.18E-03	-4.00E-06	-0.17%	No	2.92%
Na (scrnd)	gram/gram of supernate	4.21E-02	4.24E-02	-2.51E-04	-0.59%	No	2.18%

- ► No other differences between the Tank 40 samples for any analyte considered as part of this study were statistically significant at the 5% level (i.e. with 95% confidence).
- ► The sensitivity of the process used to make the comparisons between the two Tank 40 samples (as revealed by Column 8 of Table 1) indicates that:
  - ▪ For the analyses of each of the elemental concentrations in the slurry, any difference between the two samples of 7.52% or greater for one of these analytes would have been detected with at least a 90% probability.
  - ▪ For the analyses of each of the other analytes (i.e., the selected fission products and actinides, Co-60, Cs-137, and the supernate measurements), any difference between the two samples of 16.96% or greater for one of these analytes would have been detected with at least a 90% probability. Thus, the sensitivity is not as good for some of these analytes as compared to the sensitivity for comparisons involving the elemental concentrations. This possibility was indicated in the TT&QA plan [3].

- Using the data after the potential outlying measurements were removed,
  - ► No potential outliers were seen in weight percent (wt%) slurry solids for the two Tank 40 samples, so the screened results are the same as those presented above.
  - ► The difference between the screened weight percent (wt%) soluble solids in the supernate for the two Tank 40 samples was statistically significant at the 5% level (i.e., with 95% confidence). However, the difference was only 0.75%, which is judged to be small enough to be of no practical concern.
  - ► The difference between the screened elemental concentrations in the slurry for the two Tank 40 samples was statistically significant at the 5% level (i.e., with 95% confidence) for Al, Ca, and Na. However, the differences were only 1.55% (for Al), 1.26% (for Ca), and 1.23% (for Na), which are judged to be small enough to be of no practical concern.
  - ► The sensitivity of the process used to make the comparisons between the two Tank 40 samples (as revealed by Column 8 of Table 1) indicates that:
    - ▪ For the screened analyses of each of the elemental concentrations in the slurry, any difference between the two samples of 5.02% or greater for one of these analytes would have been detected with at least a 90% probability.
    - ▪ For the screened analyses of each of the other analytes (i.e., the selected fission products and actinides, Co-60, Cs-137, and the supernate measurements), any difference between the two samples of 14.14% or greater for one of these analytes would have been detected with at least a 90% probability. The sensitivity of the comparisons between the two Tank 40 samples for these analytes improved for most of the analytes as a result of the screening process.

Based upon the results from the comparisons of the 32-hour and 60-hour Tank 40 samples summarized in this memorandum, these two samples of Tank 40 are judged to be essentially the same for the analytes considered as part of this task.

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[2] J. E. Occhipinti, "Determine If A Statistical Difference in Composition Exists Between Samples Taken from Tank 40," HLW/DWPF/TTR-01-0025, Revision 0, July 11, 2001.

[3] SAS Institute, Inc. **JMP® Statistics and Graphics Guide: JMP Version 4**, SAS Institute, Inc., Cary, NC, 2000.

APPROVALS

Authors

R. F. Swingle, Waste Processing Technology Date

N. E. Bibler, Immobilization Technology Date

C. J. Coleman, Analytical Development Date

T. L. Fellinger, Immobilization Technology Date

T. B. Edwards, Statistical Consulting Date

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Appendix

Table A1. Weight Percent (wt%) Solids of Slurry by Sample

Composite	Wt% Solids
30 hr	26.304
30 hr	26.461
30 hr	26.275
30 hr	26.368
30 hr	26.377
30 hr	26.370
30 hr	26.321
30 hr	26.222
30 hr	26.400
30 hr	26.412
62 hr	26.701
62 hr	26.674
62 hr	26.763
62 hr	26.792
62 hr	26.603
62 hr	26.622
62 hr	26.616
62 hr	26.675
62 hr	26.651
62 hr	26.685

Table A2. Elemental Concentrations as Weight Percents (wt%'s) of Slurry from ICP-ES Analyses

ADS LIMS #	Type of Sample	Instrument Calibration	Ag	Al	Ca	Fe	Mg	Mn	Na	U	Fe/Na
300166374	60	1	0.0091	1.4220	0.5024	5.2896	0.4278	0.7198	4.1878	1.5280	1.2631
300166375	ARG-1/1	1	0.0148	2.5075	1.0695	10.7326	0.5720	1.6051	8.6477	0.2851	1.2411
300166376	32	1	0.0090	1.4816	0.5084	5.5040	0.4425	0.7470	4.4110	1.5902	1.2478
300166377	32	1	0.0084	1.3768	0.4909	5.0967	0.4103	0.6917	4.1197	1.4730	1.2372
300166378	60	1	0.0087	1.3877	0.4976	5.1800	0.4163	0.6998	4.1183	1.4941	1.2578
300166379	32	1	0.0082	1.3649	0.4872	5.0709	0.4060	0.6830	4.0923	1.4631	1.2391
300166380	32	1	0.0086	1.3940	0.4946	5.1988	0.4153	0.6981	4.1629	1.4952	1.2488
300166381	60	1	0.0084	1.3912	0.4983	5.1872	0.4124	0.6916	4.1460	1.4987	1.2511
300166382	Blk 1	1	0.0023	0.0116	0.0000	0.0104	0.0009	0.0007	0.0148	0.0398	0.7027
300166383	60	1	0.0087	1.4172	0.5057	5.3161	0.4231	0.7079	4.2042	1.5262	1.2645
300166384	ARG-1/1	1	0.0138	2.4961	1.0631	10.6257	0.5562	1.5533	8.5400	0.2899	1.2446
300166385	32	1	0.0090	1.3927	0.4956	5.3080	0.4214	0.7057	4.1260	1.5622	1.2865
300166386	60	1	0.0088	1.5020	0.5150	5.6133	0.4437	0.7438	4.4536	1.6084	1.2604
300166387	60	2	0.0075	1.3889	0.5123	5.1157	0.4186	0.7164	4.1900	1.6600	1.2209
300166388	32	2	0.0069	1.3219	0.4866	4.7887	0.3911	0.6693	4.0967	1.6300	1.1689
300166389	60	2	0.0067	1.3447	0.4949	4.8601	0.3947	0.6764	4.1281	1.6300	1.1773
300166390	32	2	0.0080	1.5622	0.5534	5.7798	0.4689	0.8016	4.7422	1.6800	1.2188
300166391	Blk 2	2	0.0000	0.0076	0.0000	0.0218	0.0017	0.0025	0.0166	0.0000	1.3133
300166392	ARG-1/2	2	0.0000	2.3618	1.0266	10.1205	0.5398	1.5410	8.4957	0.0000	1.1913
300166393	32	2	0.0068	1.3253	0.4931	4.9200	0.3981	0.6819	4.0776	1.6400	1.2066
300166394	60	2	0.0069	1.3439	0.4971	5.0122	0.4048	0.6927	4.1002	1.6400	1.2224
300166395	60	2	0.0069	1.3399	0.4905	4.8663	0.3924	0.6706	4.1007	1.6400	1.1867
300166396	ARG-1/2	2	0.0000	2.3668	0.9822	10.0126	0.5358	1.5135	8.5133	0.0000	1.1761
300166397	32	2	0.0066	1.3175	0.4842	4.8117	0.3871	0.6606	4.0867	1.6100	1.1774
300166398	60	2	0.0068	1.3399	0.4936	4.8820	0.3920	0.6696	4.1236	1.6500	1.1839
300166399	32	2	0.0069	1.3417	0.4898	4.9376	0.3965	0.6777	4.0800	1.6200	1.2102

Appendix *(continued)*

Table A3. Noble Metal Concentrations (as micrograms per grams of slurry) from ICP-MS Analyses

ADS LIMS #	Composite Type	Calibration	Tc-99	Ru-101	Ru-102	Rh-103	Ru-104	Pd-105	Ag-107	Ag-109	U-235	U-238	Pu-239
300166374	60	1	1.8031	27.088	25.512	17.324	16.531	1.4089	8.782	8.587	53.197	13571.04	19.565
300166375	ARG1-1	1	0.4099	.	.	.	0.099	0.0893	0.511	0.165	.	653.24	25.756
300166376	32	1	2.0030	27.134	26.132	17.576	17.890	1.4292	10.149	9.676	55.619	14172.20	21.744
300166377	32	1	1.2962	26.339	24.749	16.835	16.764	1.3040	9.476	9.938	51.540	12154.89	20.647
300166378	60	1	1.5618	26.393	25.635	16.708	17.183	1.2813	10.349	10.482	53.356	13238.82	22.085
300166379	32	1	1.7086	26.764	25.282	17.081	17.020	1.3689	10.018	10.156	53.260	12395.48	21.014
300166380	32	1	1.6121	27.648	24.798	16.959	16.607	1.0457	10.052	10.430	53.674	13069.60	21.573
300166381	60	1	1.7476	26.723	25.095	16.713	17.072	1.4224	9.411	9.227	53.775	12910.29	19.918
300166382	Blk1	1	0.2000	.	.	.	0.124	.	.	0.095	.	6.36	0.155
300166383	60	1	1.6567	27.251	26.411	17.378	16.975	1.3754	10.081	9.597	52.487	12572.77	19.839
300166384	ARG1-1	1	0.2528	.	.	.	.	0.0959	0.762	0.228	.	8.42	0.734
300166385	32	1	1.7827	27.860	26.163	17.526	17.466	1.1941	11.098	11.255	54.069	12721.09	21.861
300166386	60	1	1.7512	26.959	26.152	17.632	17.367	1.4778	10.574	10.704	54.571	13309.23	21.695
300166387	60	1	1.6526	26.137	24.907	16.612	16.391	1.5030	10.058	9.783	51.863	12484.92	21.023
300166387	60	2	1.7861	25.461	24.324	16.585	15.494	1.1617	10.496	9.494	56.967	14027.13	21.303
300166388	32	1	1.7863	28.426	26.602	18.108	18.151	1.4414	10.967	11.158	55.307	13725.64	22.190
300166388	32	2	1.8361	25.976	23.913	16.132	16.378	1.0899	10.344	9.716	56.068	13842.74	20.340
300166389	60	2	1.7424	25.319	24.787	15.753	16.218	1.3189	10.319	10.067	56.707	13717.40	21.699
300166390	32	2	1.9142	26.640	25.473	16.744	17.157	1.2510	10.678	9.922	58.245	14029.69	21.527
300166391	Blk2	2	0.3111	0.200	.	.	0.181	.	0.137	0.131	0.137	28.71	0.408
300166392	ARG1-2	2	12.7608	.	.	.	.	.	30.441	9.839	.	12.89	0.802
300166393	32	2	1.8967	25.957	25.416	16.395	16.702	1.1820	10.114	8.878	56.339	13924.99	23.552
300166394	60	2	1.7236	26.477	24.299	16.308	15.988	1.3213	9.294	8.451	57.465	14569.72	21.803
300166395	60	2	1.5737	22.832	21.837	14.515	14.591	1.1049	8.987	8.621	50.519	12907.48	19.567
300166396	ARG1-2	2	0.2615	0.131	.	.	.	.	1.012	0.197	0.173	30.16	0.852
300166397	32	2	1.6830	26.168	24.651	16.549	16.264	1.2816	9.727	9.342	57.027	14878.79	23.512
300166398	60	2	1.5928	25.649	24.346	16.556	16.407	1.1362	10.070	9.525	56.495	13573.04	21.546
300166399	32	2	1.7162	25.801	25.119	16.375	16.375	1.0513	9.902	9.003	56.806	13608.32	22.445

Appendix *(continued)*

Table A4. Activity Measured by Gamma Scan

ADS LIMS #	Composite Type	Calibration	Co-60 (dpm/g)	Cs-137 (dpm/g)
300166374	60	1	2.66E+06	1.85E+08
300166375	ARG1-1	1	.	1.77E+06
300166376	32	1	2.84E+06	1.98E+08
300166377	32	1	2.68E+06	1.91E+08
300166378	60	1	2.36E+06	1.88E+08
300166379	32	1	2.83E+06	1.92E+08
300166380	32	1	2.71E+06	1.75E+08
300166381	60	1	2.47E+06	1.89E+08
300166382	Blk1	1	.	1.79E+03
300166383	60	1	2.72E+06	1.92E+08
300166384	ARG1-1	1	.	4.64E+05
300166385	32	1	2.70E+06	1.94E+08
300166386	60	1	2.81E+06	1.78E+08
300166387	60	1	2.67E+06	1.72E+08
300166388	32	1	2.49E+06	1.90E+08
300166389	60	2	2.60E+06	1.85E+08
300166390	32	2	2.69E+06	1.90E+08
300166391	Blk2	2	.	1.17E+03
300166392	ARG1-2	2	.	1.17E+06
300166393	32	2	2.76E+06	1.99E+08
300166394	60	2	2.38E+06	1.90E+08
300166395	60	2	2.70E+06	1.81E+08
300166396	ARG1-2	2	.	4.11E+06
300166397	32	2	2.44E+06	1.76E+08
300166398	60	2	2.82E+06	1.72E+08
300166399	32	2	2.86E+06	1.72E+08

Appendix *(continued)*

Table A5. Weight Percent (wt%) Soluble Solids of Supernate by Composite Sample

Composite	Wt% Solids
32 hr	11.520
32 hr	11.536
32 hr	11.659
32 hr	11.547
32 hr	11.531
32 hr	11.552
32 hr	11.558
32 hr	11.480
32 hr	11.922
32 hr	11.497
60 hr	11.460
60 hr	11.391
60 hr	11.438
60 hr	11.383
60 hr	11.524
60 hr	11.498
60 hr	11.587
60 hr	11.302
60 hr	11.491
60 hr	11.345

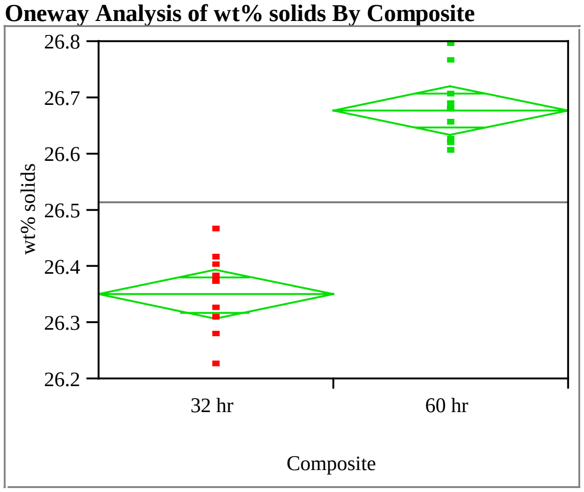
.**Table A6. Elemental Concentrations as Weight Percents (wt%'s) of Slurry from ICP-ES Analyses**

ADS LIMS #	Type of Sample	Instrument Calibration	Al	Na
300166348	60	1	0.00219	0.0424
300166350	32	1	0.00217	0.0422
300166351	32	1	0.00113	0.0221
300166352	60	1	0.00218	0.0424
300166353	32	1	0.00218	0.0425
300166354	32	1	0.00186	0.0319
300166355	60	1	0.00216	0.0423
300166357	60	1	0.00217	0.0423
300166359	32	1	0.00215	0.0419
300166360	60	1	0.00215	0.0420
300166361	60	2	0.00227	0.0437
300166362	32	2	0.00221	0.0426
300166363	60	2	0.00220	0.0421
300166364	32	2	0.00212	0.0407
300166367	32	2	0.00221	0.0423
300166368	60	2	0.00221	0.0423
300166369	60	2	0.00220	0.0423
300166371	32	2	0.00221	0.0424
300166372	60	2	0.00210	0.0421
300166373	32	2	0.00221	0.0426

.Appendix *(continued)*

Exhibit A1. Plots of the Weight Percent (wt%) Solids Values by Type of Composite

Oneway Analysis of wt% solids By Composite



Oneway Anova

Summary of Fit

Rsquare	0.87107
Adj Rsquare	0.863907
Root Mean Square Error	0.066346
Mean of Response	26.5146
Observations (or Sum Wgts)	20

t-Test

	Difference	t-Test	DF	Prob > |t|
Estimate	-0.3272	-11.028	18	<.0001
Std Error	0.029671			
Lower 95%	-0.38954			
Upper 95%	-0.26486			

Assuming equal variances

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Composite	1	0.53529920	0.535299	121.6104	<.0001
Error	18	0.07923160	0.004402		
C. Total	19	0.61453080			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
30 hr	10	26.3510	0.02098	26.307	26.395
62 hr	10	26.6782	0.02098	26.634	26.722

Std Error uses a pooled estimate of error variance

Tests that the Variances are Equal

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif to Median
30 hr	10	0.0707688	0.0564000	0.0530000
62 hr	10	0.0616059	0.0456400	0.0450000

Test	F Ratio	DFNum	DFDen	Prob>F
O'Brien[.5]	0.2159	1	18	0.6477
Brown-Forsythe	0.1681	1	18	0.6867
Levene	0.3918	1	18	0.5392
Bartlett	0.1634	1	.	0.6860

Welch Anova testing Means Equal, allowing Std Devs Not Equal

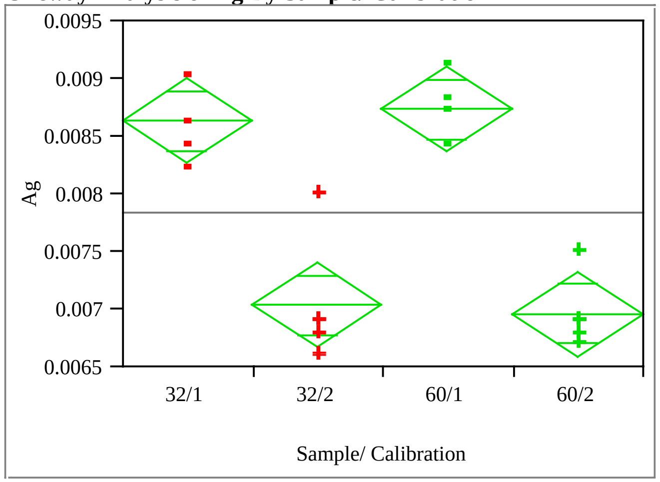
F Ratio	DFNum	DFDen	Prob>F
121.6104	1	17.665	<.0001

t-Test
11.0277

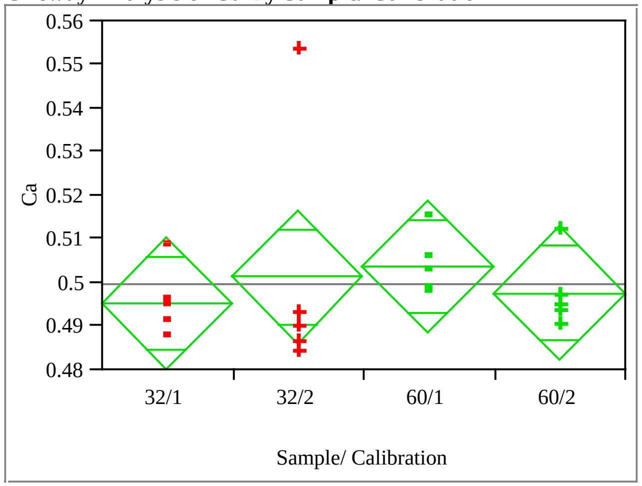
Appendix *(continued)*

Exhibit A2. Plots of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block

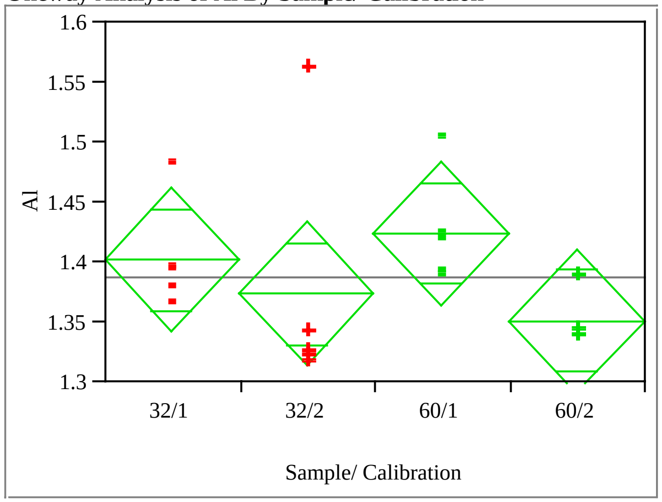
Oneway Analysis of Ag By Sample/ Calibration



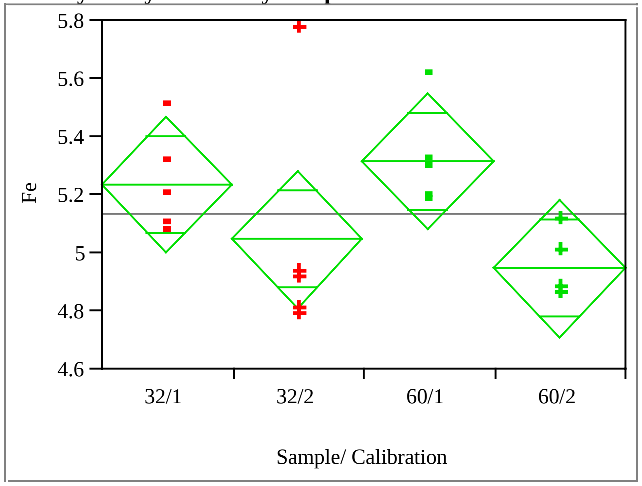
Oneway Analysis of Ca By Sample/ Calibration



Oneway Analysis of Al By Sample/ Calibration



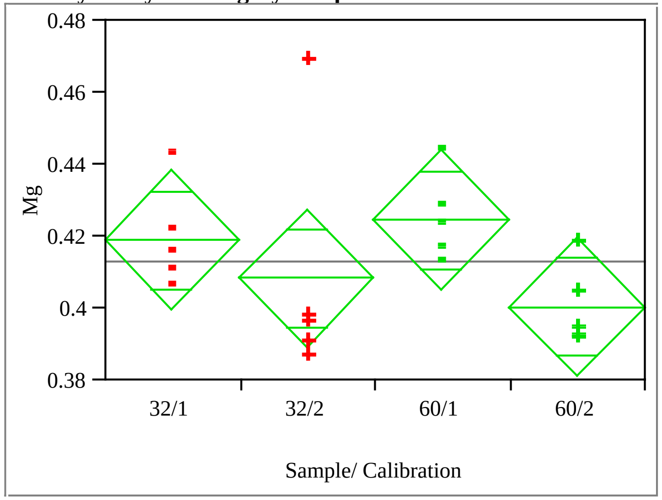
Oneway Analysis of Fe By Sample/ Calibration



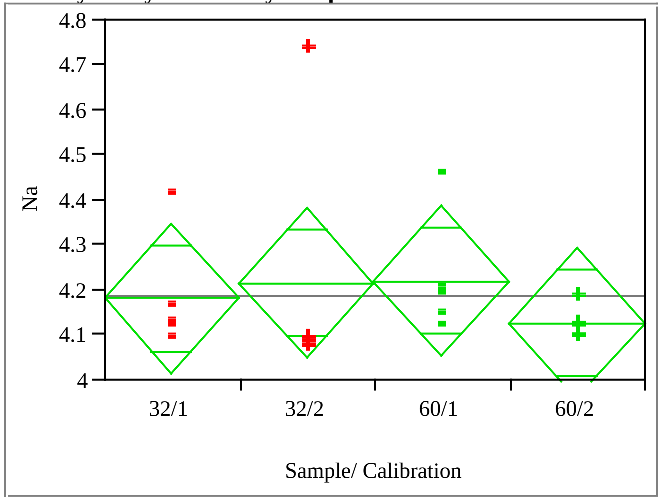
Appendix *(continued)*

Exhibit A2. Plots of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*

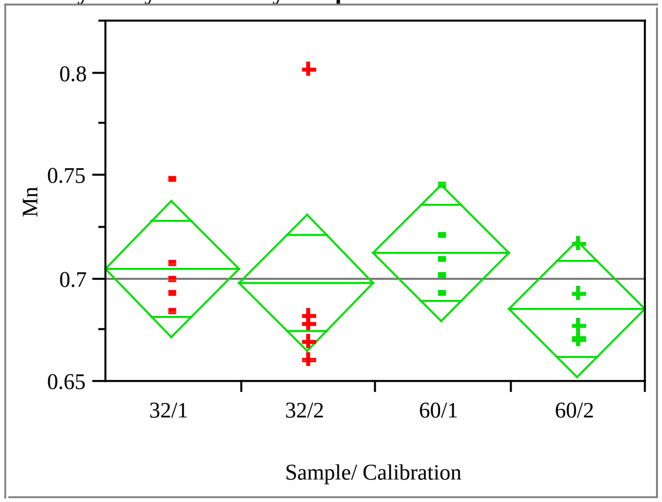
Oneway Analysis of Mg By Sample/ Calibration



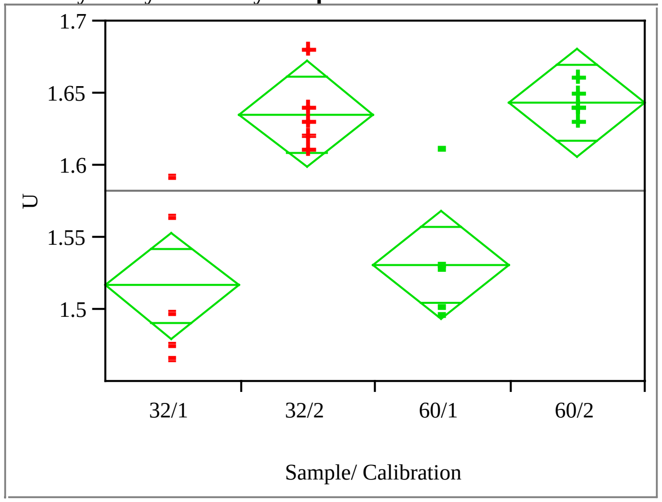
Oneway Analysis of Na By Sample/ Calibration



Oneway Analysis of Mn By Sample/ Calibration

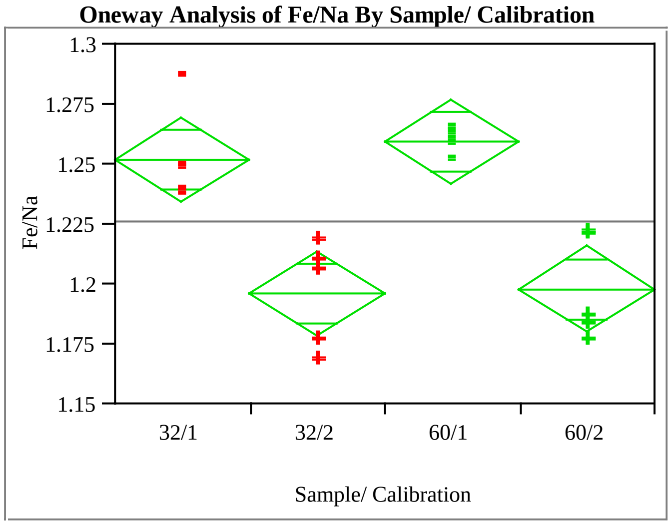


Oneway Analysis of U By Sample/ Calibration



Appendix *(continued)*

Exhibit A2. Plots of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*



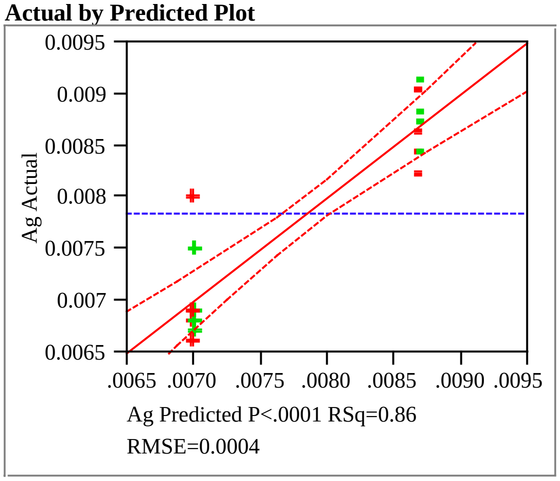
Appendix *(continued)*

Exhibit A3. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*

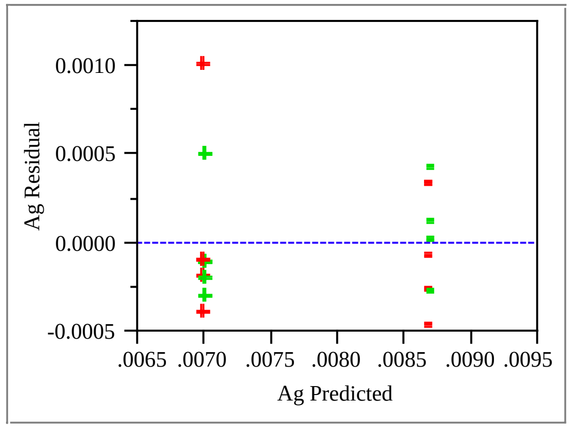
Response Ag

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.855688
RSquare Adj	0.83871
Root Mean Square Error	0.000376
Mean of Response	0.007845
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00001428	0.0000071	50.4000
Error	17	0.00000241	0.0000001	**Prob > F**
C. Total	19	0.00001669		<.0001

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00000004	4.05e-8	0.2736
Pure Error	16	0.00000237	0.0000001	**Prob > F**
Total Error	17	0.00000241		0.6081
				Max RSq
				0.8581

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.007845	0.000084	93.21	<.0001
Sample Type[32]	-0.000005	0.000084	-0.06	0.9533
Calibration[1]	0.000845	0.000084	10.04	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00000000	0.0035	0.9533
Calibration	1	1	0.00001428	100.7966	<.0001

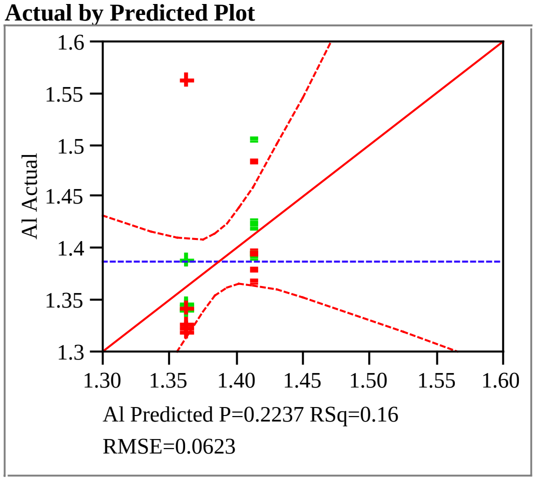
Appendix *(continued)*

Exhibit A3. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*

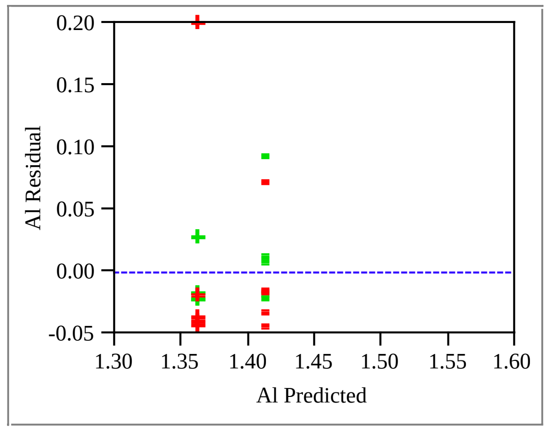
Response Al

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.161511
RSquare Adj	0.062866
Root Mean Square Error	0.062303
Mean of Response	1.3878
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Ratio**
Model	2	0.01271095	0.006355	1.6373
Error	17	0.06598913	0.003882	**Prob > F**
C. Total	19	0.07870008		0.2237

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Ratio**
Lack Of Fit	1	0.00245090	0.002451	0.6172
Pure Error	16	0.06353823	0.003971	**Prob > F**
Total Error	17	0.06598913		0.4436
				Max RSq
				0.1927

Parameter Estimates

Term	**Estimate**	**Std Error**	**t Ratio**	**Prob>|t|**
Intercept	1.3878	0.013931	99.62	<.0001
Sample Type[32]	0.00006	0.013931	0.00	0.9966
Calibration[1]	0.02521	0.013931	1.81	0.0881

Effect Tests

Source	**Nparm**	**DF**	**Sum of Squares**	**F Ratio**	**Prob > F**
Sample Type	1	1	0.00000007	0.0000	0.9966
Calibration	1	1	0.01271088	3.2746	0.0881

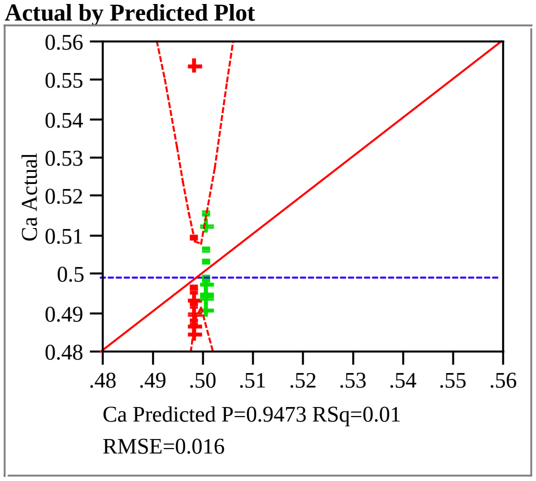
Appendix *(continued)*

Exhibit A3. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*

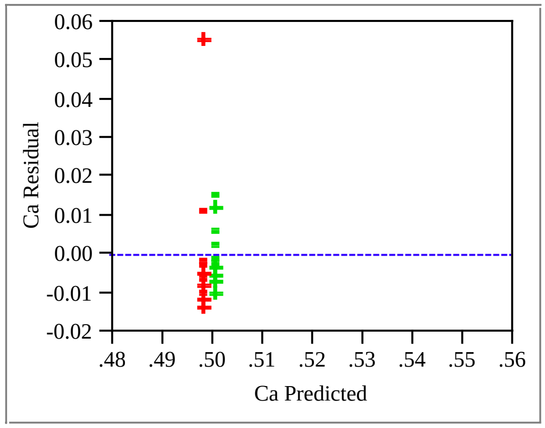
Response Ca

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.006354
RSquare Adj	-0.11055
Root Mean Square Error	0.016006
Mean of Response	0.49956
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00002785	0.000014	0.0544
Error	17	0.00435524	0.000256	**Prob > F**
C. Total	19	0.00438309		0.9473

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00018605	0.000186	0.7140
Pure Error	16	0.00416919	0.000261	**Prob > F**
Total Error	17	0.00435524		0.4106
				Max RSq
				0.0488

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.49956	0.003579	139.58	<.0001
Sample Type[32]	-0.00118	0.003579	-0.33	0.7457
Calibration[1]	0.00001	0.003579	0.00	0.9978

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00002785	0.1087	0.7457
Calibration	1	1	0.00000000	0.0000	0.9978

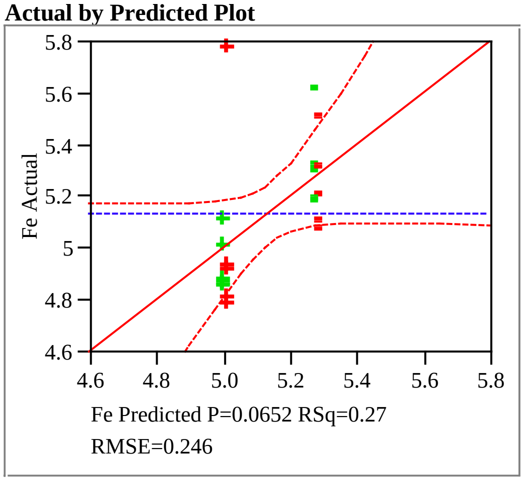
Appendix *(continued)*

Exhibit A3. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*

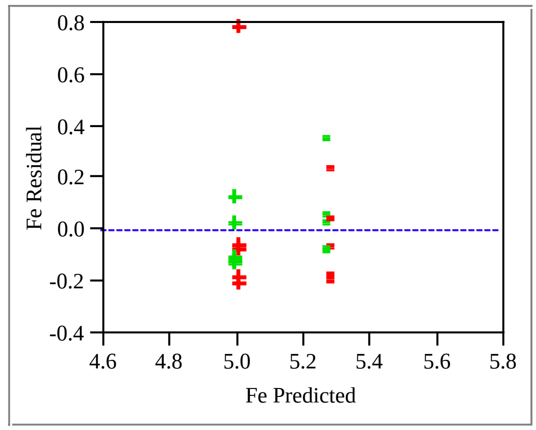
Response Fe

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.274782
RSquare Adj	0.189463
Root Mean Square Error	0.245995
Mean of Response	5.136935
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.3897835	0.194892	3.2206
Error	17	1.0287333	0.060514	**Prob > F**
C. Total	19	1.4185168		0.0652

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.0413413	0.041341	0.6699
Pure Error	16	0.9873919	0.061712	**Prob > F**
Total Error	17	1.0287333		0.4251
				Max RSq
				0.3039

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.136935	0.055006	93.39	<.0001
Sample Type[32]	0.004685	0.055006	0.09	0.9331
Calibration[1]	0.139525	0.055006	2.54	0.0213

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00043898	0.0073	0.9331
Calibration	1	1	0.38934451	6.4340	0.0213

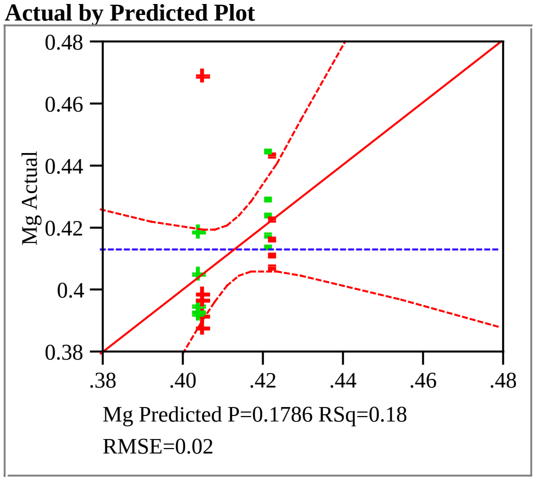
Appendix *(continued)*

Exhibit A3. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*

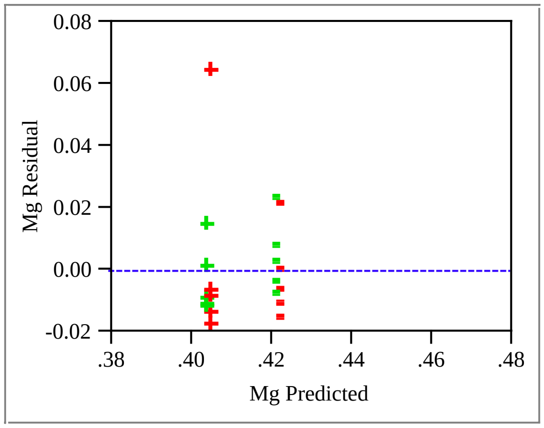
Response Mg

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.183432
RSquare Adj	0.087366
Root Mean Square Error	0.020021
Mean of Response	0.41315
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00153076	0.000765	1.9094
Error	17	0.00681431	0.000401	**Prob > F**
C. Total	19	0.00834507		0.1786

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00022445	0.000224	0.5450
Pure Error	16	0.00658986	0.000412	**Prob > F**
Total Error	17	0.00681431		0.4711
				Max RSq
				0.2103

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.41315	0.004477	92.29	<.0001
Sample Type[32]	0.00057	0.004477	0.13	0.9002
Calibration[1]	0.00873	0.004477	1.95	0.0679

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00000650	0.0162	0.9002
Calibration	1	1	0.00152426	3.8026	0.0679

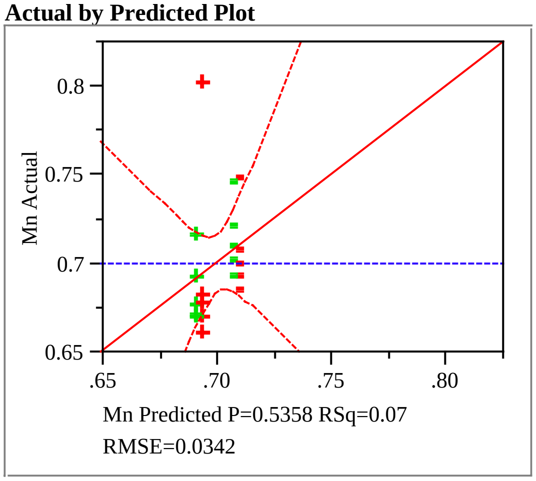
Appendix *(continued)*

Exhibit A3. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*

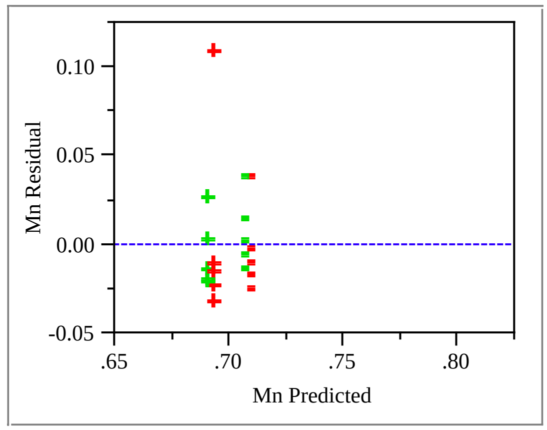
Response Mn

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.07078
RSquare Adj	-0.03854
Root Mean Square Error	0.034165
Mean of Response	0.70026
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00151153	0.000756	0.6475
Error	17	0.01984364	0.001167	**Prob > F**
C. Total	19	0.02135517		0.5358

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00052839	0.000528	0.4377
Pure Error	16	0.01931525	0.001207	**Prob > F**
Total Error	17	0.01984364		0.5177
				Max RSq
				0.0955

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.70026	0.00764	91.66	<.0001
Sample Type[32]	0.0014	0.00764	0.18	0.8568
Calibration[1]	0.00858	0.00764	1.12	0.2770

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00003920	0.0336	0.8568
Calibration	1	1	0.00147233	1.2613	0.2770

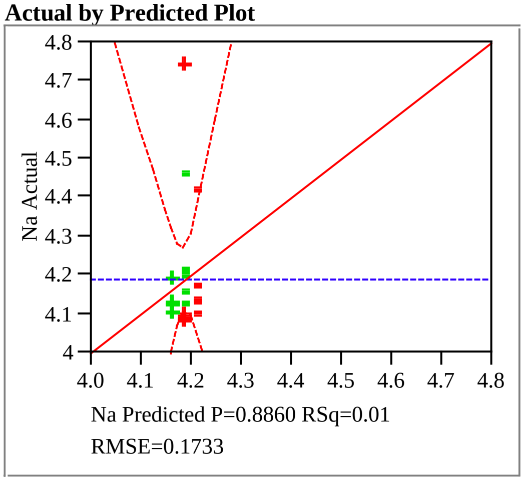
Appendix *(continued)*

Exhibit A3. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*

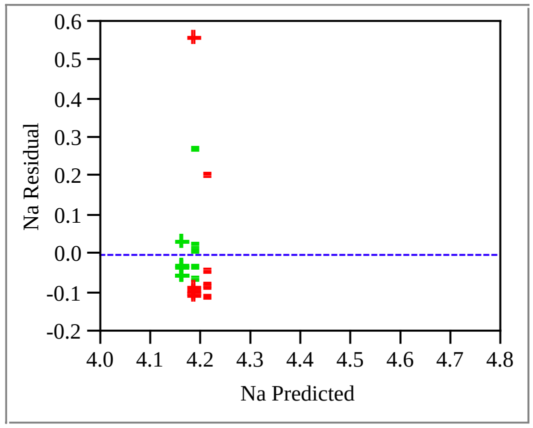
Response Na

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.014135
RSquare Adj	-0.10185
Root Mean Square Error	0.173337
Mean of Response	4.18738
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00732354	0.003662	0.1219
Error	17	0.51077977	0.030046	**Prob > F**
C. Total	19	0.51810331		0.8860

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.02039050	0.020390	0.6653
Pure Error	16	0.49038928	0.030649	**Prob > F**
Total Error	17	0.51077977		0.4267
				Max RSq
				0.0535

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.18738	0.038759	108.04	<.0001
Sample Type[32]	0.01213	0.038759	0.31	0.7581
Calibration[1]	0.0148	0.038759	0.38	0.7073

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00294274	0.0979	0.7581
Calibration	1	1	0.00438080	0.1458	0.7073

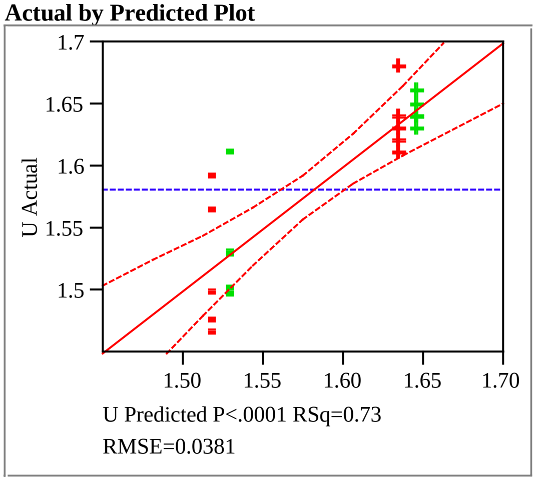
Appendix *(continued)*

Exhibit A3. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*

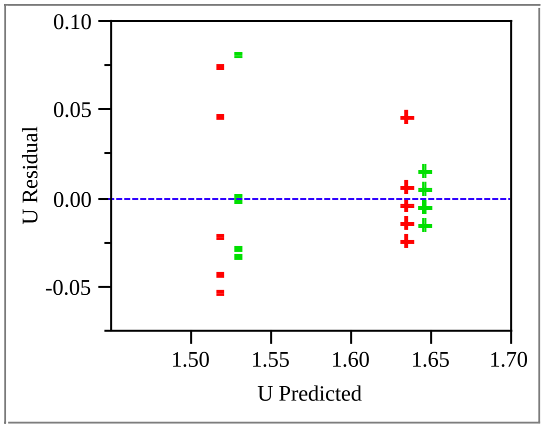
Response U

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.734085
RSquare Adj	0.702801
Root Mean Square Error	0.038068
Mean of Response	1.581955
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.06800829	0.034004	23.4651
Error	17	0.02463530	0.001449	**Prob > F**
C. Total	19	0.09264359		<.0001

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00005024	0.000050	0.0327
Pure Error	16	0.02458506	0.001537	**Prob > F**
Total Error	17	0.02463530		0.8588
				Max RSq
				0.7346

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.581955	0.008512	185.85	<.0001
Sample Type[32]	-0.005585	0.008512	-0.66	0.5205
Calibration[1]	-0.058045	0.008512	-6.82	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00062384	0.4305	0.5205
Calibration	1	1	0.06738444	46.4997	<.0001

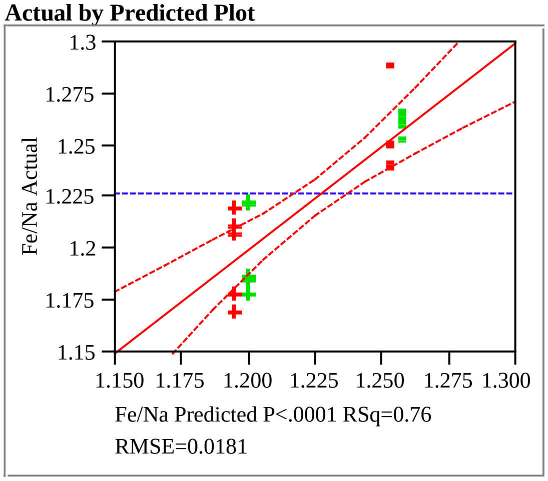
Appendix *(continued)*

Exhibit A3. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry by Type of Composite and ICP Calibration Block *(continued)*

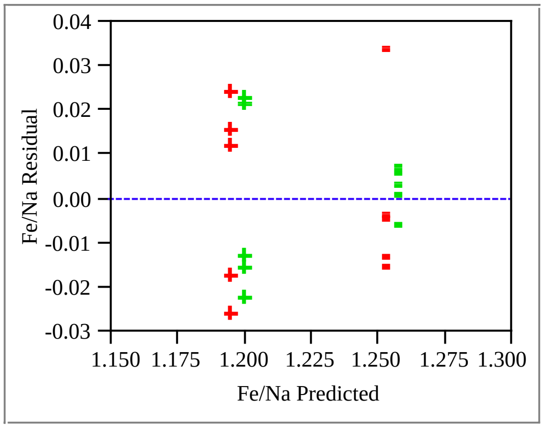
Response Fe/Na

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.755364
RSquare Adj	0.726583
Root Mean Square Error	0.018054
Mean of Response	1.226475
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.01710939	0.008555	26.2455
Error	17	0.00554113	0.000326	**Prob > F**
C. Total	19	0.02265053		<.0001

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00003955	0.000040	0.1150
Pure Error	16	0.00550159	0.000344	**Prob > F**
Total Error	17	0.00554113		0.7389
				Max RSq
				0.7571

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.2264751	0.004037	303.81	<.0001
Sample Type[32]	-0.002345	0.004037	-0.58	0.5690
Calibration[1]	0.0291543	0.004037	7.22	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00010996	0.3374	0.5690
Calibration	1	1	0.01699943	52.1536	<.0001

Appendix *(continued)*

Exhibit A4. Sensitivity of Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry to 5% Differences Due to Type of Composite

Response Ag

Level	Least Sq Mean	Std Error	Mean
32	0.00784000	0.00011903	0.007840
60	0.00785000	0.00011903	0.007850

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.000376	0.0002	20	0.6106

Response Al

Level	Least Sq Mean	Std Error	Mean
32	1.3878600	0.01970206	1.38786
60	1.3877400	0.01970206	1.38774

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.062303	0.03469	20	0.6509

Response Ca

Level	Least Sq Mean	Std Error	Mean
32	0.49838000	0.00506153	0.498380
60	0.50074000	0.00506153	0.500740

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.016006	0.01252	20	0.9090

Response Fe

Level	Least Sq Mean	Std Error	Mean
32	5.1416200	0.07779057	5.14162
60	5.1322500	0.07779057	5.13225

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.245995	0.12831	20	0.5948

Response Mg

Level	Least Sq Mean	Std Error	Mean
32	0.41372000	0.00633121	0.413720
60	0.41258000	0.00633121	0.412580

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.020021	0.01031	20	0.5839

Response Mn

Level	Least Sq Mean	Std Error	Mean
32	0.70166000	0.01080404	0.701660
60	0.69886000	0.01080404	0.698860

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.034165	0.01747	20	0.5780

Response Na

Level	Least Sq Mean	Std Error	Mean
32	4.1995100	0.05481411	4.19951
60	4.1752500	0.05481411	4.17525

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.173337	0.10438	20	0.7186

Response U

Level	Least Sq Mean	Std Error	Mean
32	1.5763700	0.01203800	1.57637
60	1.5875400	0.01203800	1.58754

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.038068	0.03969	20	0.9924

Response Fe/Na

Level	Least Sq Mean	Std Error	Mean
32	1.2241303	0.00570919	1.22413
60	1.2288198	0.00570919	1.22882

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.018054	0.03072	20	1.0000

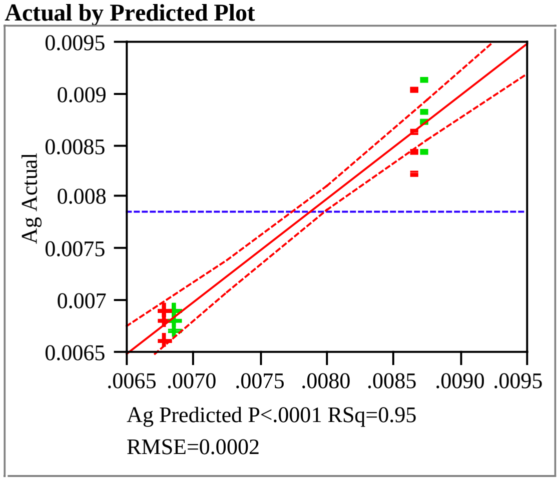
Appendix *(continued)*

Exhibit A5. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry with Potential Outliers Removed by Type of Composite and ICP Calibration Block

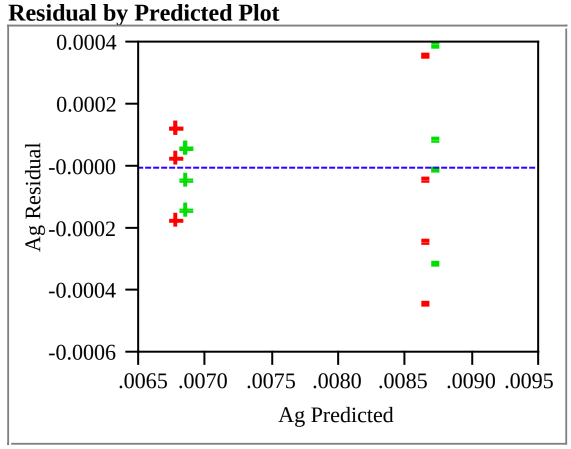
Response Ag

LIMS Numbers Removed From this Analysis:
300166387 and 300166390.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.948155
RSquare Adj	0.941242
Root Mean Square Error	0.000239
Mean of Response	0.007856
Observations (or Sum Wgts)	18

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00001569	0.0000078	137.1614
Error	15	0.00000086	5.7183e-8	**Prob > F**
C. Total	17	0.00001654		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	6.25e-9	6.25e-9	0.1028
Pure Error	14	0.00000085	6.0821e-8	**Prob > F**
Total Error	15	0.00000086		0.7533
				Max RSq
				0.9485

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.0077512	0.000057	136.67	<.0001
Sample Type[32]	-0.000033	0.000056	-0.59	0.5631
Calibration[1]	0.0009387	0.000057	16.55	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00000002	0.3498	0.5631
Calibration	1	1	0.00001567	273.9731	<.0001

Sample Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	0.00771792	0.00007996	0.007822
60	0.00778458	0.00007996	0.007889

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.000239	0.000195	18	0.8970

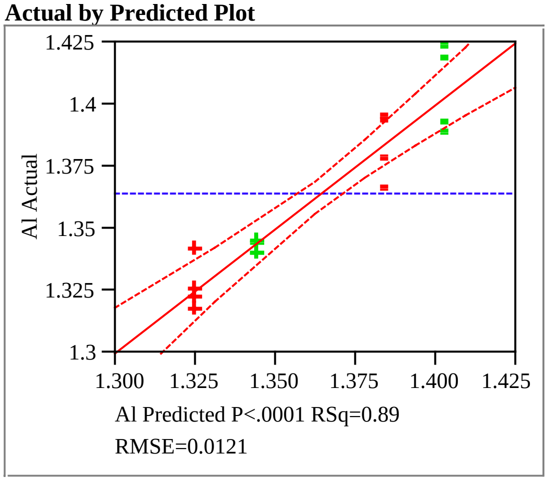
Appendix *(continued)*

Exhibit A5. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

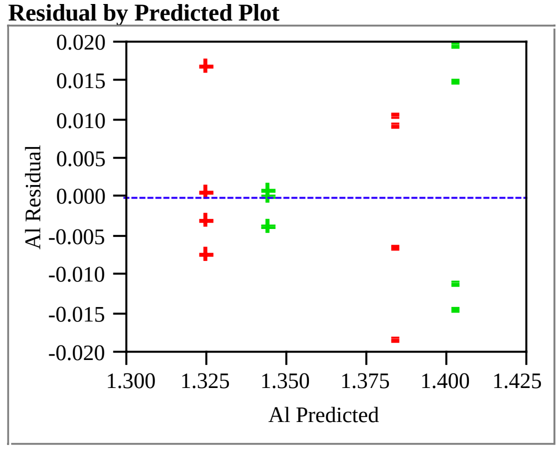
Response Al

LIMS Numbers Removed From this Analysis: 300166376, 300166386, 300166387, and 300166390.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.88947
RSquare Adj	0.872465
Root Mean Square Error	0.012111
Mean of Response	1.363831
Observations (or Sum Wgts)	16

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.01534461	0.007672	52.3074
Error	13	0.00190680	0.000147	**Prob > F**
C. Total	15	0.01725141		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00004796	0.000048	0.3096
Pure Error	12	0.00185885	0.000155	**Prob > F**
Total Error	13	0.00190680		0.5882
				Max RSq
				0.8922

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.3638312	0.003028	450.44	<.0001
Sample Type[32]	-0.009481	0.003028	-3.13	0.0080
Calibration[1]	0.0294812	0.003028	9.74	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00143831	9.8059	0.0080
Calibration	1	1	0.01390631	94.8089	<.0001

Sample Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	1.3543500	0.00428190	1.35435
60	1.3733125	0.00428190	1.37331

Power Details

Test

Sample Type

Power

Alpha	Sigma	Delta	Number	Power
0.0500	0.012111	0.034333	16	1.00000

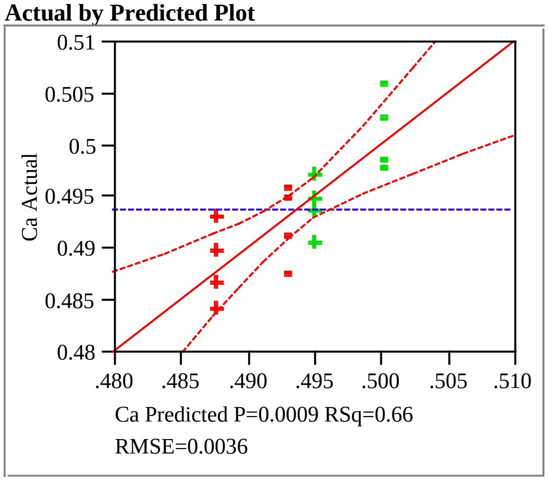
Appendix *(continued)*

Exhibit A5. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

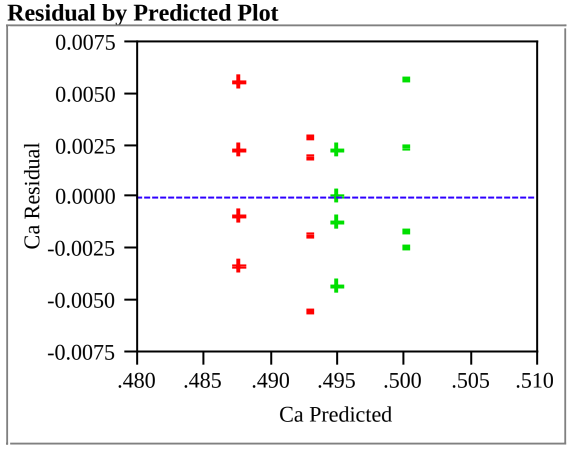
Response Ca

LIMS Numbers Removed From this Analysis:
300166376, 300166386, 300166387, and 300166390.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.661594
RSquare Adj	0.609531
Root Mean Square Error	0.00357
Mean of Response	0.493881
Observations (or Sum Wgts)	16

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00032387	0.000162	12.7077
Error	13	0.00016566	0.000013	**Prob > F**
C. Total	15	0.00048952		0.0009

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00001106	0.000011	0.8581
Pure Error	12	0.00015460	0.000013	**Prob > F**
Total Error	13	0.00016566		0.3725
				Max RSq
				0.6842

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.4938812	0.000892	553.41	<.0001
Sample Type[32]	-0.003631	0.000892	-4.07	0.0013
Calibration[1]	0.0026562	0.000892	2.98	0.0107

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00021098	16.5563	0.0013
Calibration	1	1	0.00011289	8.8591	0.0107

Sample Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	0.49025000	0.00126209	0.490250
60	0.49751250	0.00126209	0.497512

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.00357	0.012438	16	1.0000

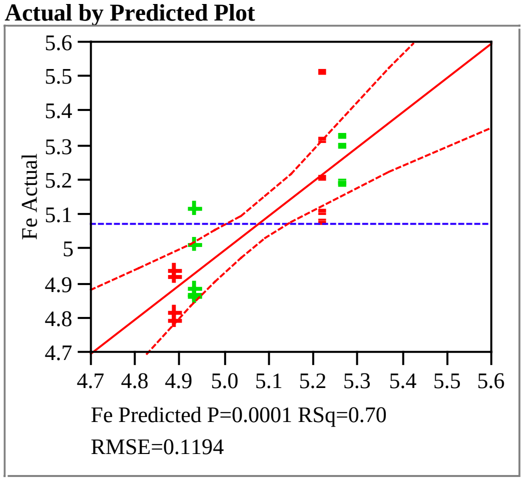
Appendix *(continued)*

Exhibit A5. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

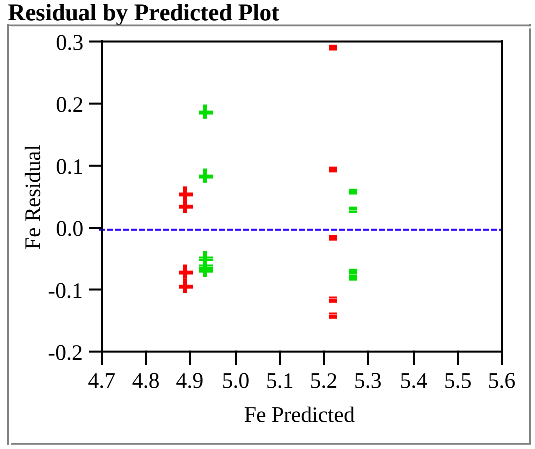
Response Fe

LIMS Numbers Removed From this Analysis: 300166386 and 300166390.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.698199
RSquare Adj	0.657958
Root Mean Square Error	0.119414
Mean of Response	5.074756
Observations (or Sum Wgts)	18

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.49483049	0.247415	17.3508
Error	15	0.21389415	0.014260	**Prob > F**
C. Total	17	0.70872464		0.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00628588	0.006286	0.4239
Pure Error	14	0.20760827	0.014829	**Prob > F**
Total Error	15	0.21389415		0.5255
				Max RSq
				0.7071

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	5.0747556	0.028146	180.30	<.0001
Sample Type[32]	-0.022576	0.028321	-0.80	0.4378
Calibration[1]	0.1667862	0.028321	5.89	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00906110	0.6354	0.4378
Calibration	1	1	0.49453606	34.6809	<.0001

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	5.0521793	0.03992873	5.07071
60	5.0973318	0.03992873	5.07880

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.119414	0.127333	18	0.9881

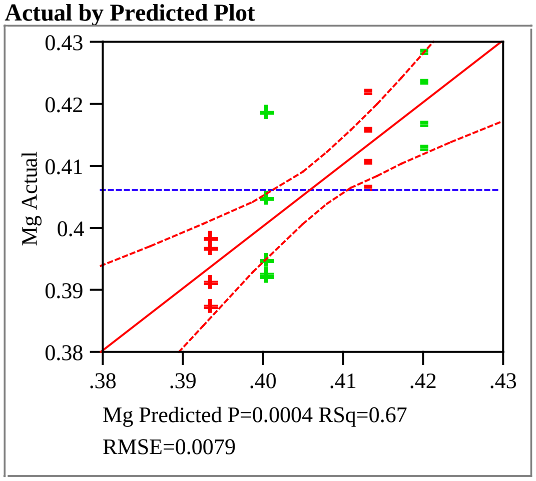
Appendix *(continued)*

Exhibit A5. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

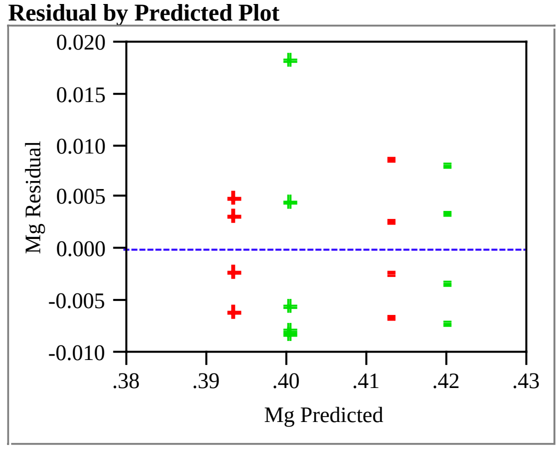
Response Mg

LIMS Numbers Removed From this Analysis: 300166376, 300166386, and 300166390.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.673015
RSquare Adj	0.626303
Root Mean Square Error	0.007875
Mean of Response	0.406347
Observations (or Sum Wgts)	17

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00178721	0.000894	14.4077
Error	14	0.00086831	0.000062	**Prob > F**
C. Total	16	0.00265552		0.0004

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00000044	0.000000	0.0067
Pure Error	13	0.00086787	0.000067	**Prob > F**
Total Error	14	0.00086831		0.9362
				Max RSq
				0.6732

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.4067211	0.001916	212.24	<.0001
Sample Type[32]	-0.003496	0.001916	-1.82	0.0895
Calibration[1]	0.0098539	0.001916	5.14	0.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00020642	3.3282	0.0895
Calibration	1	1	0.00163992	26.4407	0.0001

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	0.40322500	0.00278439	0.403225
60	0.41021711	0.00263377	0.409122

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.007875	0.010255	17	0.9987

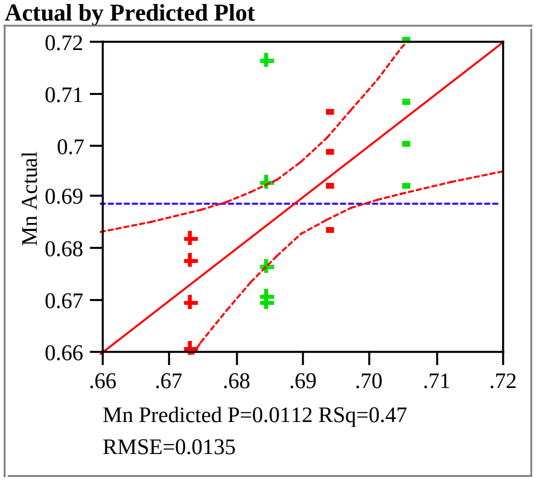
Appendix *(continued)*

Exhibit A5. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

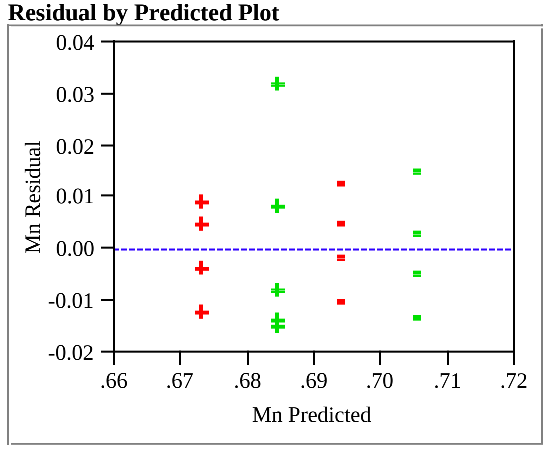
Response Mn

**LIMS Numbers Removed From this Analysis:
300166376, 300166386, and 300166390.**

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.473637
RSquare Adj	0.398442
Root Mean Square Error	0.013497
Mean of Response	0.688988
Observations (or Sum Wgts)	17

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00229483	0.001147	6.2988
Error	14	0.00255029	0.000182	**Prob > F**
C. Total	16	0.00484512		0.0112

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00000720	0.000007	0.0368
Pure Error	13	0.00254309	0.000196	**Prob > F**
Total Error	14	0.00255029		0.8508
				Max RSq
				0.4751

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.6892632	0.003284	209.87	<.0001
Sample Type[32]	-0.005763	0.003284	-1.75	0.1011
Calibration[1]	0.0104368	0.003284	3.18	0.0067

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00056095	3.0794	0.1011
Calibration	1	1	0.00183967	10.0990	0.0067

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	0.68350000	0.00477184	0.683500
60	0.69502632	0.00451371	0.693867

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.013497	0.017376	17	0.9984

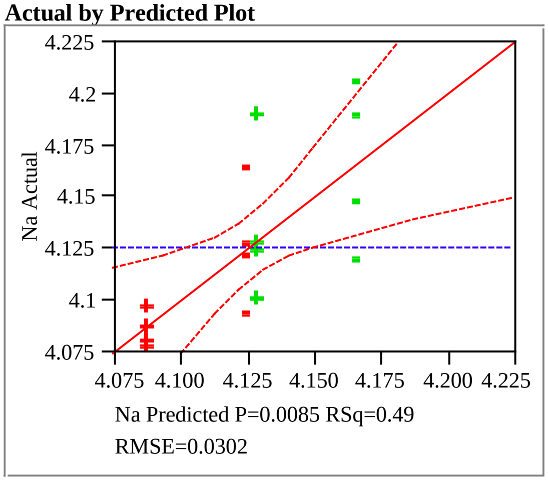
Appendix *(continued)*

Exhibit A5. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

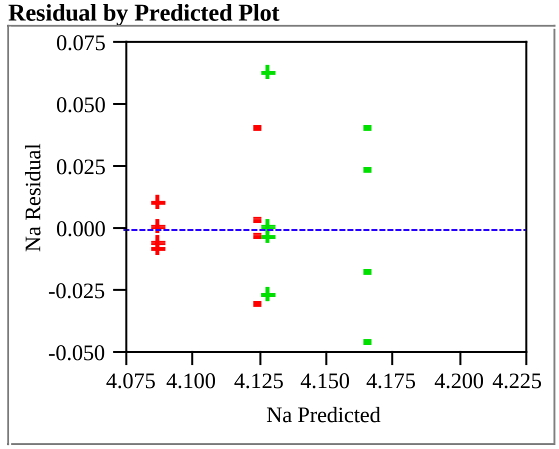
Response Na

**LIMS Numbers Removed From this Analysis:
300166376, 300166386, and 300166390.**

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.494149
RSquare Adj	0.421884
Root Mean Square Error	0.030177
Mean of Response	4.125929
Observations (or Sum Wgts)	17

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.01245458	0.006227	6.8381
Error	14	0.01274954	0.000911	**Prob > F**
C. Total	16	0.02520412		0.0085

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00002056	0.000021	0.0210
Pure Error	13	0.01272897	0.000979	**Prob > F**
Total Error	14	0.01274954		0.8870
				Max RSq
				0.4950

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	4.1258257	0.007343	561.86	<.0001
Sample Type[32]	-0.020588	0.007343	-2.80	0.0141
Calibration[1]	0.0188243	0.007343	2.56	0.0225

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00715873	7.8609	0.0141
Calibration	1	1	0.00598468	6.5716	0.0225

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	4.1052375	0.01066936	4.10524
60	4.1464138	0.01009220	4.14432

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.030177	0.10366	17	1.0000

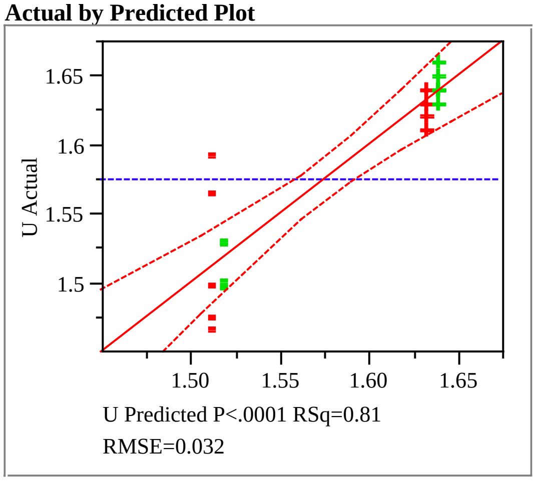
Appendix *(continued)*

Exhibit A5. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

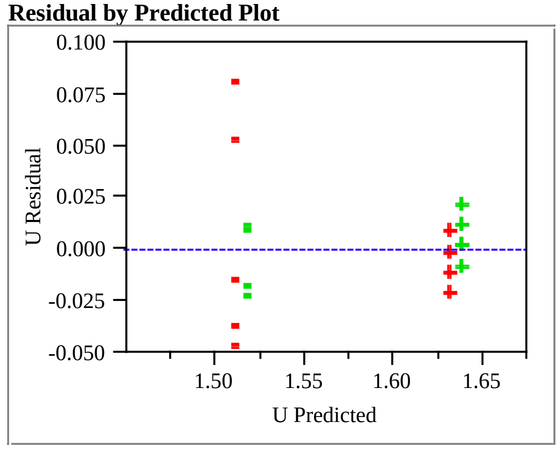
Response U

LIMS Numbers Removed From this Analysis: 300166386 and 300166390.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.811815
RSquare Adj	0.786723
Root Mean Square Error	0.03197
Mean of Response	1.575039
Observations (or Sum Wgts)	18

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.06613889	0.033069	32.3543
Error	15	0.01533155	0.001022	**Prob > F**
C. Total	17	0.08147044		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00063947	0.000639	0.6093
Pure Error	14	0.01469208	0.001049	**Prob > F**
Total Error	15	0.01533155		0.4480
				Max RSq
				0.8197

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.5750389	0.007535	209.02	<.0001
Sample Type[32]	-0.003502	0.007582	-0.46	0.6508
Calibration[1]	-0.060128	0.007582	-7.93	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00021809	0.2134	0.6508
Calibration	1	1	0.06427229	62.8824	<.0001

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	1.5715364	0.01069003	1.56486
60	1.5785414	0.01069003	1.58522

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.03197	0.039463	18	0.9982

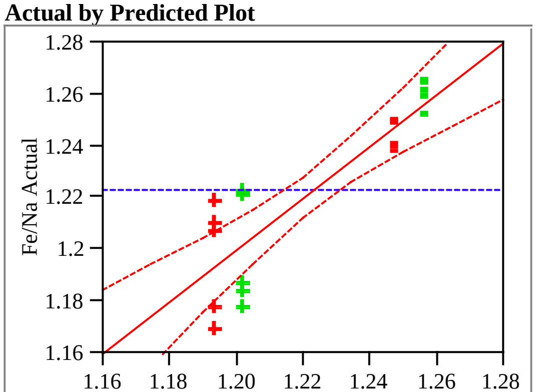
Appendix *(continued)*

Exhibit A5. Statistical Analyses of the Elemental Concentrations as Wet Weight Percents (wt%'s) of Slurry with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

Response Fe/Na

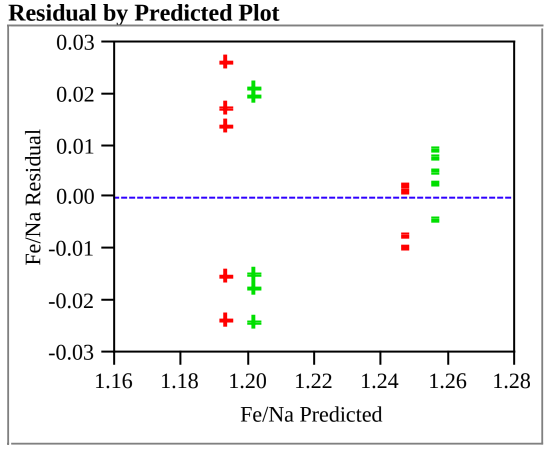
LIMS Number Removed From this Analysis: 300166385.

Actual by Predicted Plot



Fe/Na Predicted P<.0001 RSq=0.77
RMSE=0.0163

Residual by Predicted Plot



Summary of Fit

RSquare	0.774929
RSquare Adj	0.746795
Root Mean Square Error	0.016289
Mean of Response	1.223317
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.01461588	0.007308	27.5444
Error	16	0.00424505	0.000265	**Prob > F**
C. Total	18	0.01886093		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00023971	0.000240	0.8977
Pure Error	15	0.00400534	0.000267	**Prob > F**
Total Error	16	0.00424505		0.3584
				Max RSq
				0.7876

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.2245226	0.003748	326.73	<.0001
Sample Type[32]	-0.004297	0.003748	-1.15	0.2684
Calibration[1]	0.0272018	0.003748	7.26	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00034881	1.3147	0.2684
Calibration	1	1	0.01397664	52.6793	<.0001

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	1.2202254	0.00544545	1.21720
60	1.2288198	0.00515088	1.22882

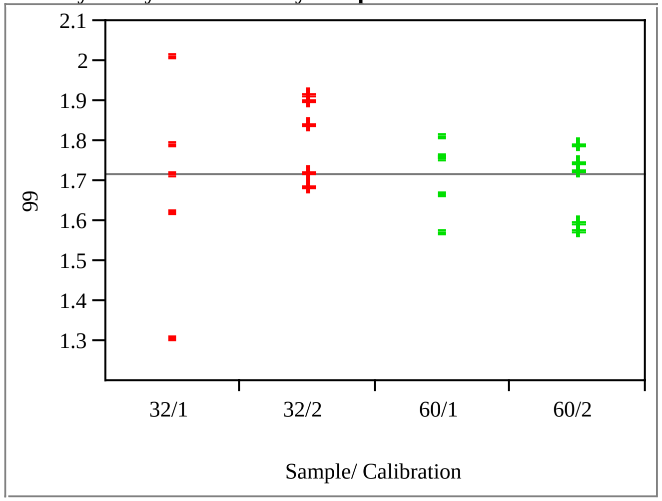
Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.016289	0.030721	19	1.0000

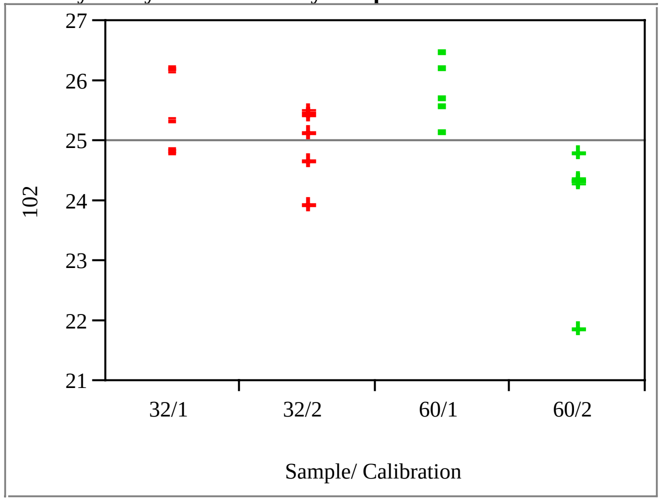
Appendix *(continued)*

Exhibit A6. Plots of the Selected Fission Product and Actinide Concentrations (as micrograms per gram of slurry) by Mass Number Versus Type of Composite and ICP Calibration Block

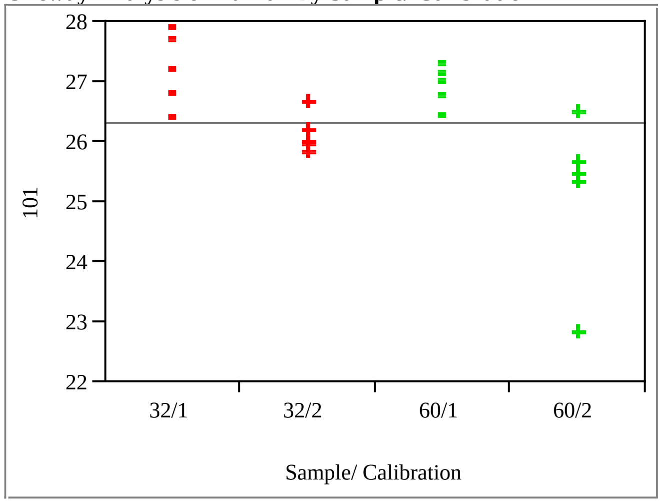
Oneway Analysis of Tc-99 By Sample/ Calibration



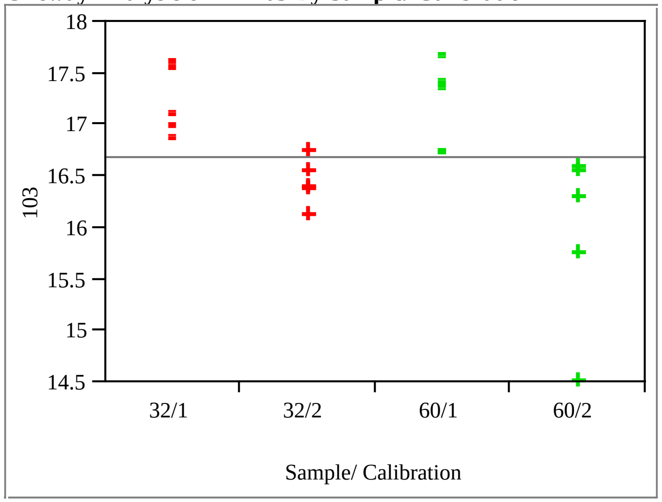
Oneway Analysis of Ru-102 By Sample/ Calibration



Oneway Analysis of Ru-101 By Sample/ Calibration



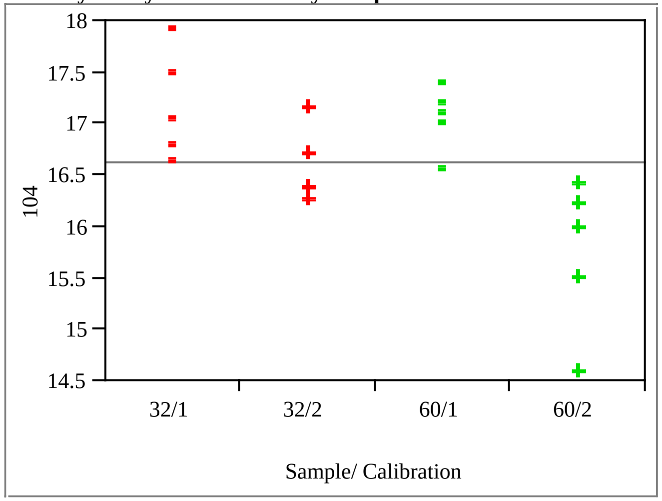
Oneway Analysis of Rh-103 By Sample/ Calibration



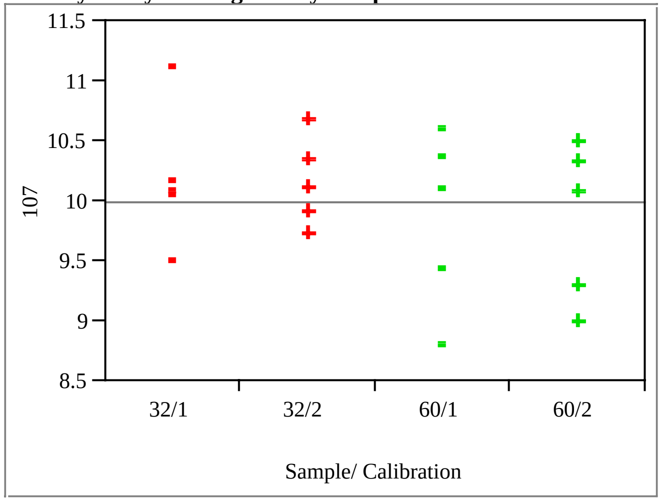
Appendix *(continued)*

Exhibit A6. Plots of the Selected Fission Product and Actinide Concentrations (as micrograms per gram of slurry) by Mass Number Versus Type of Composite and ICP Calibration Block *(continued)*

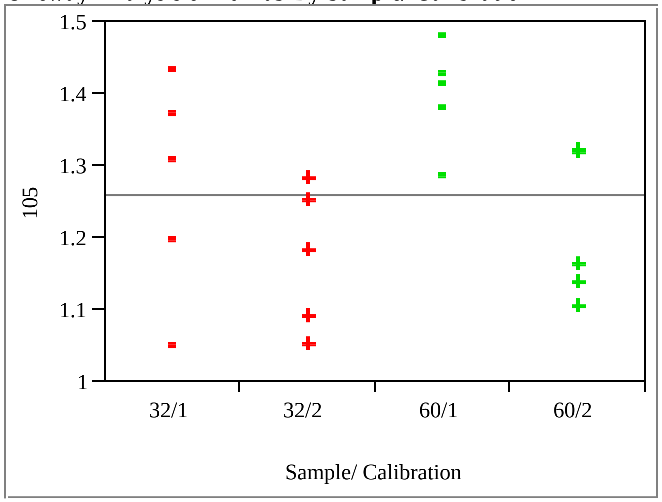
Oneway Analysis of Ru-104 By Sample/ Calibration



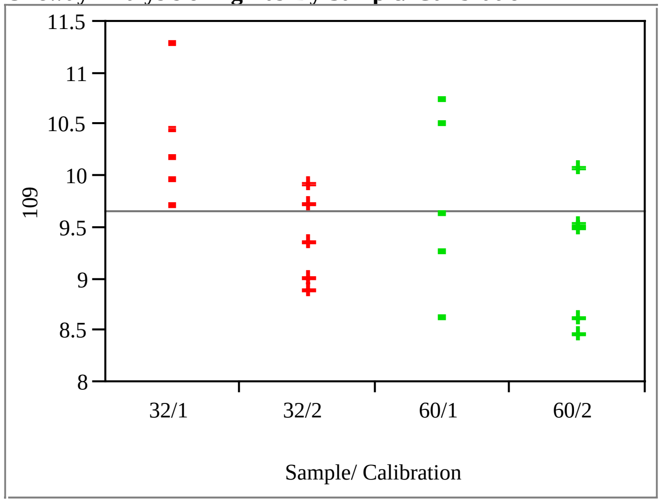
Oneway Analysis of Ag-107 By Sample/ Calibration



Oneway Analysis of Pd-105 By Sample/ Calibration



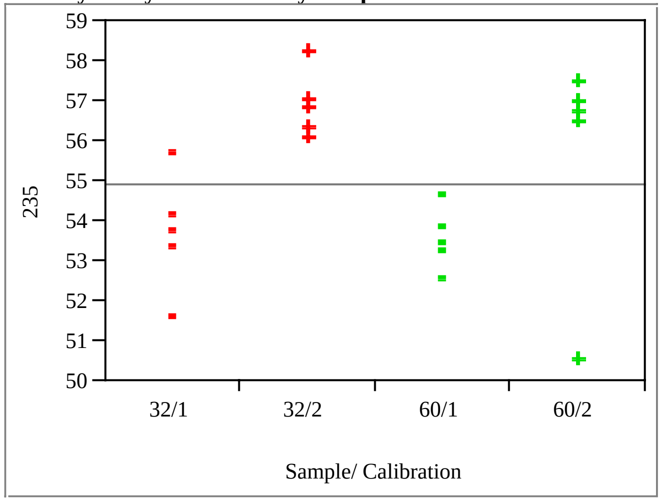
Oneway Analysis of Ag-109 By Sample/ Calibration



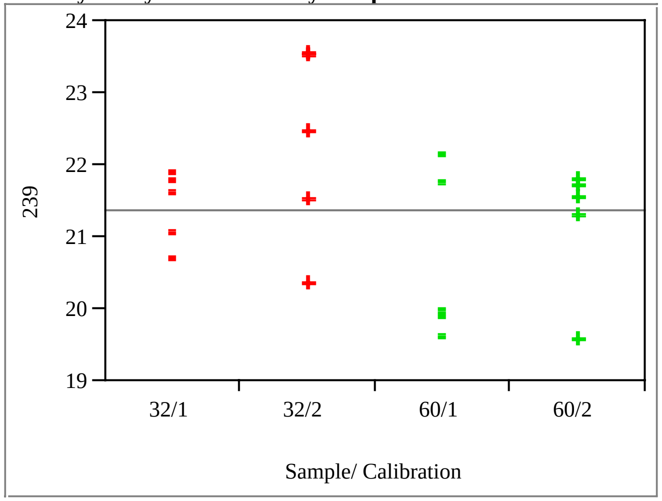
Appendix *(continued)*

Exhibit A6. Plots of the Selected Fission Product and Actinide Concentrations (as micrograms per gram of slurry) by Mass Number Versus Type of Composite and ICP Calibration Block *(continued)*

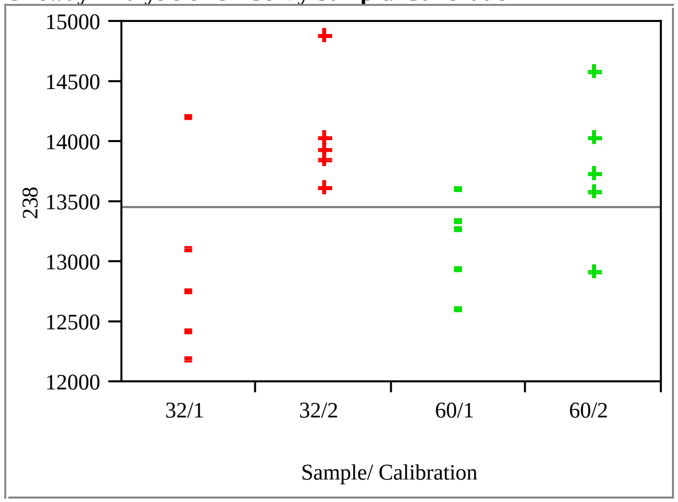
Oneway Analysis of U-235 By Sample/ Calibration



Oneway Analysis of Pu-239 By Sample/ Calibration



Oneway Analysis of U-238 By Sample/ Calibration



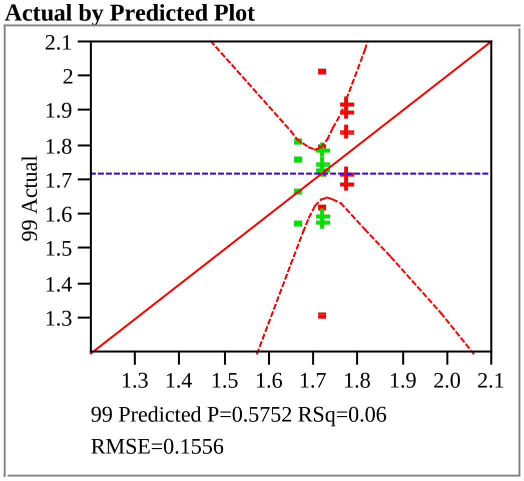
Appendix *(continued)*

Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block

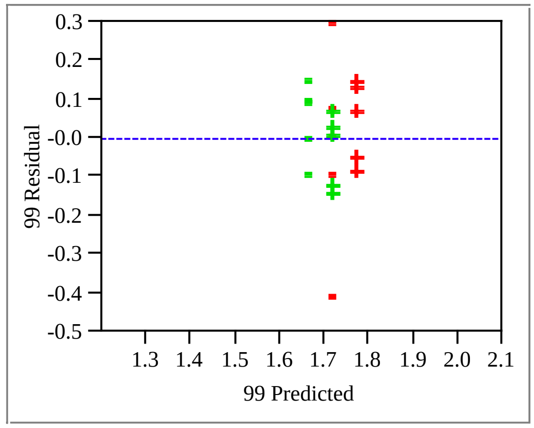
Response Tc-99

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.062987
RSquare Adj	-0.04725
Root Mean Square Error	0.155614
Mean of Response	1.719386
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.02767285	0.013836	0.5714
Error	17	0.41166808	0.024216	**Prob > F**
C. Total	19	0.43934093		0.5752

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.02777639	0.027776	1.1577
Pure Error	16	0.38389169	0.023993	**Prob > F**
Total Error	17	0.41166808		0.2979
				Max RSq
				0.1262

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.7193856	0.034796	49.41	<.0001
Composite Type[32]	0.0254909	0.034796	0.73	0.4738
Calibration[1]	-0.02709	0.034796	-0.78	0.4470

Effect Tests

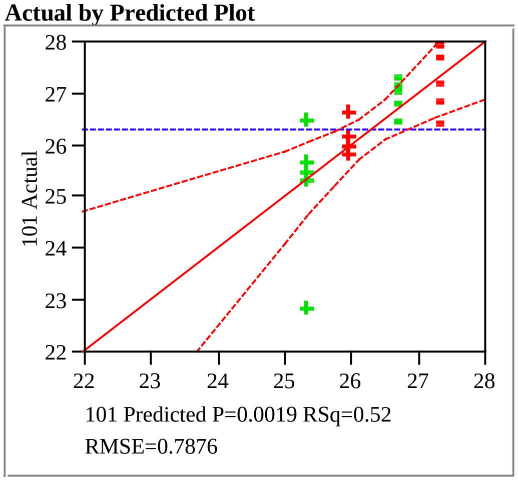
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.01299577	0.5367	0.4738
Calibration	1	1	0.01467708	0.6061	0.4470

Appendix *(continued)*

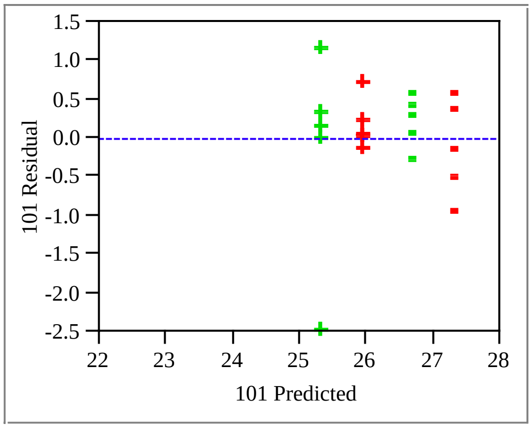
Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block

(continued)

Response Ru-101
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.521988
RSquare Adj	0.465752
Root Mean Square Error	0.787553
Mean of Response	26.322
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	11.514126	5.75706	9.2820
Error	17	10.544078	0.62024	**Prob > F**
C. Total	19	22.058204		0.0019

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.603295	0.603295	0.9710
Pure Error	16	9.940783	0.621299	**Prob > F**
Total Error	17	10.544078		0.3391
				Max RSq
				0.5493

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	26.322003	0.176102	149.47	<.0001
Composite Type[32]	0.3067776	0.176102	1.74	0.0996
Calibration[1]	0.6939696	0.176102	3.94	0.0011

Effect Tests

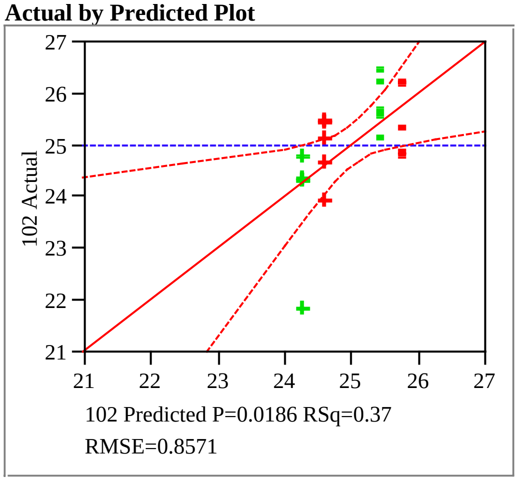
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	1.8822504	3.0347	0.0996
Calibration	1	1	9.6318752	15.5293	0.0011

Appendix *(continued)*

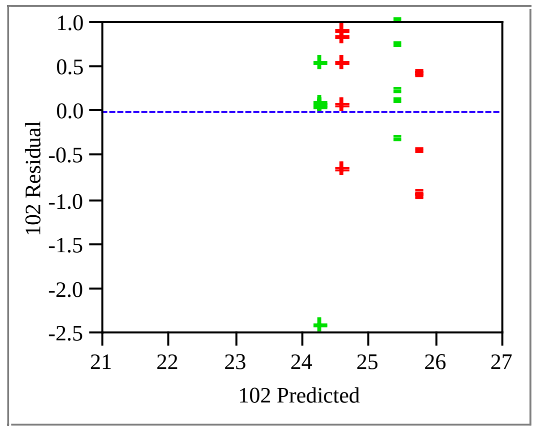
Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block

(continued)

Response Ru-102
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.374058
RSquare Adj	0.300417
Root Mean Square Error	0.857065
Mean of Response	25.00461
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	7.462434	3.73122	5.0795
Error	17	12.487529	0.73456	**Prob > F**
C. Total	19	19.949963		0.0186

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	2.217246	2.21725	3.4542
Pure Error	16	10.270283	0.64189	**Prob > F**
Total Error	17	12.487529		0.0816
				Max RSq
				0.4852

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	25.004611	0.191646	130.47	<.0001
Composite Type[32]	0.1649316	0.191646	0.86	0.4014
Calibration[1]	0.588149	0.191646	3.07	0.0070

Effect Tests

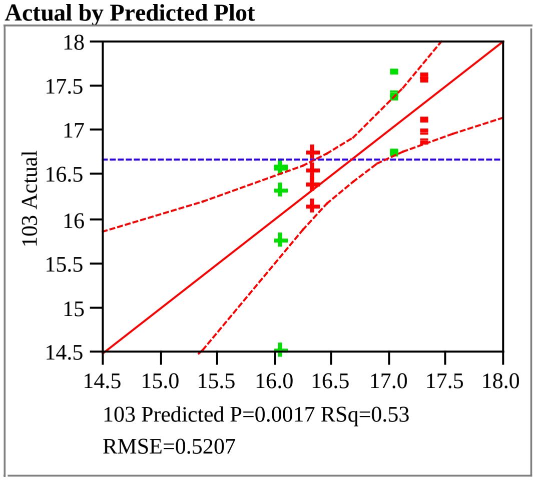
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.5440485	0.7406	0.4014
Calibration	1	1	6.9183859	9.4184	0.0070

Appendix *(continued)*

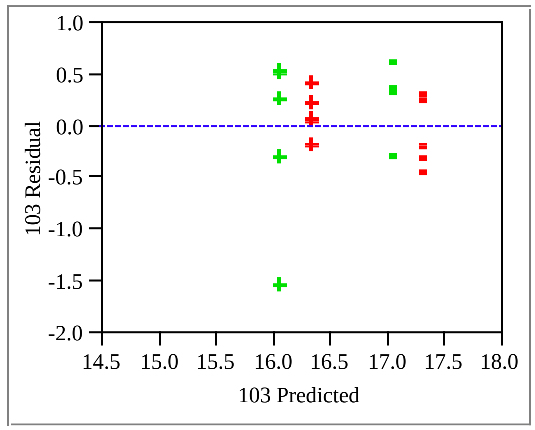
Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block

(continued)

Response Rh-103
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.529348
RSquare Adj	0.473977
Root Mean Square Error	0.520707
Mean of Response	16.68221
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	5.1841281	2.59206	9.5600
Error	17	4.6093022	0.27114	**Prob > F**
C. Total	19	9.7934303		0.0017

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.2540878	0.254088	0.9335
Pure Error	16	4.3552144	0.272201	**Prob > F**
Total Error	17	4.6093022		0.3483
				Max RSq
				0.5553

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	16.682213	0.116434	143.28	<.0001
Composite Type[32]	0.1349485	0.116434	1.16	0.2625
Calibration[1]	0.4909127	0.116434	4.22	0.0006

Effect Tests

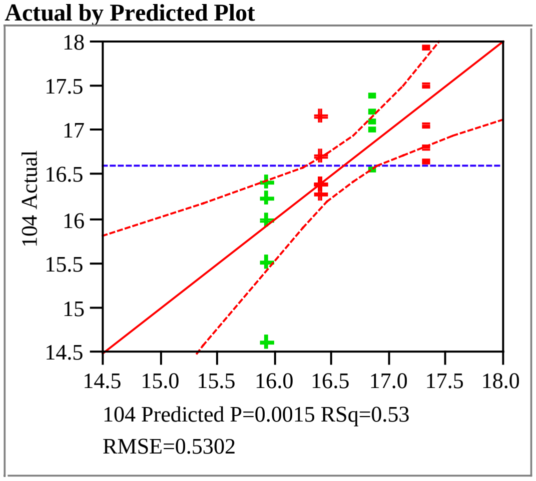
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.3642218	1.3433	0.2625
Calibration	1	1	4.8199063	17.7767	0.0006

Appendix *(continued)*

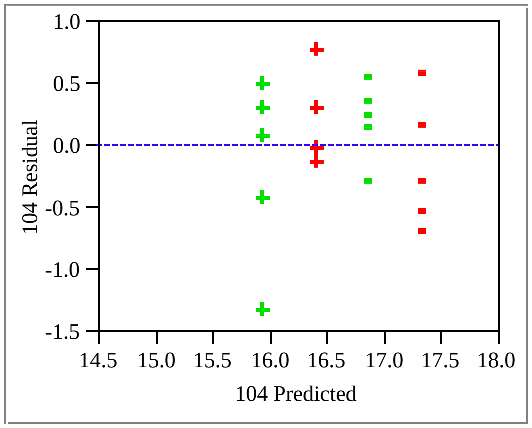
Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block

(continued)

Response Ru-104
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.534005
RSquare Adj	0.479182
Root Mean Square Error	0.5302
Mean of Response	16.62251
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	5.476375	2.73819	9.7405
Error	17	4.778911	0.28111	**Prob > F**
C. Total	19	10.255286		0.0015

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.6331798	0.633180	2.4437
Pure Error	16	4.1457315	0.259108	**Prob > F**
Total Error	17	4.7789113		0.1376
				Max RSq
				0.5957

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	16.622508	0.118556	140.21	<.0001
Composite Type[32]	0.2398455	0.118556	2.02	0.0591
Calibration[1]	0.465073	0.118556	3.92	0.0011

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	1.1505172	4.0927	0.0591
Calibration	1	1	4.3258578	15.3884	0.0011

Appendix *(continued)*

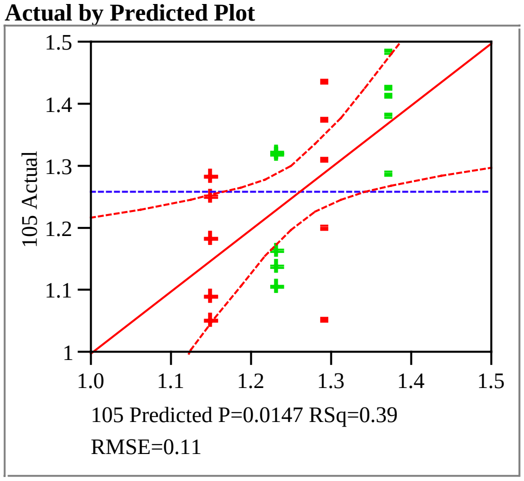
Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block

(continued)

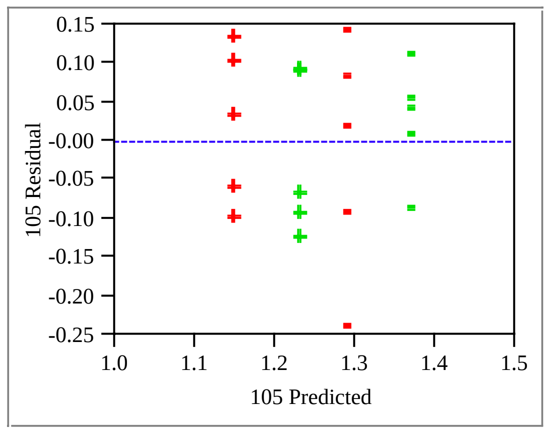
Response Pd-105

Whole Model

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.391163
RSquare Adj	0.319535
Root Mean Square Error	0.10999
Mean of Response	1.260321
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.13213426	0.066067	5.4610
Error	17	0.20566438	0.012098	**Prob > F**
C. Total	19	0.33779864		0.0147

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00952905	0.009529	0.7773
Pure Error	16	0.19613533	0.012258	**Prob > F**
Total Error	17	0.20566438		0.3910
				Max RSq
				0.4194

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.2603207	0.024595	51.24	<.0001
Composite Type[32]	-0.04055	0.024595	-1.65	0.1176
Calibration[1]	0.0704446	0.024595	2.86	0.0107

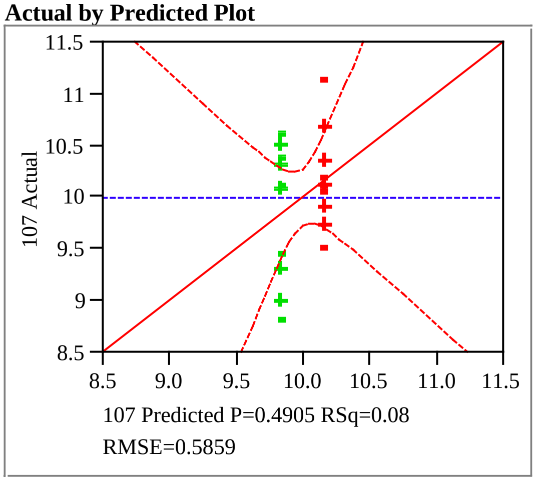
Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.03288556	2.7183	0.1176
Calibration	1	1	0.09924870	8.2038	0.0107

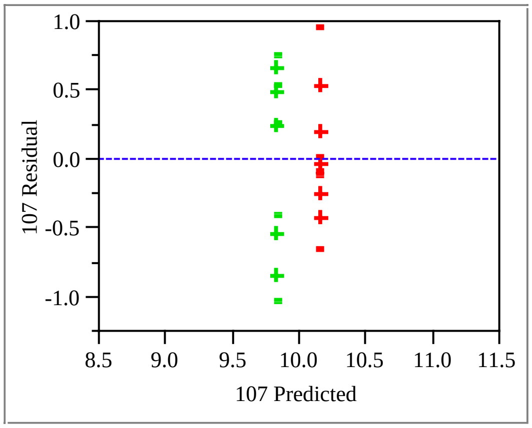
Appendix *(continued)*

Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block
(continued)

Response Ag-107
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit
R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.080398
RSquare Adj	-0.02779
Root Mean Square Error	0.585948
Mean of Response	9.996063
Observations (or Sum Wgts)	20

Analysis of Variance
The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.5102851	0.255143	0.7431
Error	17	5.8367019	0.343335	**Prob > F**
C. Total	19	6.3469869		0.4905

Lack Of Fit
Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.0000003	0.000000	0.0000
Pure Error	16	5.8367016	0.364794	**Prob > F**
Total Error	17	5.8367019		0.9993
				Max RSq
				0.0804

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	9.996063	0.131022	76.29	<.0001
Composite Type[32]	0.1597058	0.131022	1.22	0.2395
Calibration[1]	0.002884	0.131022	0.02	0.9827

Effect Tests

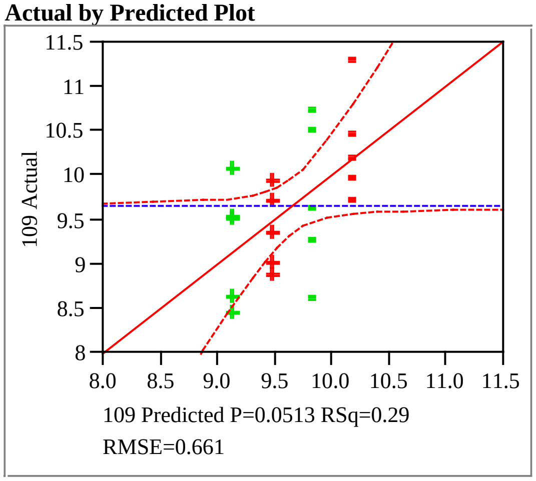
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.51011871	1.4858	0.2395
Calibration	1	1	0.00016634	0.0005	0.9827

Appendix *(continued)*

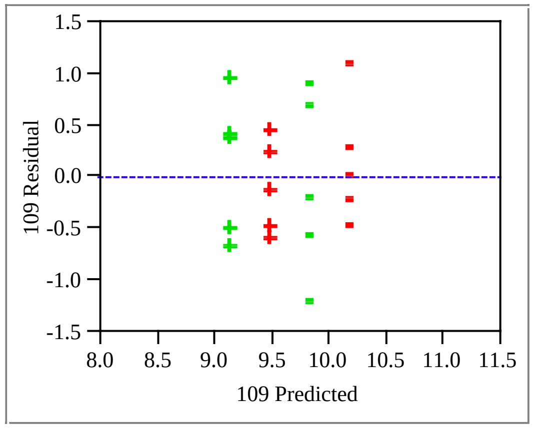
Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block

(continued)

Response Ag-109
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.294982
RSquare Adj	0.212039
Root Mean Square Error	0.661038
Mean of Response	9.653543
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	3.108120	1.55406	3.5564
Error	17	7.428517	0.43697	**Prob > F**
C. Total	19	10.536637		0.0513

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.2320722	0.232072	0.5160
Pure Error	16	7.1964448	0.449778	**Prob > F**
Total Error	17	7.4285170		0.4829
				Max RSq
				0.3170

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	9.653543	0.147813	65.31	<.0001
Composite Type[32]	0.1780016	0.147813	1.20	0.2450
Calibration[1]	0.3517406	0.147813	2.38	0.0293

Effect Tests

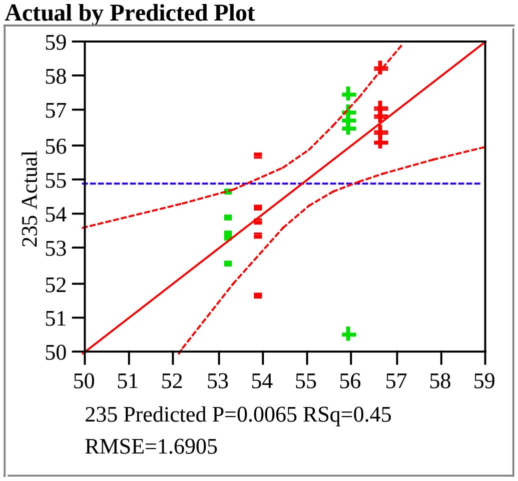
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.6336917	1.4502	0.2450
Calibration	1	1	2.4744283	5.6627	0.0293

Appendix *(continued)*

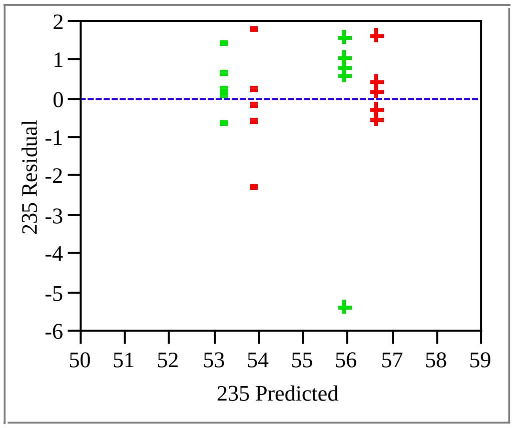
Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block

(continued)

Response U-235
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.446681
RSquare Adj	0.381584
Root Mean Square Error	1.690543
Mean of Response	54.90922
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	39.221359	19.6107	6.8618
Error	17	48.584898	2.8579	**Prob > F**
C. Total	19	87.806257		0.0065

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	1.542866	1.54287	0.5248
Pure Error	16	47.042031	2.94013	**Prob > F**
Total Error	17	48.584898		0.4793
				Max RSq
				0.4643

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	54.909219	0.378017	145.26	<.0001
Composite Type[32]	0.3554784	0.378017	0.94	0.3602
Calibration[1]	-1.354512	0.378017	-3.58	0.0023

Effect Tests

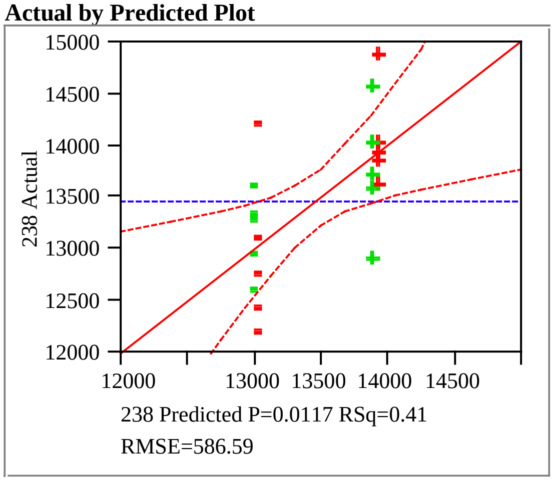
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	2.527298	0.8843	0.3602
Calibration	1	1	36.694061	12.8394	0.0023

Appendix *(continued)*

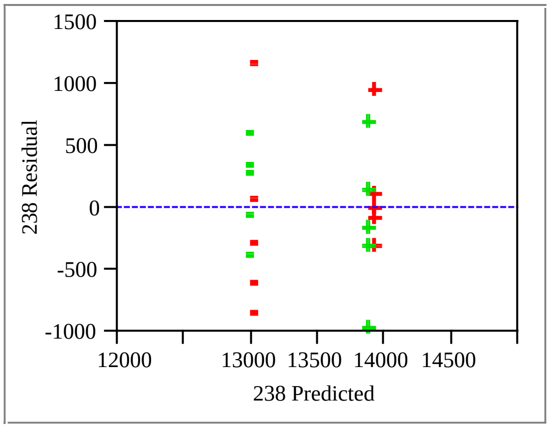
Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block

(continued)

Response U-238
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.407651
RSquare Adj	0.337963
Root Mean Square Error	586.5918
Mean of Response	13459.74
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	4025612.3	2012806	5.8497
Error	17	5849529.8	344090	**Prob > F**
C. Total	19	9875142.0		0.0117

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	332474.3	332474	0.9642
Pure Error	16	5517055.4	344816	**Prob > F**
Total Error	17	5849529.8		0.3407
				Max RSq
				0.4413

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	13459.736	131.1659	102.62	<.0001
Composite Type[32]	20.042057	131.1659	0.15	0.8804
Calibration[1]	-448.1952	131.1659	-3.42	0.0033

Effect Tests

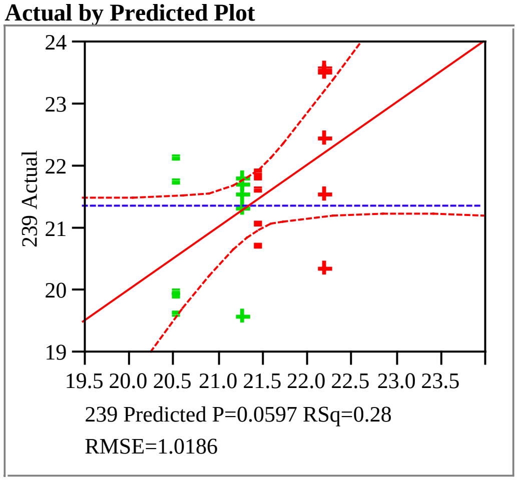
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	8033.7	0.0233	0.8804
Calibration	1	1	4017578.6	11.6760	0.0033

Appendix *(continued)*

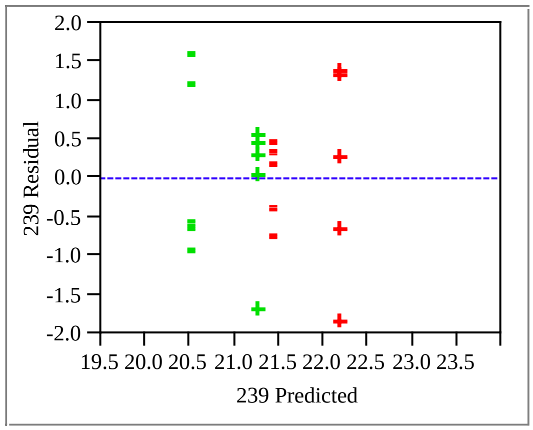
Exhibit A7. Statistical Analyses of Selected Fission Product and Actinide Concentrations as Micrograms per Gram of Slurry by Type of Composite and ICP Calibration Block

(continued)

Response Pu-239
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.282155
RSquare Adj	0.197702
Root Mean Square Error	1.018567
Mean of Response	21.36172
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	6.932416	3.46621	3.3410
Error	17	17.637154	1.03748	**Prob > F**
C. Total	19	24.569571		0.0597

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.147923	0.14792	0.1353
Pure Error	16	17.489231	1.09308	**Prob > F**
Total Error	17	17.637154		0.7178
				Max RSq
				0.2882

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	21.361715	0.227759	93.79	<.0001
Composite Type[32]	0.4597447	0.227759	2.02	0.0596
Calibration[1]	-0.367771	0.227759	-1.61	0.1248

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	4.2273031	4.0746	0.0596
Calibration	1	1	2.7051132	2.6074	0.1248

Appendix *(continued)*

Exhibit A8. Sensitivity of Statistical Analyses of the Concentrations (in micrograms per gram of slurry) by Mass Number to 5% Differences Due to Type of Composite

Response Tc-99

Level	Least Sq Mean	Std Error	Mean
32	1.7448765	0.04920952	1.74488
60	1.6938946	0.04920952	1.69389

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.155614	0.042347	20	0.2096

Response Ru-101

Level	Least Sq Mean	Std Error	Mean
32	26.628781	0.24904616	26.6288
60	26.015226	0.24904616	26.0152

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.787553	0.575381	20	0.8682

Response Ru-102

Level	Least Sq Mean	Std Error	Mean
32	25.169542	0.27102777	25.1695
60	24.839679	0.27102777	24.8397

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.857065	620992	20	0.0500

Response Rh-103

Level	Least Sq Mean	Std Error	Mean
32	16.817161	0.16466190	16.8172
60	16.547264	0.16466190	16.5473

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.520707	0.004117	20	0.0501

Response Ru-104

Level	Least Sq Mean	Std Error	Mean
32	16.862353	0.16766408	16.8624
60	16.382662	0.16766408	16.3827

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.5302	0.409567	20	0.9021

Response Pd-105

Level	Least Sq Mean	Std Error	Mean
32	1.2197710	0.03478204	1.21977
60	1.3008704	0.03478204	1.30087

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.10999	0.032522	20	0.2390

Response Ag-107

Level	Least Sq Mean	Std Error	Mean
32	10.155769	0.18529312	10.1558
60	9.836357	0.18529312	9.8364

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.585948	0.245909	20	0.4251

Response Ag-109

Level	Least Sq Mean	Std Error	Mean
32	9.8315446	0.20903865	9.83154
60	9.4755413	0.20903865	9.47554

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.661038	0.236889	20	0.3275

Response U-235

Level	Least Sq Mean	Std Error	Mean
32	55.264698	0.53459659	55.2647
60	54.553741	0.53459659	54.5537

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	1.690543	1.363844	20	0.9247

Response U-238

Level	Least Sq Mean	Std Error	Mean
32	13479.778	185.49663	13479.8
60	13439.694	185.49663	13439.7

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	586.5918	335.9923	20	0.6755

Response Pu-239

Level	Least Sq Mean	Std Error	Mean
32	21.821460	0.32209931	21.8215
60	20.901971	0.32209931	20.9020

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	1.018567	0.522549	20	0.5807

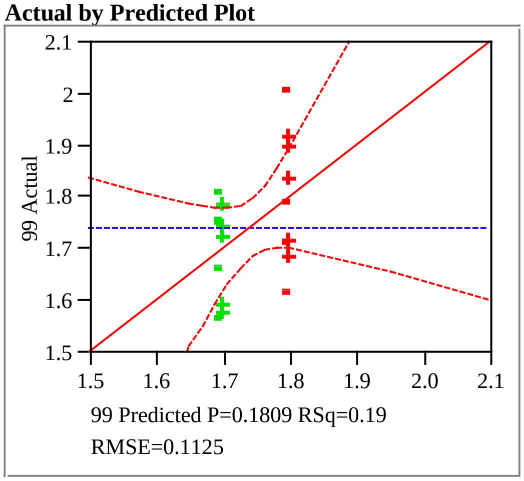
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

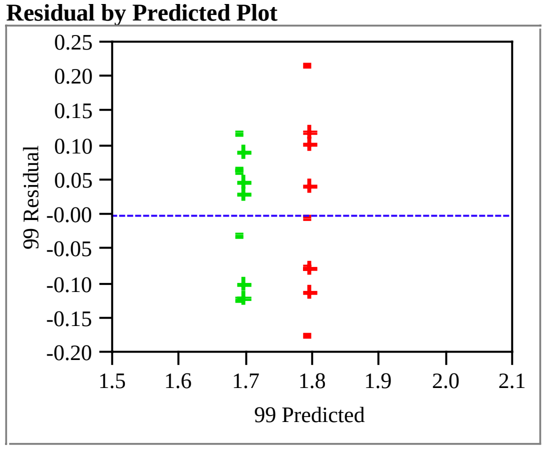
Response Tc-99

LIMS Number Removed From this Analysis: 300166377.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.192426
RSquare Adj	0.091479
Root Mean Square Error	0.112514
Mean of Response	1.741659
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.04826334	0.024132	1.9062
Error	16	0.20255176	0.012659	**Prob > F**
C. Total	18	0.25081510		0.1809

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00330265	0.003303	0.2486
Pure Error	15	0.19924911	0.013283	**Prob > F**
Total Error	16	0.20255176		0.6253
				Max RSq
				0.2056

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.7441857	0.025888	67.37	<.0001
Composite Type[32]	0.0502911	0.025888	1.94	0.0699
Calibration[1]	-0.00229	0.025888	-0.09	0.9306

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.04777370	3.7737	0.0699
Calibration	1	1	0.00009902	0.0078	0.9306

Composite Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	1.7944768	0.03761494	1.79473
60	1.6938946	0.03558017	1.69389

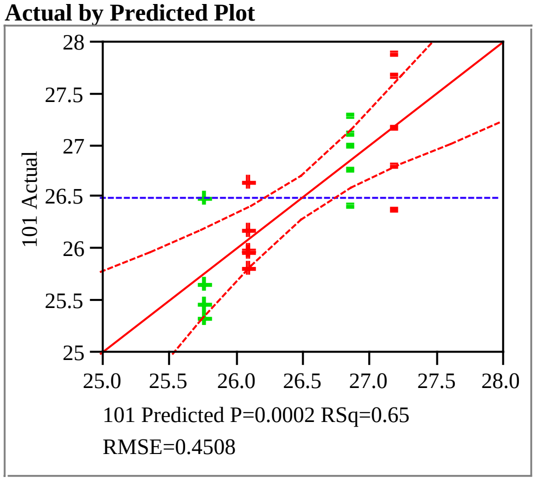
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

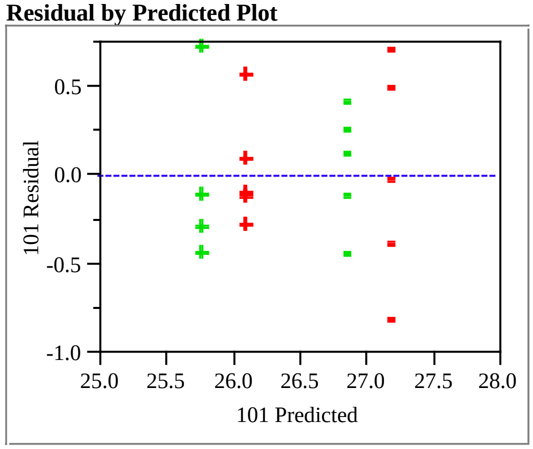
Response Ru-101

LIMS Number Removed From this Analysis: 300166395.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.647865
RSquare Adj	0.603849
Root Mean Square Error	0.450796
Mean of Response	26.50571
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	5.9821255	2.99106	14.7186
Error	16	3.2514671	0.20322	**Prob > F**
C. Total	18	9.2335926		0.0002

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.0157514	0.015751	0.0730
Pure Error	15	3.2357156	0.215714	**Prob > F**
Total Error	16	3.2514671		0.7907
				Max RSq
				0.6496

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	26.468458	0.103723	255.18	<.0001
Composite Type[32]	0.1603234	0.103723	1.55	0.1417
Calibration[1]	0.5475153	0.103723	5.28	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.4855120	2.3891	0.1417
Calibration	1	1	5.6623787	27.8637	<.0001

Composite Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	26.628781	0.14255409	26.6288
60	26.308134	0.15070652	26.3690

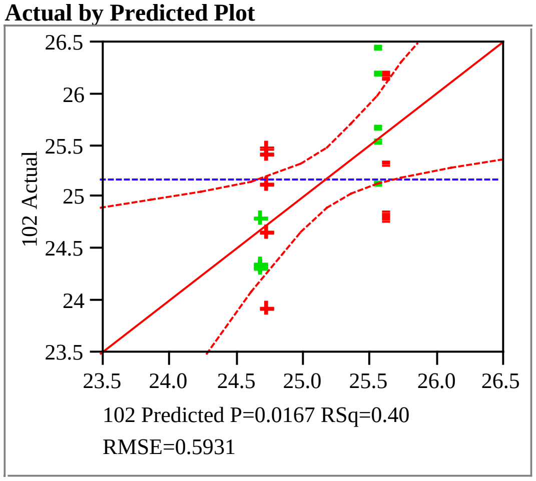
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

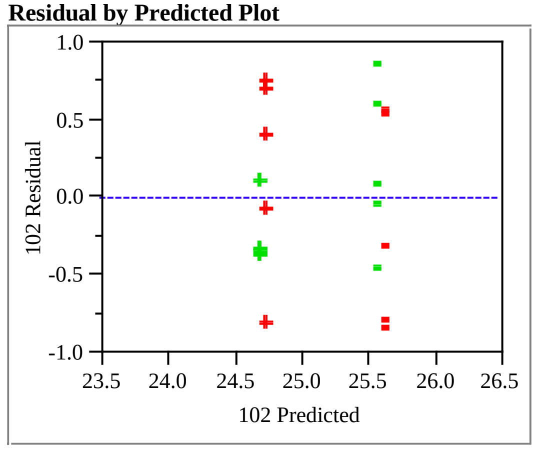
Response Ru-102

LIMS Number Removed From this Analysis: 300166395.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.400465
RSquare Adj	0.325523
Root Mean Square Error	0.59308
Mean of Response	25.17134
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	3.7592063	1.87960	5.3437
Error	16	5.6278991	0.35174	**Prob > F**
C. Total	18	9.3871054		0.0167

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.7745708	0.774571	2.3939
Pure Error	15	4.8533283	0.323555	**Prob > F**
Total Error	16	5.6278991		0.1426
				Max RSq
				0.4830

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	25.146651	0.136461	184.28	<.0001
Composite Type[32]	0.0228915	0.136461	0.17	0.8689
Calibration[1]	0.446109	0.136461	3.27	0.0048

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.0098982	0.0281	0.8689
Calibration	1	1	3.7591385	10.6872	0.0048

Composite Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	25.169542	0.18754831	25.1695
60	25.123759	0.19827388	25.1733

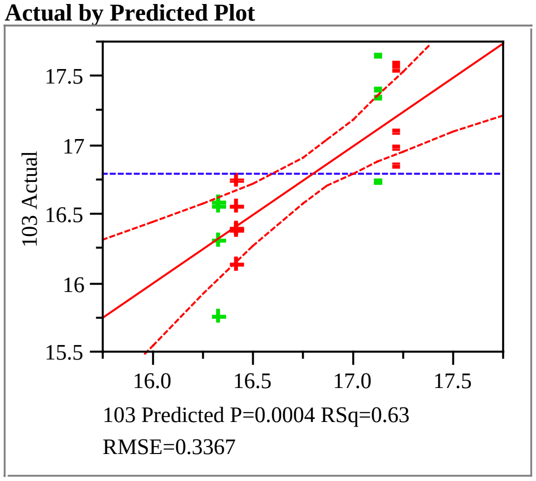
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

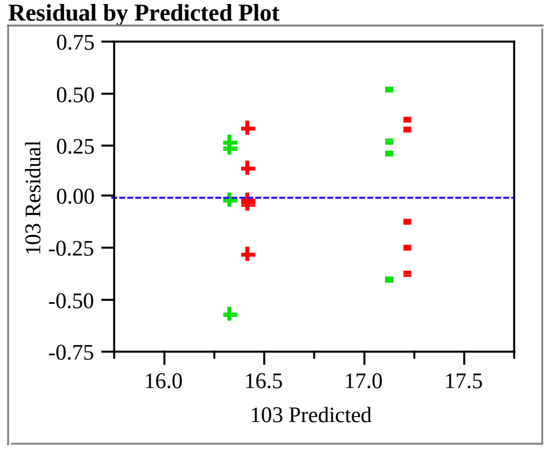
Response Rh-103

LIMS Number Removed From this Analysis: 300166395.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.625906
RSquare Adj	0.579144
Root Mean Square Error	0.336713
Mean of Response	16.79628
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	3.0350625	1.51753	13.3850
Error	16	1.8140096	0.11338	**Prob > F**
C. Total	18	4.8490721		0.0004

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.0103239	0.010324	0.0859
Pure Error	15	1.8036857	0.120246	**Prob > F**
Total Error	16	1.8140096		0.7735
				Max RSq
				0.6280

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	16.772885	0.077474	216.50	<.0001
Composite Type[32]	0.0442763	0.077474	0.57	0.5756
Calibration[1]	0.4002405	0.077474	5.17	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.0370295	0.3266	0.5756
Calibration	1	1	3.0258580	26.6888	<.0001

Composite Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	16.817161	0.10647798	16.8172
60	16.728609	0.11256727	16.7731

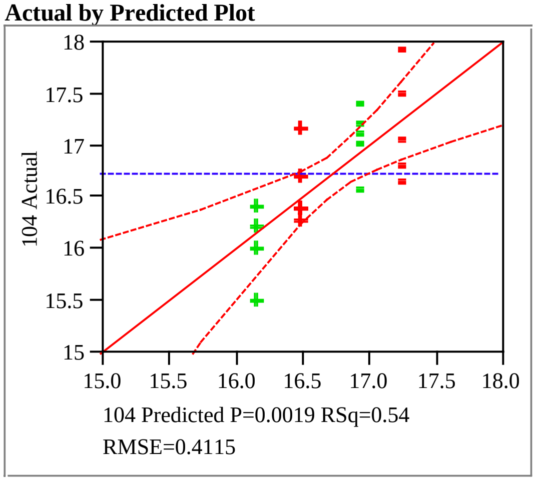
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

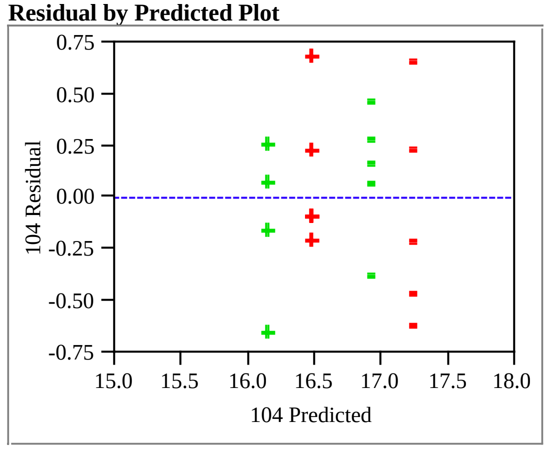
Response Ru-104

LIMS Number Removed From this Analysis: 300166395.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.541771
RSquare Adj	0.484492
Root Mean Square Error	0.41146
Mean of Response	16.72942
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	3.2026425	1.60132	9.4585
Error	16	2.7087938	0.16930	**Prob > F**
C. Total	18	5.9114363		0.0019

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.2120768	0.212077	1.2741
Pure Error	15	2.4967170	0.166448	**Prob > F**
Total Error	16	2.7087938		0.2767
				Max RSq
				0.5776

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	16.700537	0.094673	176.40	<.0001
Composite Type[32]	0.1618161	0.094673	1.71	0.1067
Calibration[1]	0.3870436	0.094673	4.09	0.0009

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.4945954	2.9214	0.1067
Calibration	1	1	2.8296080	16.7136	0.0009

Composite Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	16.862353	0.13011518	16.8624
60	16.538721	0.13755625	16.5817

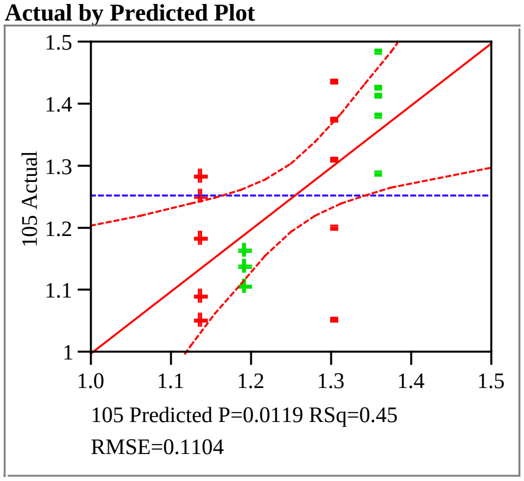
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

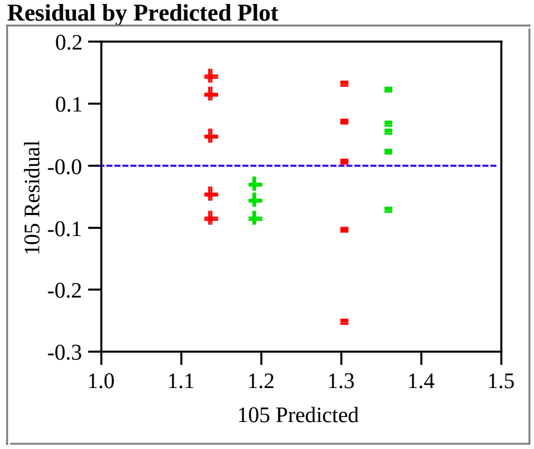
Response Pd-105

**LIMS Numbers Removed From this Analysis:
300166389 and 300166394.**

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.446161
RSquare Adj	0.372316
Root Mean Square Error	0.110359
Mean of Response	1.253679
Observations (or Sum Wgts)	18

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.14716838	0.073584	6.0419
Error	15	0.18268613	0.012179	**Prob > F**
C. Total	17	0.32985451		0.0119

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.02799556	0.027996	2.5337
Pure Error	14	0.15469057	0.011049	**Prob > F**
Total Error	15	0.18268613		0.1338
				Max RSq
				0.5310

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	1.2475103	0.026381	47.29	<.0001
Composite Type[32]	-0.027739	0.026381	-1.05	0.3097
Calibration[1]	0.083255	0.026381	3.16	0.0065

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.01346563	1.1056	0.3097
Calibration	1	1	0.12129949	9.9597	0.0065

Composite Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	1.2197710	0.03489853	1.21977
60	1.2752495	0.03957122	1.29606

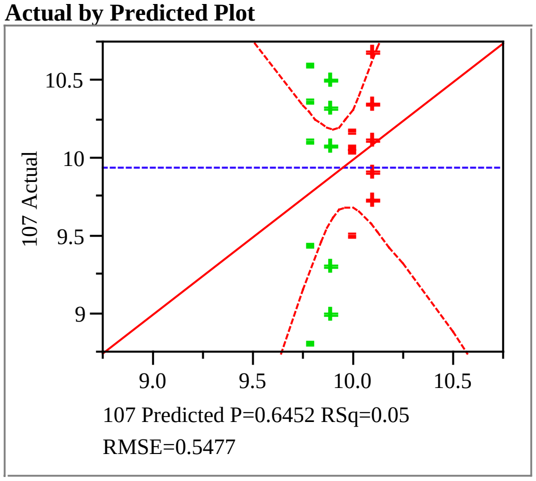
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

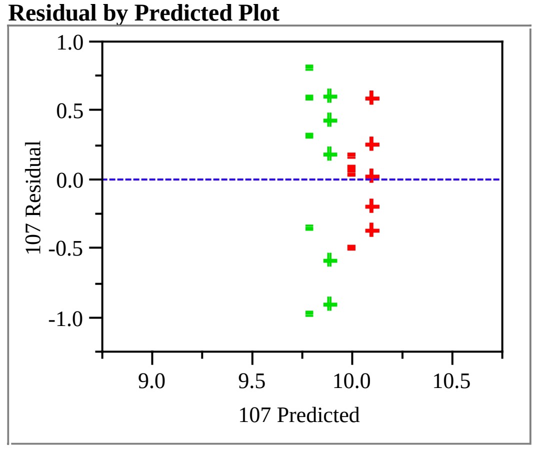
Response Ag-107

LIMS Number Removed From this Analysis: 300166385.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.053305
RSquare Adj	-0.06503
Root Mean Square Error	0.547684
Mean of Response	9.938083
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.2702325	0.135116	0.4505
Error	16	4.7993223	0.299958	**Prob > F**
C. Total	18	5.0695548		0.6452

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.0651035	0.065103	0.2063
Pure Error	15	4.7342188	0.315615	**Prob > F**
Total Error	16	4.7993223		0.6562
				Max RSq
				0.0661

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	9.9408261	0.126016	78.89	<.0001
Composite Type[32]	0.1044689	0.126016	0.83	0.4193
Calibration[1]	-0.052353	0.126016	-0.42	0.6833

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.20614850	0.6873	0.4193
Calibration	1	1	0.05177126	0.1726	0.6833

Composite Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	10.045295	0.18309746	10.0511
60	9.836357	0.17319285	9.8364

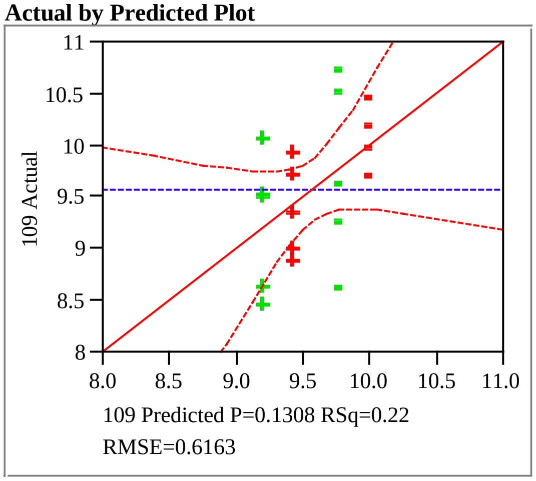
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

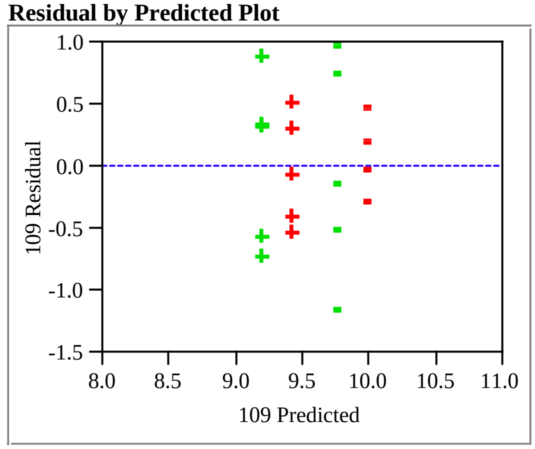
Response Ag-109

LIMS Number Removed From this Analysis: 300166385.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.224544
RSquare Adj	0.127612
Root Mean Square Error	0.616321
Mean of Response	9.569264
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	1.7598605	0.879930	2.3165
Error	16	6.0776271	0.379852	**Prob > F**
C. Total	18	7.8374876		0.1308

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.0424341	0.042434	0.1055
Pure Error	15	6.0351930	0.402346	**Prob > F**
Total Error	16	6.0776271		0.7499
				Max RSq
				0.2300

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	9.5905096	0.141809	67.63	<.0001
Composite Type[32]	0.1149683	0.141809	0.81	0.4294
Calibration[1]	0.2887072	0.141809	2.04	0.0587

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.2496678	0.6573	0.4294
Calibration	1	1	1.5744236	4.1448	0.0587

Composite Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	9.7054779	0.20604372	9.67340
60	9.4755413	0.19489784	9.47554

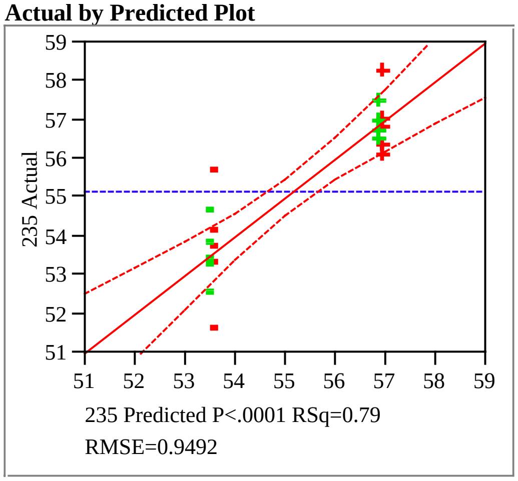
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

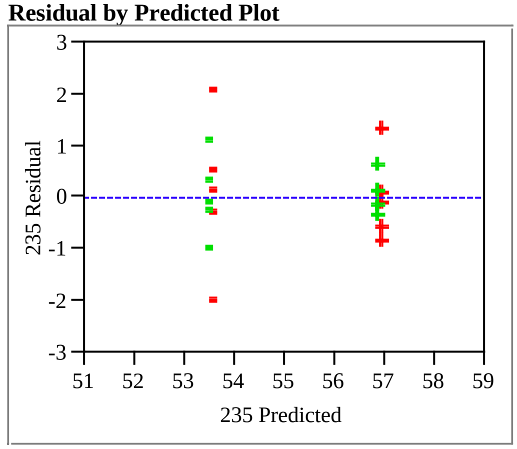
Response U-235

LIMS Number Removed From this Analysis: 300166395.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.786503
RSquare Adj	0.759816
Root Mean Square Error	0.949169
Mean of Response	55.14029
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	53.102560	26.5513	29.4712
Error	16	14.414763	0.9009	**Prob > F**
C. Total	18	67.517323		<.0001

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.032772	0.032772	0.0342
Pure Error	15	14.381991	0.958799	**Prob > F**
Total Error	16	14.414763		0.8558
				Max RSq
				0.7870

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	55.226237	0.218394	252.87	<.0001
Composite Type[32]	0.0384604	0.218394	0.18	0.8624
Calibration[1]	-1.67153	0.218394	-7.65	<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	0.027941	0.0310	0.8624
Calibration	1	1	52.775797	58.5797	<.0001

Composite Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	55.264698	0.30015374	55.2647
60	55.187777	0.31731902	55.0021

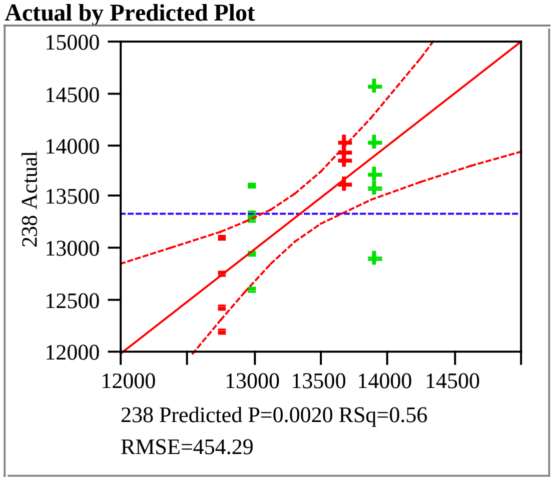
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

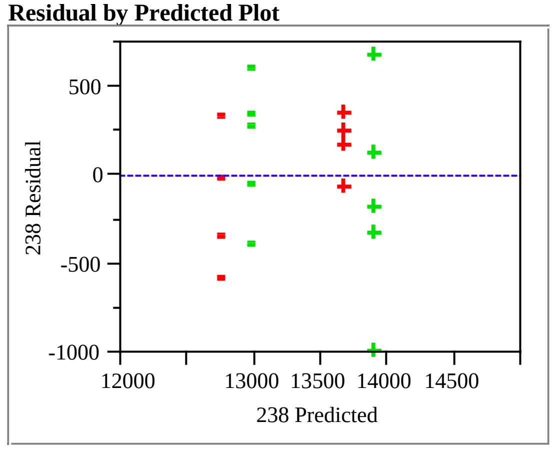
Response U-238

LIMS Numbers Removed From this Analysis: 300166376 and 300166397.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.564071
RSquare Adj	0.505948
Root Mean Square Error	454.2913
Mean of Response	13341.32
Observations (or Sum Wgts)	18

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	4005705.4	2002853	9.7047
Error	15	3095709.0	206381	**Prob > F**
C. Total	17	7101414.3		0.0020

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	437713.6	437714	2.3055
Pure Error	14	2657995.3	189857	**Prob > F**
Total Error	15	3095709.0		0.1512
				Max RSq
				0.6257

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	13329.021	107.7446	123.71	<.0001
Composite Type[32]	-110.6725	107.7446	-1.03	0.3206
Calibration[1]	-458.7396	107.0775	-4.28	0.0007

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	217749.4	1.0551	0.3206
Calibration	1	1	3787955.9	18.3542	0.0007

Composite Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	13218.349	160.61623	13218.3
60	13439.694	143.65953	13439.7

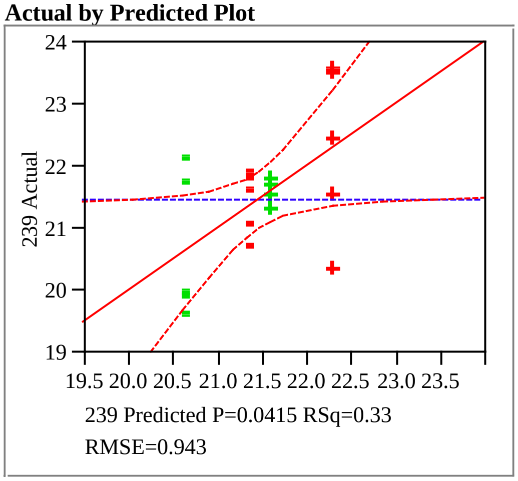
Appendix *(continued)*

Exhibit A9. Statistical Analyses of the Mass Concentrations (micrograms per gram of slurry) with Potential Outliers Removed by Type of Composite and ICP Calibration Block *(continued)*

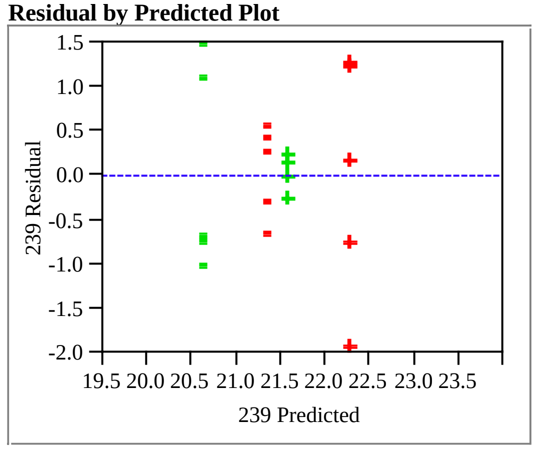
Response Pu-239

LIMS Number Removed From this Analysis: 300166395.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.328264
RSquare Adj	0.244298
Root Mean Square Error	0.942989
Mean of Response	21.45615
Observations (or Sum Wgts)	19

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	6.952780	3.47639	3.9094
Error	16	14.227640	0.88923	**Prob > F**
C. Total	18	21.180420		0.0415

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.004248	0.004248	0.0045
Pure Error	15	14.223392	0.948226	**Prob > F**
Total Error	16	14.227640		0.9475
				Max RSq
				0.3285

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	21.461855	0.216972	98.92	<.0001
Composite Type[32]	0.3596048	0.216972	1.66	0.1169
Calibration[1]	-0.467911	0.216972	-2.16	0.0466

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	2.4426288	2.7469	0.1169
Calibration	1	1	4.1355471	4.6507	0.0466

Composite Type

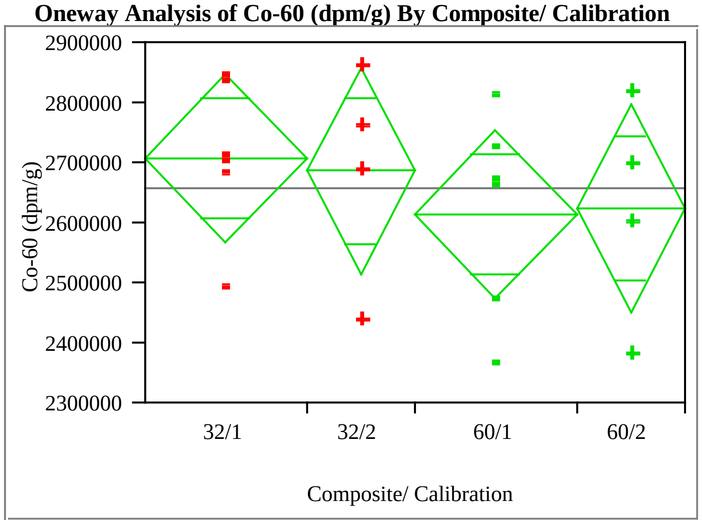
Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	21.821460	0.29819918	21.8215
60	21.102250	0.31525267	21.0503

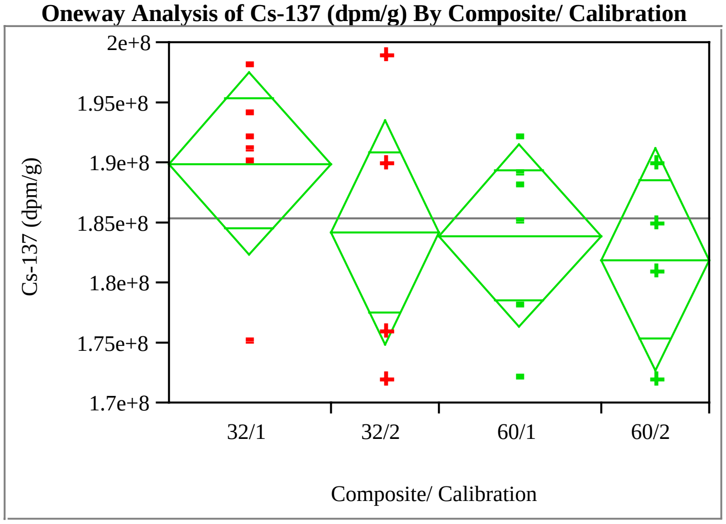
Appendix *(continued)*

Exhibit A10. Plots of the Cobalt and Cesium Radioactivity (dpm per gram of slurry) by Type of Composite and ICP Calibration Block

Oneway Analysis of Co-60 (dpm/g) By Composite/ Calibration



Oneway Analysis of Cs-137 (dpm/g) By Composite/ Calibration

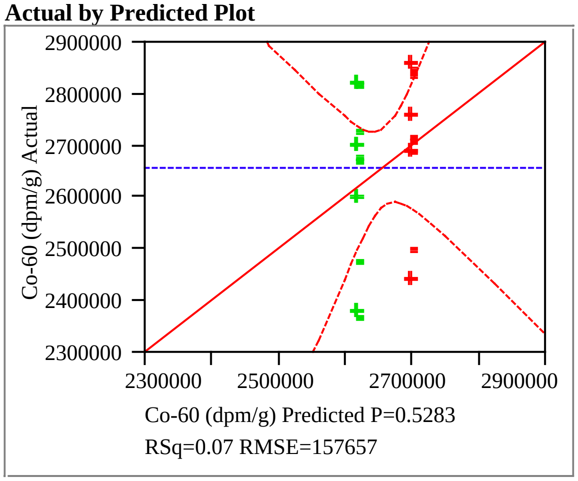


Appendix *(continued)*

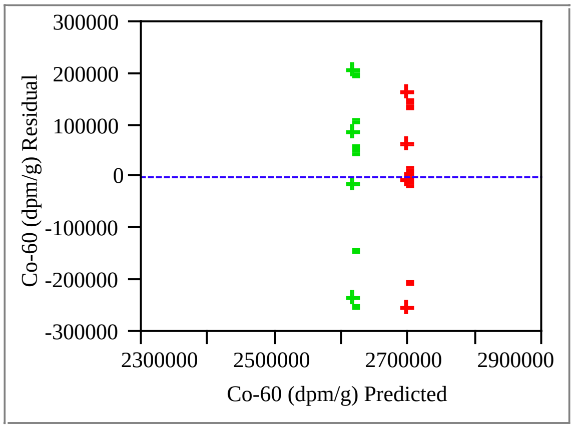
Exhibit A11. Statistical Analyses of the Cobalt and Cesium Radioactivity (dpm per gram of slurry) by Type of Composite and ICP Calibration Block

Response Co-60 (dpm/g)

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.07233
RSquare Adj	-0.03681
Root Mean Square Error	157657.3
Mean of Response	2659500
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	3.29458e10	1.6473e10	0.6627
Error	17	4.22549e11	2.4856e10	**Prob > F**
C. Total	19	4.55495e11		0.5283

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	1140833333	1.14083e9	0.0433
Pure Error	16	4.21408e11	2.6338e10	**Prob > F**
Total Error	17	4.22549e11		0.8378
				Max RSq
				0.0748

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	2658958.3	35980.2	73.90	<.0001
Composite Type[32]	40500	35253.25	1.15	0.2665
Calibration[1]	2708.3333	35980.2	0.08	0.9409

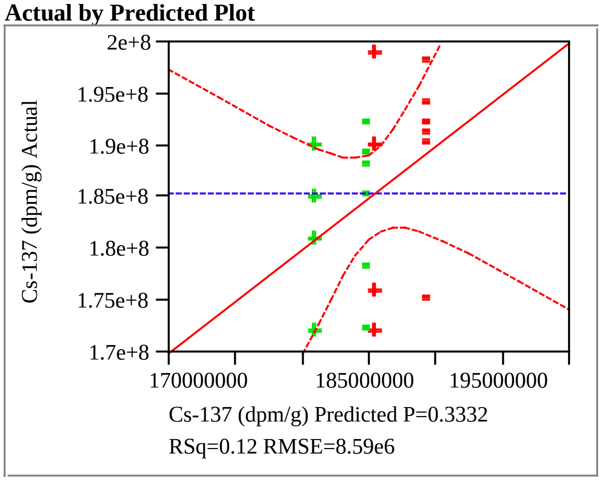
Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	3.2805e+10	1.3198	0.2665
Calibration	1	1	140833333	0.0057	0.9409

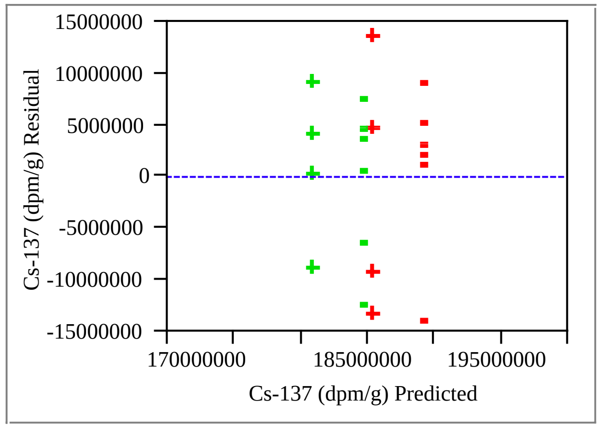
Appendix *(continued)*

Exhibit A11. Statistical Analyses of the Cobalt and Cesium Radioactivity (dpm per gram of slurry) by Type of Composite and ICP Calibration Block *(continued)*

Response Cs-137 (dpm/g)
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.121295
RSquare Adj	0.017918
Root Mean Square Error	8594201
Mean of Response	1.8545e8
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	1.73325e14	8.6663e13	1.1733
Error	17	1.25563e15	7.386e+13	**Prob > F**
C. Total	19	1.42895e15		0.3332

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	1.6875e+13	1.6875e13	0.2180
Pure Error	16	1.23875e15	7.7422e13	**Prob > F**
Total Error	17	1.25563e15		0.6469
				Max RSq
				0.1331

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	185062500	1961349	94.35	<.0001
Composite Type[32]	2250000	1921722	1.17	0.2578
Calibration[1]	1937500	1961349	0.99	0.3371

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	1.0125e+14	1.3708	0.2578
Calibration	1	1	7.2075e+13	0.9758	0.3371

Appendix *(continued)*

Exhibit A12. Sensitivity of Statistical Analyses of the Cobalt and Cesium Radioactivity (in dpm per gram of slurry) to 5% Differences Due to Type of Composite

Response Co-60 (dpm/g)

Level	Least Sq Mean	Std Error	Mean
32	2699458.3	50372.277	2700000
60	2618458.3	50372.277	2619000

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	157657.3	65461.46	20	0.4177

Response Cs-137 (dpm/g)

Level	Least Sq Mean	Std Error	Mean
32	187312500	2745888.7	187700000
60	182812500	2745888.7	183200000

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	8594201	4570313	20	0.6113

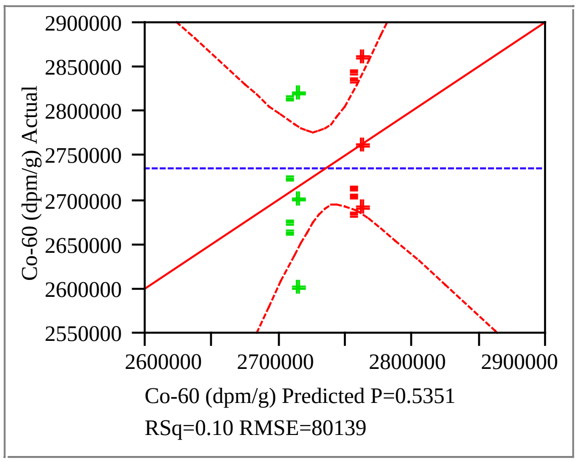
Appendix *(continued)*

Exhibit A13. Statistical Analyses of the Screened Cobalt and Cesium Radioactivity (dpm per gram of slurry) by Type of Composite and ICP Calibration Block

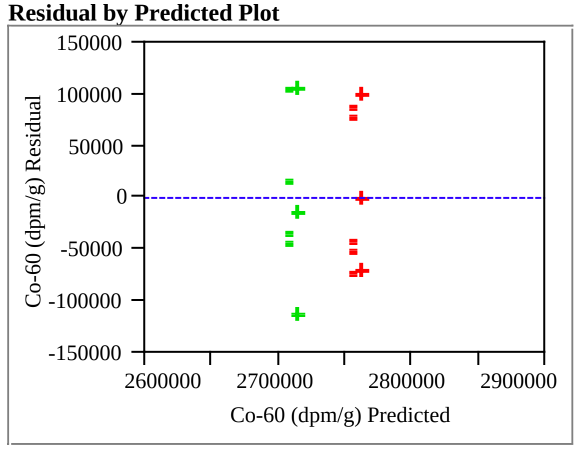
Response Co-60 (dpm/g)

LIMS Numbers Removed From this Analysis: 300166378, 300166381, 300166388, 300166394, and 300166397.

Actual by Predicted Plot



Residual by Predicted Plot



Composite Type-Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	2759427.9	28822.664	2758750
60	2711815.9	30440.125	2711429

Summary of Fit

RSquare	0.098975
RSquare Adj	-0.0512
Root Mean Square Error	80139.29
Mean of Response	2736667
Observations (or Sum Wgts)	15

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	8465671642	4.23284e9	0.6591
Error	12	7.70677e10	6.42231e9	**Prob > F**
C. Total	14	8.55333e10		0.5351

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	620995025	620995025	0.0894
Pure Error	11	7.64467e10	6.9497e+9	**Prob > F**
Total Error	12	7.70677e10		0.7706
				Max RSq
				0.1062

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	2735621.9	21150.05	129.34	<.0001
Composite Type[32]	23805.97	20768.94	1.15	0.2740
Calibration[1]	-2711.443	21150.05	-0.13	0.9001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	8437893864	1.3138	0.2740
Calibration	1	1	105552594	0.0164	0.9001

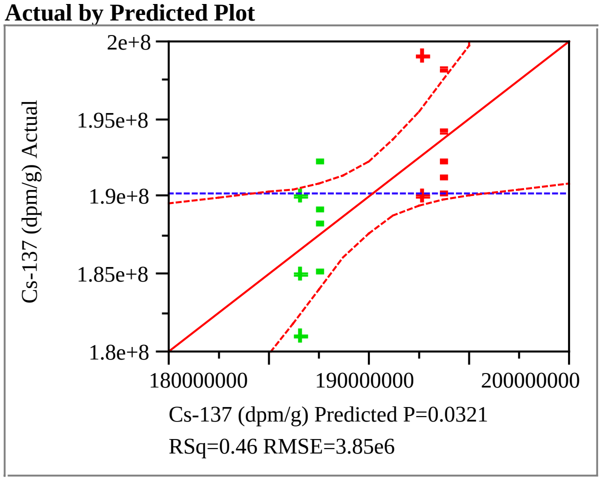
Appendix *(continued)*

Exhibit A13. Statistical Analyses of the Screened Cobalt and Cesium Radioactivity (dpm per gram of slurry) by Type of Composite and ICP Calibration Block *(continued)*

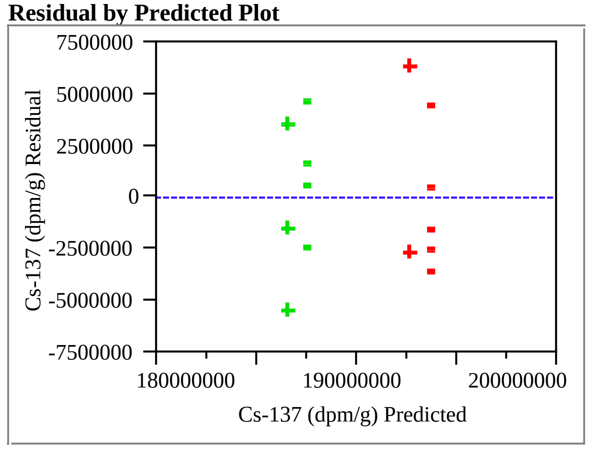
Response Cs-137 (dpm/g)

**LIMS Numbers Removed From this Analysis:
300166376 and 300166397.**

Actual by Predicted Plot



Residual by Predicted Plot



Composite Type-Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	193204545	1528180.2	193428571
60	187068182	1463806.6	187142857

Summary of Fit

RSquare	0.464876
RSquare Adj	0.367581
Root Mean Square Error	3851049
Mean of Response	1.9029e8
Observations (or Sum Wgts)	14

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	1.41721e14	7.086e+13	4.7780
Error	11	1.63136e14	1.4831e13	**Prob > F**
C. Total	13	3.04857e14		0.0321

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	1.69697e13	1.697e+13	1.1610
Pure Error	10	1.46167e14	1.4617e13	**Prob > F**
Total Error	11	1.63136e14		0.3066
				Max RSq
				0.5205

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	190136364	1075002	176.87	<.0001
Composite Type[32]	3068181.8	1040866	2.95	0.0133
Calibration[1]	522727.27	1086142	0.48	0.6398

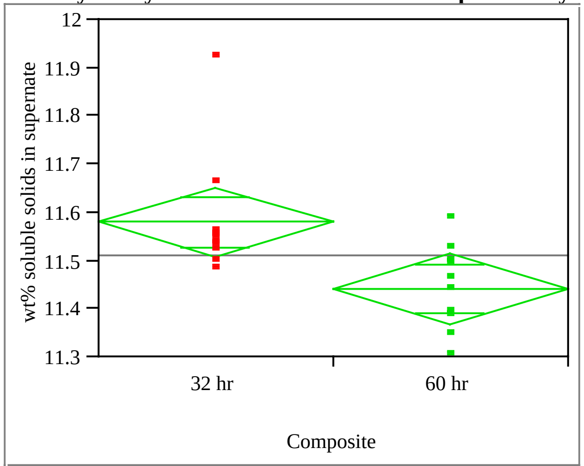
Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Composite Type	1	1	1.28864e14	8.6890	0.0133
Calibration	1	1	3.43506e12	0.2316	0.6398

Appendix *(continued)*

Exhibit A14. Statistical Analyses of the Weight Percent Solids of the Supernate by Type of Composite

Oneway Analysis of wt% soluble solids in supernate By Composite



Oneway Anova

Summary of Fit

Rsquare	0.303853
Adj Rsquare	0.265178
Root Mean Square Error	0.110329
Mean of Response	11.51105
Observations (or Sum Wgts)	20

t-Test

	Difference	t-Test	DF	Prob > |t|
Estimate	0.138300	2.803	18	0.0118
Std Error	0.049341			
Lower 95%	0.034639			
Upper 95%	0.241961			

Assuming equal variances

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Composite	1	0.09563445	0.095634	7.8566	0.0118
Error	18	0.21910450	0.012172		
C. Total	19	0.31473895			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
32 hr	10	11.5802	0.03489	11.507	11.653
60 hr	10	11.4419	0.03489	11.369	11.515

Std Error uses a pooled estimate of error variance

Tests that the Variances are Equal

Level	Count	Std Dev	MeanAbs Dif to Mean	MeanAbs Dif to Median
32 hr	10	0.1292661	0.0841200	0.0674000
60 hr	10	0.0873797	0.0701000	0.0701000

Test	F Ratio	DFNum	DFDen	Prob>F
O'Brien[.5]	0.4387	1	18	0.5161
Brown-Forsythe	0.0047	1	18	0.9462
Levene	0.1783	1	18	0.6778
Bartlett	1.2755	1	.	0.2587

Welch Anova testing Means Equal, allowing Std Devs Not Equal

F Ratio	DFNum	DFDen	Prob>F
7.8566	1	15.804	0.0129

t-Test
2.8030

Power Details

Test

Composite

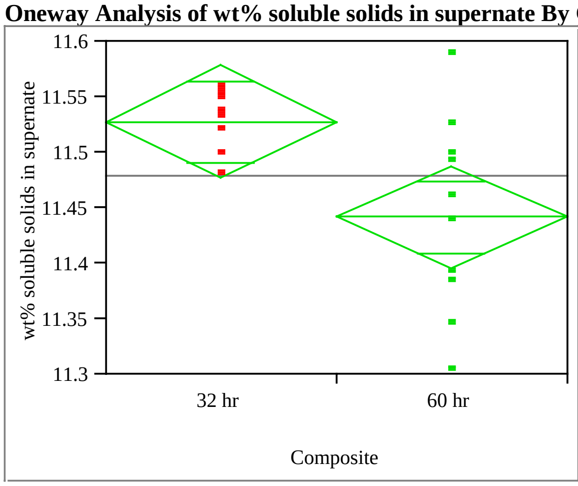
Power

Alpha	Sigma	Delta	Number	Power
0.0500	0.110329	0.286048	20	1.0000

Appendix *(continued)*

Exhibit A15. Statistical Analyses of the Screened Weight Percent Solids of the Supernate by Type of Composite

Oneway Analysis of wt% soluble solids in supernate By Composite



Oneway Anova

Summary of Fit

Rsquare	0.306344
Adj Rsquare	0.262991
Root Mean Square Error	0.067987
Mean of Response	11.48
Observations (or Sum Wgts)	18

t-Test

	Difference	t-Test	DF	Prob > |t|
Estimate	0.085725	2.658	16	0.0172
Std Error	0.032249			
Lower 95%	0.017360			
Upper 95%	0.154090			

Assuming equal variances

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Composite	1	0.03266123	0.032661	7.0662	0.0172
Error	16	0.07395477	0.004622		
C. Total	17	0.10661600			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
32 hr	8	11.5276	0.02404	11.477	11.579
60 hr	10	11.4419	0.02150	11.396	11.487

Std Error uses a pooled estimate of error variance

Tests that the Variances are Equal

Level	Count	Std Dev	MeanAbsDif to Mean	MeanAbsDif o Median
30 hr	8	0.0273545	0.0214687	0.0206250
62 hr	10	0.0873797	0.0701000	0.0701000

Test	F Ratio	DFNum	DFDen	Prob>F
O'Brien[.5]	4.5951	1	16	0.0478
Brown-Forsythe	7.8436	1	16	0.0128
Levene	7.9602	1	16	0.0123
Bartlett	7.7352	1	.	0.0054

Welch Anova testing Means Equal, allowing Std Devs Not Equal

F Ratio	DFNum	DFDen	Prob>F
8.5745	1	11.125	0.0136

t-Test
2.9282

Power Details

Test

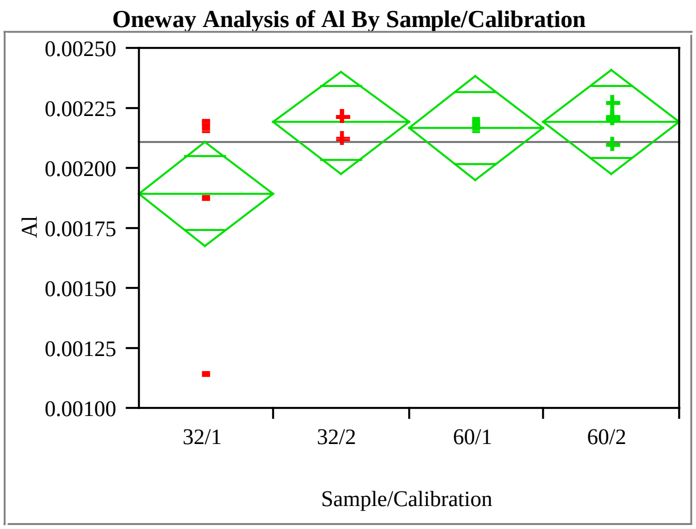
Composite

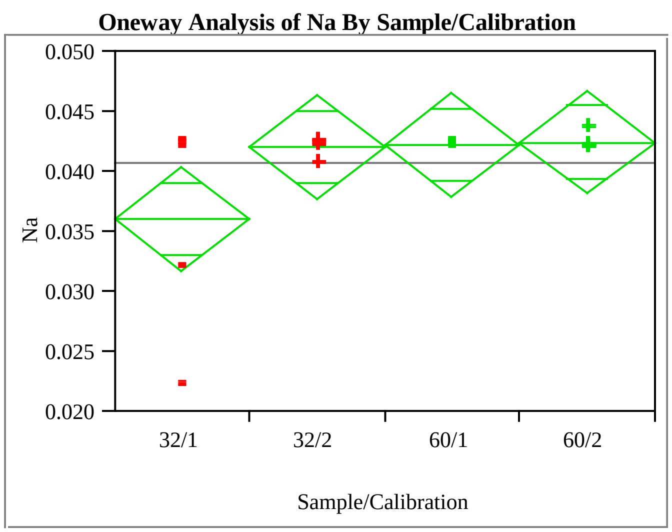
Power

Alpha	Sigma	Delta	Number	Power
0.0500	0.067987	0.286048	18	1.0000

Appendix *(continued)*

Exhibit A16. Plots of the Al and Na Concentrations (as grams/gram of supernate) in the Supernate by Type of Composite and ICP Calibration

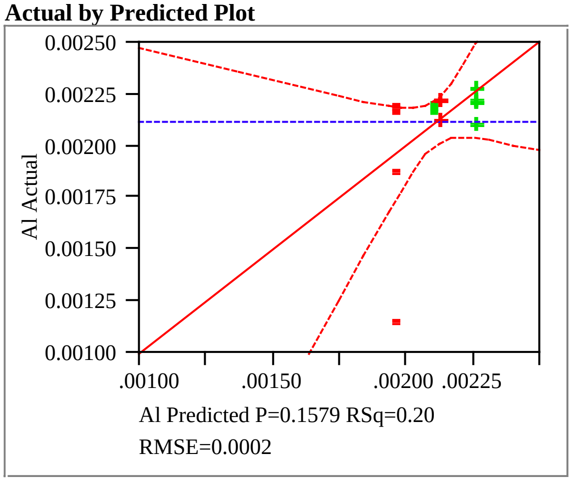




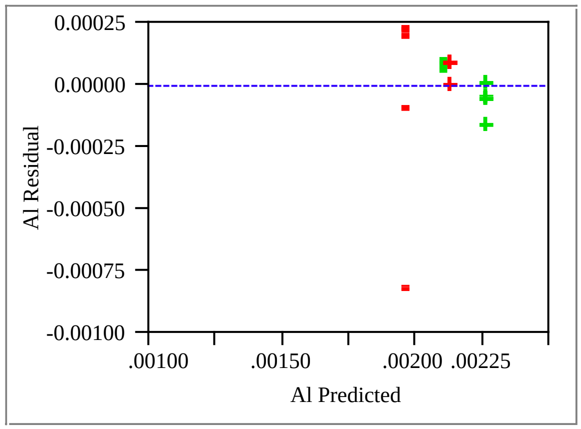
Appendix *(continued)*

Exhibit A17. Statistical Analyses of the Al and Na Concentrations (as grams/gram of supernate) in the Supernate by Type of Composite

Response Al
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.195177
RSquare Adj	0.100492
Root Mean Square Error	0.000233
Mean of Response	0.002114
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00000022	0.0000001	2.0613
Error	17	0.00000092	5.4145e-8	**Prob > F**
C. Total	19	0.00000114		0.1579

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00000009	8.978e-8	1.7293
Pure Error	16	0.00000083	5.1917e-8	**Prob > F**
Total Error	17	0.00000092		0.2070
				Max RSq
				0.2737

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.002114	0.000052	40.63	<.0001
Sample Type[32]	-0.000069	0.000052	-1.33	0.2023
Calibration[1]	-0.00008	0.000052	-1.54	0.1426

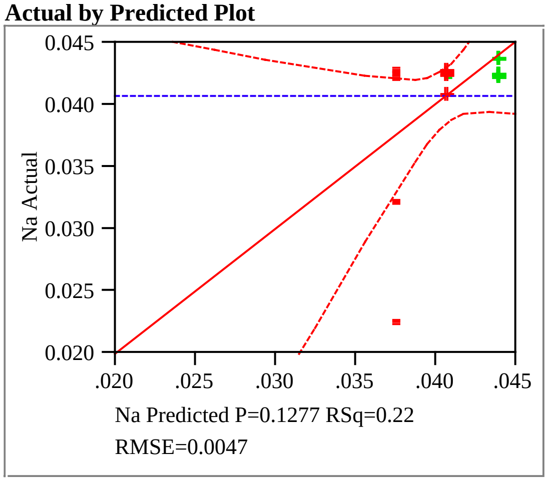
Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.0000001	1.7586	0.2023
Calibration	1	1	0.00000013	2.3640	0.1426

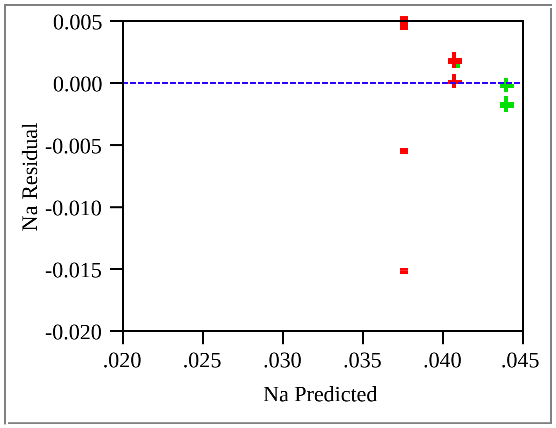
Appendix *(continued)*

Exhibit A17. Statistical Analyses of the Al and Na Concentrations (as grams/gram of supernate) in the Supernate by Type of Composite *(continued)*

Response Na
Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

R-square is the portion of variation attributed to the model, between 0 and 1. Root Mean Squared Error "RMSE" estimates the standard deviation of the residual.

RSquare	0.215016
RSquare Adj	0.122665
Root Mean Square Error	0.004676
Mean of Response	0.040755
Observations (or Sum Wgts)	20

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	0.00010183	0.000051	2.3282
Error	17	0.00037174	0.000022	**Prob > F**
C. Total	19	0.00047357		0.1277

Lack Of Fit

Using replicated points as the part of residual error that does not depend on the form of the model so that you can test for the adequacy of the form of the model.

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	0.00004176	0.000042	2.0248
Pure Error	16	0.00032998	0.000021	**Prob > F**
Total Error	17	0.00037174		0.1739
				Max RSq
				0.3032

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.040755	0.001046	38.98	<.0001
Sample Type[32]	-0.001635	0.001046	-1.56	0.1363
Calibration[1]	-0.001555	0.001046	-1.49	0.1553

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	0.00005346	2.4449	0.1363
Calibration	1	1	0.00004836	2.2115	0.1553

Appendix *(continued)*

Exhibit A18. Sensitivity of Statistical Analyses of the Al and Na Concentrations (as grams/gram of supernate) in the Supernate to 5% Differences Due to Type of Composite

Response Al

Sample Type
Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	0.00204500	0.00007358	0.002045
60	0.00218300	0.00007358	0.002183

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.000233	0.000055	20	0.1678

Response Na

Level	Least Sq Mean	Std Error	Mean
32	0.03912000	0.00147876	0.039120
60	0.04239000	0.00147876	0.042390

Power Details

Alpha	Sigma	Delta	Number	Power
0.0500	0.004676	0.00106	20	0.1597

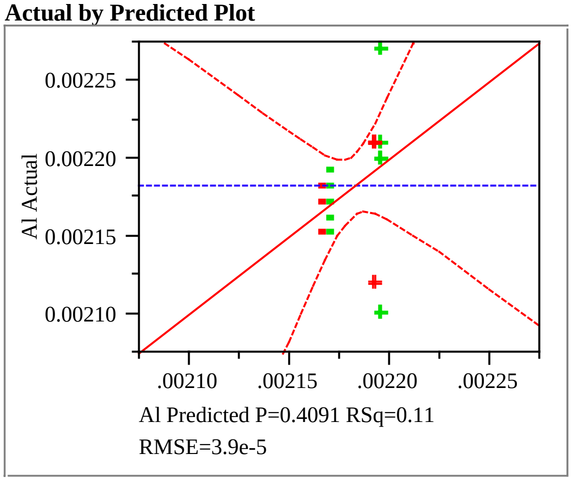
Appendix *(continued)*

Exhibit A19. Statistical Analyses of the Screened Al and Na Concentrations (as grams/gram of supernate) in the Supernate by Type of Composite

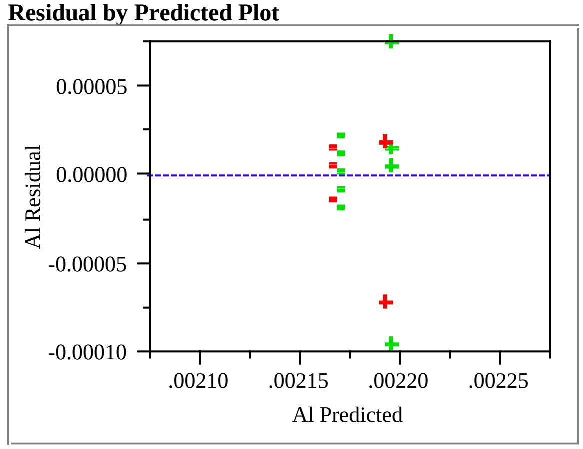
Response Al

LIMS Number Removed From this Analysis: 300166351 and 300166354.

Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.112339
RSquare Adj	-0.00602
Root Mean Square Error	0.000039
Mean of Response	0.002183
Observations (or Sum Wgts)	18

Analysis of Variance

The test that the whole model fits better than a simple mean, i.e. testing that all the parameters are zero except the intercept

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	2	2.89397e-9	1.447e-9	0.9492
Error	15	0.00000002	1.5245e-9	**Prob > F**
C. Total	17	0.00000003		0.4091

Lack Of Fit

Source	DF	Sum of Squares	Mean Square	F Ratio
Lack Of Fit	1	4.7619e-13	4.762e-13	0.0003
Pure Error	14	0.00000002	1.6333e-9	**Prob > F**
Total Error	15	0.00000002		0.9866
				Max RSq
				0.1124

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	0.0021811	0.000009	233.69	<.0001
Sample Type[32]	-0.000002	0.000009	-0.20	0.8450
Calibration[1]	-0.000013	0.000009	-1.38	0.1886

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Sample Type	1	1	6.0357e-11	0.0396	0.8450
Calibration	1	1	2.89286e-9	1.8976	0.1886

Sample Type

Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
32	0.00217929	0.00001400	0.002182
60	0.00218300	0.00001235	0.002183

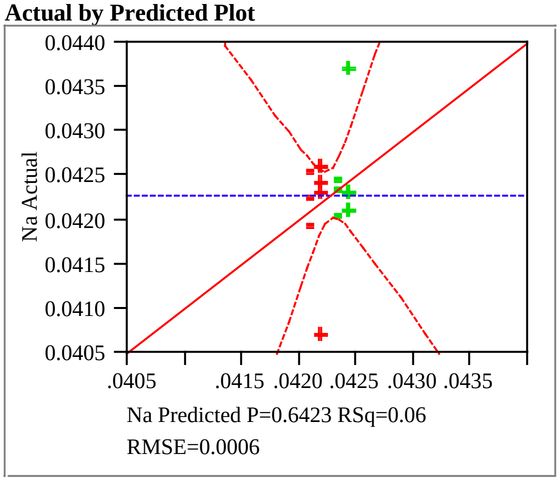
Appendix *(continued)*

Exhibit A19. Statistical Analyses of the Screened Al and Na Concentrations (as grams/gram of supernate) in the Supernate by Type of Composite *(continued)*

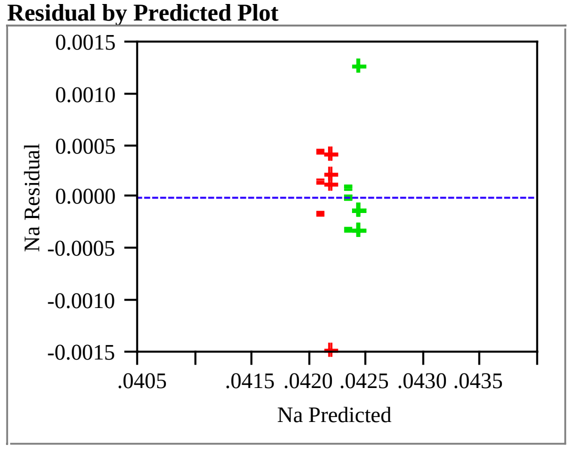
Response: Na

LIMS Number Removed From this Analysis: 300166351 and 300166354.

Whole Model
Actual by Predicted Plot



Residual by Predicted Plot



Summary of Fit

RSquare	0.057311
RSquare Adj	-0.06838
Root Mean Square Error	0.000566
Mean of Response	0.042283
Observations (or Sum Wgts)	18

Analysis of Variance

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Ratio**
Model	2	0.00000029	0.0000001	0.4560
Error	15	0.00000481	0.0000003	**Prob > F**
C. Total	17	0.0000051		0.6423

Lack Of Fit

Source	**DF**	**Sum of Squares**	**Mean Square**	**F Ratio**
Lack Of Fit	1	0.0000001	9.6429e-8	0.2863
Pure Error	14	0.00000472	0.0000003	**Prob > F**
Total Error	15	0.00000481		0.6010
				Max RSq
				0.0762

Parameter Estimates

Term	**Estimate**	**Std Error**	**t Ratio**	**Prob>|t|**
Intercept	0.0422643	0.000135	312.14	<.0001
Sample Type[32]	-0.000126	0.000135	-0.93	0.3679
Calibration[1]	-0.000046	0.000135	-0.34	0.7403

Effect Tests

Source	**Nparm**	**DF**	**Sum of Squares**	**F Ratio**	**Prob > F**
Sample Type	1	1	0.00000028	0.8621	0.3679
Calibration	1	1	0.00000004	0.1140	0.7403

Sample Type
Least Squares Means Table

Level	**Least Sq Mean**	**Std Error**	**Mean**
32	0.04213857	0.00020310	0.042150
60	0.04239000	0.00017912	0.042390