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THE ON-STREAM X-RAY DIFFRACTION ANALYSES OF PHOSPHATE ROCK SLURRIES AT THE IMC-AGRICO FOUR CORNERS PLANT

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MINTEK

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Florida Institute of Phosphate Research

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THE ON-STREAM X-RAY DIFFRACTION ANALYSES OF PHOSPHATE ROCK SLURRIES AT THE IMC-AGRICO FOUR CORNERS PLANT

Final Report
(FIPR Contract No. 93-04-051R)

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PERSPECTIVE

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On-line analysis and process automation are powerful tools for achieving optimal industry efficiency. The rewards of an effective on-stream analysis technique coupled with modern process control include: improved recovery of P_2O_5, reduced chemical consumption and improved concentrate grade. As the quality of phosphate reserves decline and become more difficult-to-process, improvement in plant efficiency is even more critical. Unfortunately, process control in phosphate beneficiation plants is still primitive, after 100 years. This is due to the following difficulties in analyzing the plant slurry: (1) multi-element analysis is required for meaningful process control (P_2O_5, CaO, SiO_2, and MgO), (2) the slurry is a heterogeneous system with about 20-30% solids and (3) the major elements to be analyzed, phosphorus and calcium, are low in atomic number.

Searching for an accurate and rapid on-stream phosphate assay technique has been on FIPR's agenda since its inception. FIPR has sponsored three projects for evaluating on-line analytical systems: a magnetic resonance technique, an optical sensor, and a neutron activation probe. However, limitations with these systems have prevented the industry from endorsing any one enthusiastically.

In January 1994, the FIPR Board approved funding for the fourth type of on-line analyzer, the Mintek X-ray diffraction system (Midfox). One of the main advantages of this technique is its ability to distinguish mineral components rather than elemental compositions, as do most of the other techniques.

This project has demonstrated the potential of the Midfox by on-line, continuous determination of numerous samples from three main processing streams in a typical Florida beneficiation plant. The ranges in plant product compositions exceeded the Midfox measuring errors in all instances.

However, the accuracy in analyzing phosphate in rougher tails and silica in concentrates was not satisfactory. Some kinks also need to be worked out of the sampling system.

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ABSTRACT

A system for the on-stream X-ray diffractometric determination of mineral phases in slurries was developed at Mintek. A contractual agreement between the Florida Institute of Phosphate Research (FIPR) and IMC Agrico (contract #93-04-051R) was signed in July 1993, whereby IMC Agrico was appointed as the contractor for the project, with Mintek acting as a sub-contractor. The principal goal of this project was to demonstrate the capabilities and benefits of on-stream X-ray diffraction (Midfox), at a beneficiation plant to the Florida phosphate industry.

In preparation for the installation of the equipment at the Four Comers mine, hardware components such as the slurry transporting system, as well as customized software to control the analyser and process the data, were developed at Mintek. The system was installed at the Four Comers plant in July and August, 1994. From then onwards until the end of October, the quartz and Bone Phosphate of Lime (BPL) concentrations of sample sets of rougher tails, amine feeds and final concentrates were measured. The results of 163 calibration samples as well as 584 further analyses are presented in this report.

The range in plant product compositions encountered during the sampling campaign exceed Midfox measuring errors in all instances.

	Quartz (insolubles)	BPL
Range of concentrations, rougher tails	91.1 - 98.0	0.4 - 3.5
Midfox error	0.7	0.4
Range of concentrations, amine feeds	10.3 - 44.00	40.2 - 64.6
Midfox error	1.7	2.4
Range of concentrations, final concentrates	3.3 - 16.8	59.8 - 72.2
Midfox error	1.0	2.4

This shows that fluctuations on the plant product compositions can be quantitatively monitored by the Midfox system.

The benefits of the Midfox on-stream analyser to the phosphate industry are discussed.

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EXECUTIVE SUMMARY

In response to the need in the mining industry for process control during the beneficiation of industrial minerals such as phosphate rock, a system for the on-stream X-ray diffractometric determination of mineral phases in slurries was developed at Mintek. The system was initially designed to monitor and supply real-time data from multiple slurry streams on phosphate rock flotation plants. The Mintek on-stream X-ray diffraction analyser has been operating successfully at Foskor, the major South African phosphate producer, for several years. The Foskor phosphate rock, however, is from an igneous ore body, with mineral characteristics different to those of the Florida sedimentary deposits. Mintek was subsequently contracted to prove that the Midfox analyser functions equally well for the sedimentary ore on a beneficiation plant in Florida. Slurried sedimentary phosphate rock samples from Florida were previously analysed by on-stream X-ray diffraction (Midfox) in the laboratory at Mintek.

The principal goal of this project, therefore, was to demonstrate to the Florida phosphate industry the capabilities and benefits of on-stream X-ray diffraction analysis by operating the Midfox analyser under plant conditions.

Hardware components such as the slurry transporting system, as well as customized software to control the analyser and process the data, were developed at Mintek. The system was installed at the Four Corners plant in July and August, 1994. IMC Agrico provided the primary sample cutters on the rougher tails, amine feeds and final concentrates lines. From that time onwards until the end of October, the quartz (insolubles) and BPL concentrations of sample sets of rougher tails, amine feeds and final concentrates were measured. The results of 163 calibration samples as well as 584 further samples are presented in this report.

The patented sample presenter ensures that an adequately large sample is measured, and that concentrations of as low as 0.2 per cent quartz and BPL in the slurry can be measured. Such detection limits, especially for the BPL, is required to quantify the very low concentrations in the rougher tails. Variations statistically greater than the analytical errors, are measurable by Midfox and are considered to be compositional fluctuations of the flotation plant products. The range in plant product compositions occurring during the sampling campaign statistically exceeded the Midfox measuring errors in all instances.

	Quartz (insolubles)	BPL
Range of concentrations, rougher tails	91.1 - 98.0	0.4 - 3.5
Midfox error	0.7	0.4
Range of concentrations, amine feeds	10.3 - 44.00	40.2 - 64.6
Midfox error	1.7	2.4
Range of concentrations, final concentrates	3.3 - 16.8	59.8 - 72.2
Midfox error	1.0	2.4

This shows that fluctuations on the plant product compositions can be quantitatively monitored by the Midfox system. The statistics clearly demonstrate that these Midfox data can be applied to manual or automated plant control.

The advantages of having an on-stream analyser such as Midfox to generate real-time data, and to ultimately achieve plant control, are summarized as follows:

- The Midfox analyser operates on the principle of X-ray diffraction, which directly measures the apatite (francolite) and quartz concentrations in the slurries. On the beneficiation plant these are the specific minerals being floated. Other techniques such as X-ray fluorescence (XRF) spectrometry, wet chemical methods, neutron activation analysis (NAA) and nuclear magnetic resonance (NMR), however, measure the chemical compositions of materials, e.g. phosphorus (P) or silicon (Si) contents. Such chemical analyses are re-calculated in terms of assumed mineral compositions. Silicon for example occurs in several minerals such as quartz and clay minerals, which could lead to incorrect mineral content calculations.
- No special skills are required of the operator. Furthermore, once the system has been calibrated it functions independently of an operator. The slurry streams are automatically selected, analysed and the results continuously transferred to a control room.
- The system has been designed to operate under plant conditions, with a minimum of maintenance required.
- There is no sample preparation required. The slurries produced on the flotation circuit are continuously sampled and automatically fed into the analyser. Although the most reliable results are obtained on slurries with solids contents of 25 per cent, slurries with solids contents varying between 5 and 40 per cent can be readily measured.
- The windowless sample presenter and the design of the detector system allows for accurate measurements to be made on large representative samples. For normal 100 second measuring intervals and 25 per cent solids in a slurry, the mineral contents of approximately 1.25 kg of sample is measured. This allows for detection limits of better than 0.2 per cent for both quartz (insolubles) and BPL in the slurries to be achieved.
- The computer software is written in a user-friendly fashion, is Microsoft@ Windows™ based and allows for a variety of options such as measuring time and measuring sequence to be easily selected.
- All the data are automatically processed, displayed on the computer screen in the control room, filed on a hard drive from where it can be retrieved for further processing or archiving.
- The Midfox analyser generates real-time analyses of the flotation plant products every 8 minutes or less. Adjustments to the flotation circuit can be timeously executed from the control room. The Midfox measurements can ultimately be integrated into an automated plant control strategy.

The most important benefits to a phosphate plant of having a Midfox analyser are therefore:

- No pre-blending of flotation plant feeds from the different mining operations required.
- Maximizing on recoveries at rougher flotation step, by optimizing on fatty acid and other reagent additions.
- Optimizing on the addition of amine and other reagents at the cleaner flotation step so as to ensure a consistent grade for the final product to the client or chemical plant.
- Savings on costs of flotation reagent additions.

- Automated sampling and analyses, independent of operator, producing a result every few minutes.
- The measurements can be utilized in automated feed-back and feed-forward plant control.
- Less blending, or stacking and reclaiming of final product to achieve a specified final product grade.

In summary it can be stated that the Midfox system at the IMC Four Corners plant proved on-stream X-ray diffraction (XRD) to be an accurate, fast and reliable method for the real-time analyses of both quartz (insolubles) and apatite (BPL) in flotation plant products, over a wide range of mineral compositions. It also proved that the high quality of results that were previously obtained at Foskor, and in the laboratory at Mintek, could equally well be achieved under severe plant conditions at the IMC Agrico Four Comers Plant.

In order to further enhance the quality of the Midfox results, it is suggested that the ruggedised commercial unit be buffered against adverse conditions such as variable temperatures, high humidities, vibrations, dust, and power failures. To obtain greater accuracies the primary sampling system should provide reasonably consistent slurry flows as well as slurry densities to the analyser. Although it was not the purpose of this project to test the primary sampling system, for subsequent projects attention needs to be given to ensuring consistent flow-rates and reasonable slurry densities (approximately 25 per cent solids) to the Midfox multiplexer tank. It is also recommended that Micromotion densitometers be integrated into the Midfox system so as to improve the data on the solids content measurements of the slurries.

Estimates of savings on reagent and manpower costs, as well as the benefits from consistent grades and greater recoveries have shown that the investment in a Midfox system can be recovered in less than a year.

1. INTRODUCTION

For better process control in the beneficiation of industrial minerals such as phosphate rock, a system for the on-stream X-ray diffractometric determination of mineral phases in slurries was developed at Mintek. The system was initially designed to monitor and supply real-time data from multiple slurry streams on phosphate rock flotation plants[1,2,3,4,5,6,7]. Slurried sedimentary phosphate rock samples from Florida[1,5,6] were previously analysed by the Mintek Integrated Diffraction and Fluorescence On-stream X-ray (Midfox) analyser at Mintek. Following, its successful use in this application, the on-stream X-ray diffractometer was adapted to handle and analyse slurries of other ore minerals such as fluorspar[8,9,10], pyrite[11] and ilmenite.

The Mintek on-stream X-ray diffraction analyser has been in operation at Foskor, the major South African phosphate producer, for several years. The system has been updated, and an improved slurry transporting system incorporating a de-aerator tank, was installed at their plant. The Foskor phosphate rock, however, is from an igneous ore body, with mineral characteristics different to those of the Florida sedimentary deposits.

Although many samples from various phosphate rock ore bodies world wide had been analysed on the Midfox system at Mintek, the analyser had previously not been tested at a sedimentary phosphate rock beneficiation plant. The principal goal of this project was, therefore, to demonstrate the capabilities and benefits of on-stream X-ray diffraction at a Florida phosphate plant.

IMC Agrico has been committed to the development of on-stream and rapid off-stream compositional measurements of various plant products for many years. They had agreed to collaborate with Mintek and the Florida Institute of Phosphate Research (FIPR) in researching the applicability of the Midfox system, for the benefit of the Florida phosphate industry.

2. AGREEMENTS

A contractual agreement between FIPR and IMC Agrico (contract #93-04-051R) was signed in July 1993, whereby IMC Agrico was appointed as the contractor for the project, with Mintek acting as a sub-contractor. A letter of agreement specifying that Mintek would install and test the Midfox analyser over a period of five months at an IMC Agrico flotation plant was signed by Mintek in November and IMC Agrico in December 1993.

It was, furthermore, agreed that the system would be installed at the Four Comers plant. The letter of agreement specified that IMC Agrico would provide and maintain, amongst others, an air-conditioned enclosure for the Midfox analyser, a support structure for the multiplexer, as well as primary sample cutters feeding into slurry lines to the multiplexer. Mintek laid down specifications for slurry flow-rates and solids contents to the analyser. The IMC Agrico laboratory was, furthermore, committed to analysing the slurry samples for solids contents, and the dried samples for bone phosphate of lime (BPL*) and insolubles contents.

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* BPL: Bone Phosphate of Lime. 1.355 x BPL = Apatite (var. Francolite)

3. SCHEDULE

In preparation for the installation of the equipment at the Four Comers mine, hardware components such as the slurry transporting system, as well as customized software to control the analyser and process the data, were developed at Mintek. Dr. Johann Engelbrecht held planning meetings with IMC Agrico in Florida on May 9 and 10, 1994, so as to discuss details of the Letter, of Agreement relating to the preparation of the site for the Midfox analyser. Discussions were also held with FIPR on this occasion.

Dr. Engelbrecht and Mr. Stefan de Bruyn reported at IMC Agrico for the mandatory three day Mine Safety and Health Administration training course on July 20. The unpacking and installation of the Midfox equipment commenced on August 1. This was followed by the alignment of the diffractometer, the installation of the slurry lines and adjustment to the slurry cutters and cyclones. IMC Agrico provided the primary sample cutters on the rougher tails, amine feeds and final concentrates lines. The sample cutters fed into lines to de-watering cyclones and the multiplexer tank mounted on a specially erected steel tower. The selected slurry stream thereafter fed into an air-conditioned room in which the Midfox analyser was installed. Some difficulties were experienced with maintaining adequate flows in the three lines transporting slurry to the Midfox instrument. Furthermore, the two Micromotion densitometers were not installed on the Midfox slurry transporting system at the Four Corners plant as was planned. One of these were lent to Mintek, to be integrated into the Midfox system in future applications.

The first samples were measured on the Midfox system on September 15 by Mr. de Bruyn. For the following one and a half months until the end of October, Mr. de Bruyn and Mr. Petrus van den Heever, who succeeded him, measured 169 rougher tails, amine feeds and final concentrates samples for calibration purposes (of which 163 were subsequently used). These samples were subsequently analysed by the IMC Agrico Four Comers metallurgical and analytical laboratories for their solids contents as well as for their BPL and insolubles concentrations. The calibration data were fed into the Midfox system to serve as references against which subsequent measurements were made. A further 584 samples were successfully measured on the Midfox system.

Sample splits of the calibration samples were also sent to Mintek in South Africa to be analysed for their BPL and silica (SiO_2) concentrations.

Mintek submitted interim reports on the results to IMC Agrico on November 10, 1994, as well as on January 17 and March 31, 1995.

4. THE MIDFOX SYSTEM

The system used at the Four Comers phosphate rock beneficiation plant is configured in the following way:

One of three slurry streams from the plant, e.g. rougher tails, amine feeds or final concentrates are automatically selected by means of a multiplexer tank (Figure 1).

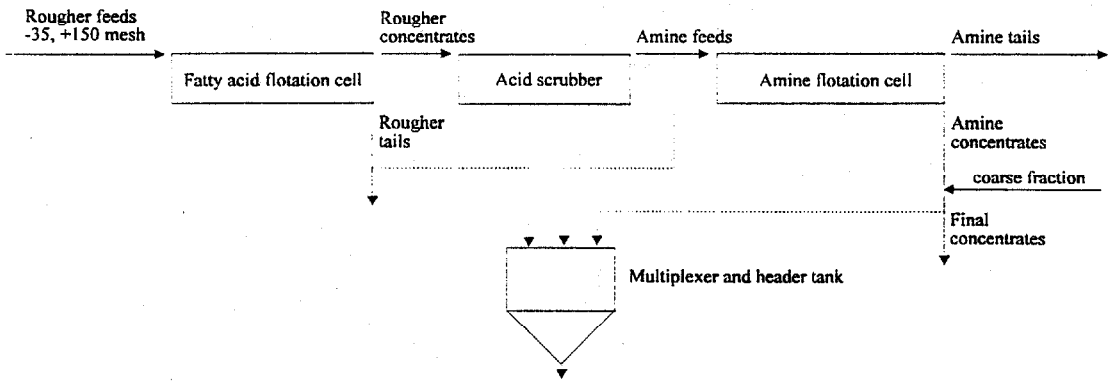

Figure 1. A simplified flow diagram of the IMC Agrico Four Corners flotation circuit.

A header tank, which is an integral component of the slurry transporting system, assures a constant hydrostatic pressure and flow-rate to a de-aerator tank. From this tank, the slurry gravitates through sample splitters to two parallel windowless sample presenters, where each slurry curtain is irradiated by the X-ray beam.

The configuration (Figure 2) used for slurried phosphate rock analyses includes a molybdenum anode X-ray tube installed in a vertical tube stand from which two sub-horizontal line-focus beams are taken, as well as vertical fixed-geometry goniometers. Each of the goniometers are fitted with a curved pyrolytic graphite incident-beam monochromator and two scintillation detectors to measure forward-diffracted X-ray intensities.

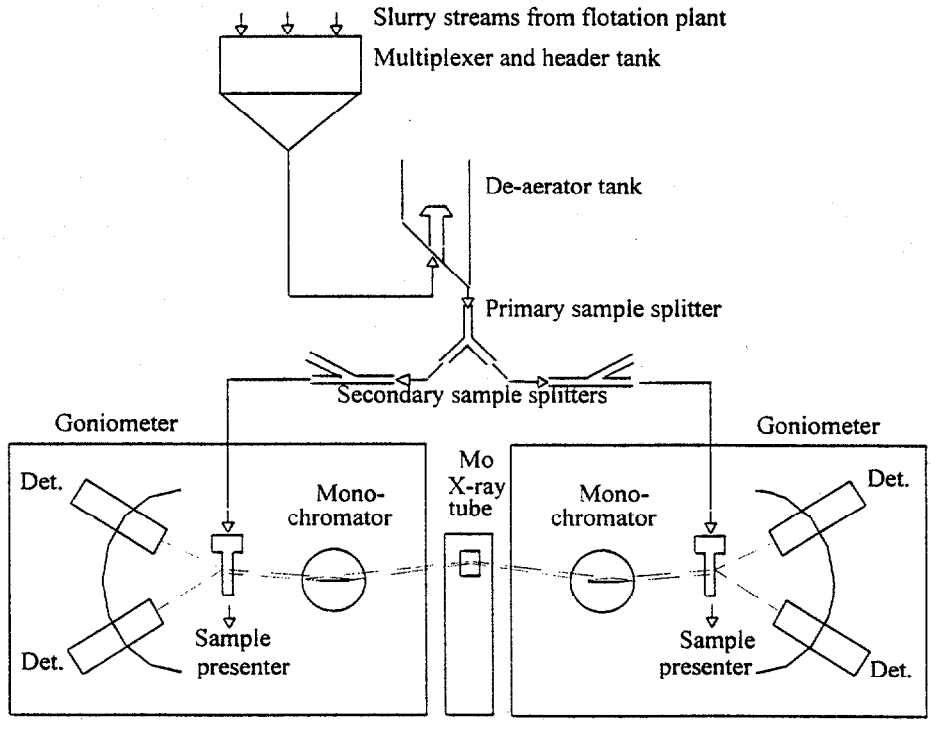

Figure 2. Diagrammatic representation of the Midfox dual XRD analyser, showing the slurry transporting system, the dual vertical fixed-geometry goniometer system, and the detectors (Det.).

The advantage of the fixed-geometry goniometer over a sequential instrument for X-ray diffraction (XRD) analysis is that the peak and background counts are measured

simultaneously, thereby accommodating the effects of fluctuating slurry density and mineral segregation during the measuring interval. The vertical goniometer has an advantage over a horizontal goniometer since the slurry stream is irradiated across its width instead of along the stream. In this mode more representative samples of the slurry are measured. The uncomplicated windowless sample presenter has advantages over other designs, such as no window failure or window contamination, and being able to operate in the transmitted mode.

The Mintek components of the system include the patented de-aerator and windowless sample presenters, the vertical fixed-geometry goniometers and software tailored to the requirements of the Florida phosphate rock industry. These components are configured with commercially available hardware, including the X-ray generator and accessories, detectors and measuring electronics, and a desk-top computer.

The slurry transporting and presentation system can comfortably handle phosphate rock bearing slurries with as high as 40 per cent solids contents. Measurements at various pulp densities indicated that in general, a solids content in the slurry of 20 per cent gives the best figures of merit. An optimum flow rate of 2.5 ± 0.3 l/min. was maintained through each of the sample presenters. The header tank was fitted with a 2 mm screen to prevent blockage of the sample presenter by coarse objects.

For the best results to be obtained, the grain-size distribution and the slurry density should remain reasonably constant. To attain the greatest accuracy separate calibration curves were constructed for the rougher tails, amine feeds and final concentrates, for each of the quartz (insolubles) and the BPL contents.

5. THEORETICAL PRINCIPLES

The concentration of a given phase (x) measured by XRD in the slurry can be expressed as:

$$W_x = K.I_x.\mu_x \qquad (1)$$

Where:

W_x is the mass fraction of the mineral phase x in the slurry,

K is a instrument constant.

I_x the net diffraction peak intensity of phase x,

μ_x is the matrix (slurry) mass attenuation coefficient (mac) for the sample containing phase x.

Unknown concentrations of apatite and quartz in the slurry are determined from reference slurries analysed by other off-stream chemical methods:

$$\frac{W_{apatite}^{unknown}}{W_{apatite}^{reference}} = \frac{I_{apatite}^{unknown} \cdot \mu_{apatite}^{unknown}}{I_{apatite}^{reference} \cdot \mu_{apatite}^{reference}} \qquad (2)$$

Mac's are expressed relative to that of water. The mac of the slurry is, furthermore, inversely proportional to the intensity of the scattered radiation as measured at the background positions:

$$\text{Relative mac, } \mu_x = \frac{\mu^{slurry}}{\mu^{water}} = \frac{I^{water}_{background}}{I^{slurry}_{background}} \qquad (3)$$

The background intensities adjacent to the apatite and the quartz peaks are measured sequentially on water and slurry. Background factors for the calculation of net peaks are derived from these background intensities.

In the Florida phosphate rock slurries the mineral phases apatite (var. francolite) and quartz, each with a different relative mac, are dominant, and together with water contribute to the total mac of the slurry.

All peak intensities are corrected for background, and thereafter for relative mac. Calibration curves are constructed from these corrected net peak intensities against the known concentrations of the apatite and quartz in the reference slurries. The unknown concentrations of the apatite and the quartz in *slurries* of the beneficiation plant are determined from these calibration curves.

The concentrations of the mineral phases in the unknown *solids* can subsequently be calculated from the mass fractions of apatite ($W_{apatite}$) and quartz (W_{quartz}) in the *slurry* as determined by the above method, and the solids content of the slurry. The solids content is calculated from the sum of the apatite and quartz contents of the slurry, assuming these to be the only two major minerals present.

Sources of errors not accounted for by the above algorithm are attributed to fluctuations in slurry density at the sample presenter, particle-size distribution, crystallinity and the contributions to the slurry mac by minerals other than apatite and quartz.

Owing to consistent chemical and physical conditions prevailing over a large area during the genesis of sedimentary phosphate rock deposits, properties such as grain size distribution, mineral composition and crystallinity can be assumed not to vary significantly within a specific deposit. Normal screening and de-sliming procedures on beneficiation plants confine the particle size ranges in the slurries.

Besides apatite (var. francolite), the sedimentary phosphate ore contains quartz as the major gangue mineral, together with minor amounts of clay minerals, aluminium phosphates, iron phosphates, microcline, calcite and dolomite. Following the screening and hydro-cycloning processes, apatite and quartz were found to be the only major minerals present in the flotation feeds.

Apatite and quartz concentrations in the slurries were determined simultaneously by the dual goniometer system (Figure 2). The 211 apatite diffraction peak and background intensities were measured at 14.58° 2θ and 17.06° 2θ respectively, while the 101 quartz diffraction peak and background were measured at 12.18° 2θ and 12.55° 2θ respectively, by four simultaneous scintillation detectors mounted in pairs on the two opposing vertical goniometers. Three general XRD scans of slurried feeds, concentrates and tails are presented (Figure 3).

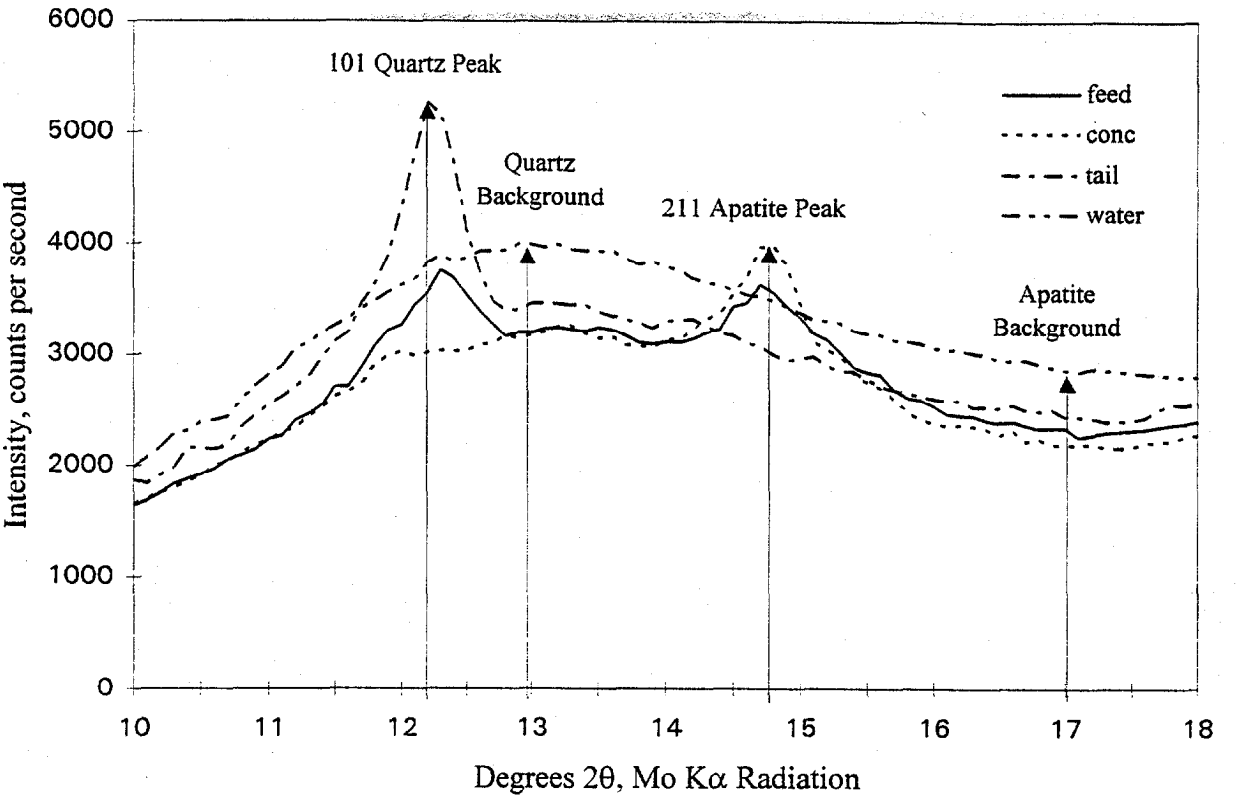

Figure 3. XRD scans of water, and phosphate rock bearing slurries.

6. GRAVIMETRIC AND CHEMICAL ANALYSES

The 163 slurry samples reported on in this document were gravimetrically analysed for their solids contents by the IMC Agrico Four Corners metallurgical laboratory. Replicate sample splits of the dried samples were subsequently analysed at their analytical laboratory according to prescribed methods [12], for BPL and insolubles contents. The rougher tails samples were also analysed for their magnesium contents.

Splits of the 163 samples were thereafter sent to Mintek in South Africa where duplicate milled samples were chemically analysed. The BPL contents were determined spectro-photometrically, using the same method as that of the IMC Agrico laboratory. The samples were also analysed for SiO_2, Al_2O_3, Fe_2O_3, CaO and P_2O_5 by X-ray fluorescence spectrometry and wet chemical methods.

The silica (SiO_2) as well as the insolubles concentrations of the samples were taken to approximate the quartz content, which is the phase measured by the Midfox XRD system on the plant.

7. RESULTS

All the data were processed on spreadsheets at Mintek, and the results are presented in this report. A description of the calculation procedures and the table headings is given in Appendix E. These include data of 163 samples analysed by the laboratories of IMC Agrico and Mintek (Appendices A, B, and C) from which the calibration curves were produced, as

well as results of 584 samples produced by the Midfox algorithm, read from the mentioned calibration curves, and for which no laboratory analyses are available. These 584 measurements are equivalent to real-time data as produced by the Midfox analyser.

The chemical data from the Mintek laboratory were processed in a similar fashion as those from the IMC Agrico laboratory, and the final results from the two data sets compared. In general there are no significant differences, and therefore it was decided to present only the IMC Agrico data in this report.

Separate quartz (insolubles) and BPL calibration curves were constructed for each of the rougher tails, amine feeds, and final concentrates sample sets. In each case calibration curves were constructed for the solids contents of the slurries, the background factors and the relative mass attenuation coefficients (mac's). Calibration curves were also constructed which relate the net XRD peak intensities to quartz (insolubles) or BPL contents of the slurries. For the initial calibrations, the initial data were filtered, and only those from slurries of solids contents of between 15 and 40 per cent were retained. Samples showing inconsistent chemical analyses, and outliers were also discarded from these provisional calibrations. Similar calibration data had been installed on the Midfox analyser at the Four Corners plant, and produced the real-time quartz (insolubles) and BPL results, in the course of the measuring campaign. The calibration procedures conducted off-line on spread sheets as reported on in this document, are similar to those followed by the Midfox algorithm.

All the tabulated data and regression curves are depicted in the appendices to this report. The initial calibration curves were constructed from the individual IMC Agrico solids content determinations, the IMC Agrico analytical laboratory insolubles and BPL data, and the Midfox XRD intensity measurements. It should be noted that the solids contents of all samples, including the calibration data sets, were subsequently read from calibration curves relating individual sample solids contents to XRD background intensity measurements.

The coefficient of variation expressed as a relative percentage is taken to be the measure of statistical error (uncertainty) in this report. This statistic was calculated for each of the six data sets, between the Midfox and the IMC Agrico laboratory data, as well as for the replicate analyses from the IMC Agrico Four Corners laboratory. The difference between the Midfox and the Four Corners laboratory and within laboratory CV's is a measure of the error ascribed to the Midfox measurement alone. Variations in slurry compositions greater than the CV's of the Midfox measurements are considered to be measurable by the Midfox analyser.

7.1. Rougher tails

A set of 58 rougher tails samples were measured by Midfox and subsequently analysed by the IMC Agrico laboratory (Appendix A, Tables 4, 5). The results of a further 141 samples analysed on the Midfox system only are given in Appendix A, Tables 6, 7. A few control samples were inserted in both data sets. The calibration curves for the quartz (insolubles) and the BPL are given in Appendix A, Figures 4 and 5. The plots for these two species, comparing the results of Midfox to those of the IMC Agrico analytical laboratory are given in Appendix A, Figures 6 and 7.

A summary of the statistics from Appendix A, Tables 4 and 5 are given in Table 1 below.

Rougher tails, quartz (insolubles), Appendix A, Table 4, Figures 4, 6.

Although the range of measured quartz (insolubles) compositions lie between 91.1 and 98.0 per cent, most of the samples were within a standard deviation of 1.4 per cent of the mean value of 95.1 per cent. Figure 6 illustrates the tight clustering of the results, with the quartz (insolubles) concentrations remained consistent during the measuring campaign. The mean statistical error, CV (%) between the Midfox and the laboratory results is 0.96 per cent. A large proportion of this, however, can be ascribed to the error between duplicate laboratory results (0.7 per cent). The mean error ascribed to the Midfox measurement alone in this instance is 0.7 per cent, which happens to be equal to laboratory error.

The absolute error (0.7 per cent) encountered with the Midfox measurements lie well within the range of concentrations (91.1 - 98.0 per cent) encountered during the sampling campaign, meaning that these fluctuations could be quantified by the Midfox analyser.

Rougher tails, BPL, Appendix A, Table 5, Figures 5,7.

The BPL values show a wide range of concentrations (0.4 - 3.5 per cent) as well as a large standard deviation (0.6 per cent). Due to the very low BPL contents of the tails in the slurries, the net relative error ascribed to the Midfox analyser alone is 27.8 per cent.

The absolute error (0.4 per cent) encountered with the Midfox measurements lies well within the range of concentrations (0.4 - 3.5 per cent) encountered during the sampling campaign, and such fluctuations could easily be assessed by the Midfox analyser.

Table 1. Comparative statistics for rougher tails.

	Quartz (insolubles)	BPL
Laboratory analyses, mean (%), standard deviation (%)	95.1 ±1.4	1.3 ±0.6
Range of concentrations	91.1 - 98.0	0.4 - 3.5
(a) Mean CV (%), Midfox - laboratory	0.96	28.4
(b) Mean CV (%), within laboratory	0.7	5.6
Net Midfox CV (%) = square root (a^2 - b^2) Absolute Midfox error (%) = CV(%) × mean (%)	0.7 0.7	27.8 0.4

7.2. Amine feeds

A set of 67 amine feeds samples were measured by Midfox and subsequently analysed by the IMC Agrico and Mintek laboratories (Appendix B, Tables 8, 9). The results of a further 255 samples analysed on the Midfox system are given in Appendix B, Tables 10, 11. The calibration curves for the quartz (insolubles) and the BPL are given in Appendix B, Figures 8 and 9. The plots of these two species, comparing the results of Midfox to those of the IMC Agrico analytical laboratories are given in Appendix B, Figures 10 and 11.

A summary of the statistics from Appendix B are given in Table 2 below.

Amine feeds, quartz (insolubles), Appendix B, Table 8, Figures 8, 10.

The quartz (insolubles) show a very large range of concentrations (10.3 - 44.0 per cent) and standard deviation (8.3 per cent). The net error between Midfox and the Four Corners laboratory is 8.6 per cent.

The absolute error (1.7 per cent) encountered with the Midfox measurements lies well within the range of concentrations (10.3 - 44.0 per cent) encountered during the sampling campaign, meaning that these fluctuations could be assessed by the Midfox analyser.

Amine feeds, BPL, Appendix B, Table 9, Figures 9, 11.

The feeds show a reasonable range of concentrations (40.2 - 64.6 per cent) and standard deviations (6.8 per cent). The relative error from the duplicate laboratory analyses is relatively small and the net error ascribed to Midfox is 4.2 per cent.

The absolute error (2.4 per cent) encountered with the Midfox measurements lie well within the range of concentrations (40.2 - 64.6 per cent) encountered during the sampling campaign, meaning that these fluctuations could be assessed by the Midfox analyser.

Table 2. Comparative statistics for amine feeds.

	Quartz (insolubles)	BPL
Laboratory analyses, mean (%), standard deviation (%)	19.9 ±8.3	57.6 ±6.07
Range of concentrations	10.3 - 44.00	40.2 - 64.6
(a) Mean CV (%), Midfox - laboratory	8.7	4.2
(b) Mean CV (%), within laboratory	1.8	0.5
Net Midfox CV (%) = square root (a^2 - b^2) Absolute Midfox error (%) = CV(%) × mean (%)	8.5 1.7	4.2 2.4

7.3. Final concentrates

A set of 38 concentrates samples were measured by Midfox and subsequently analysed by the IMC Agrico laboratory (Appendix C, Tables 12, 13). The results of a further 188 samples analysed on the Midfox system are given in Appendix C, Tables 14, 15. A few control samples were inserted in both data sets. The calibration curves for the quartz (insolubles) and the BPL are given in Appendix C, Figures 12 and 13. The plots of these two species, comparing the results of Midfox to those of the IMC Agrico analytical laboratory are given in Appendix C, Figures 14 and 15.

A summary of the statistics from Appendix C are given in Table 3 below.

Final concentrates, quartz (insolubles), Appendix C, Table 12, Figures 12, 14.

The range of concentrations (3.3 - 16.8 per cent) and standard deviation (3.0 per cent) of the quartz (insolubles) are large. The error ascribed to the duplicate analyses is also large (5.3 per cent) resulting a net error due to the Midfox analyser of 14.6 per cent.

The absolute error (1.0 per cent) encountered with the Midfox measurements lies well within the range of concentrations (3.3 - 16.8 per cent) encountered during the sampling campaign, meaning that these fluctuations could be assessed by the Midfox analyser.

Final concentrates, BPL, Appendix C, Table 13, Figures 13, 15.

From the standard deviation (2.6 per cent) it can be seen that most of the samples had BPL concentrations close to the mean of 68.6 per cent. The net relative error ascribed to the Midfox analyses is 3.4 per cent, meaning that small variations in BPL concentrations as is found here are not easily quantified. These closely clustered data are illustrated in Figure 15.

The absolute error (2.3 per cent) encountered with the Midfox measurements, however, lie within the total range of concentrations (59.8 - 72.2 per cent) encountered during the sampling campaign, meaning that the larger fluctuations in concentrations could be assessed by the Midfox analyser.

Table 3. Comparative statistics for final concentrates.

	Quartz (insolubles)	BPL
Laboratory analyses, mean (%), standard deviation (%)	6.9 ±3.0	68.6 ±2.6
Range of concentrations	3.3 - 16.8	59.8 - 72.2
(a) Mean CV (%), Midfox - laboratory	15.5	3.4
(b) Mean CV (%), within laboratory	5.3	0.34
Net Midfox CV (%) = square root (a^2 - b^2) Absolute Midfox error (%) = CV(%) × mean (%)	14.6 1.0	3.4 2.4

8. DISCUSSION OF RESULTS

The Midfox slurry transporting system of Midfox analyser, including the computer control thereof functioned most satisfactorily for a wide range of slurry densities encountered during the sampling campaign.

Although it was not the purpose of this project to test the primary sampling system, for subsequent projects attention needs to be given to ensuring consistent flow-rates and reasonable slurry densities (approximately 25 per cent solids) to the Midfox multiplexer tank.

The two Micromotion densitometers were not installed at the plant because of inconsistent flow-rates from the de-aerator tank and delays with interfacing them with the computer. One of these densitometers was later tested in the Mintek laboratories. Problems were encountered with measuring phosphate rock slurries with solids contents in excess of approximately 15 per cent. This problem was resolved by using a Micromotion densitometer of a slightly different design. It is therefore recommended that densitometers be integrated into the Midfox system so as to improve the data on the solids contents of the slurries.

However, for the purpose of this study the Midfox X-ray measurements proved to be adequate for the monitoring of the solids contents of the slurries.

The windowless sample presenter ensures that an adequately large sample is measured, and that concentrations of as low as 0.2 per cent quartz and BPL in the slurry can be measured. Such detection limits, especially for the BPL is required to quantify the very low concentrations of the rougher tails.

The statistical errors calculated from the Midfox data are perceived to be adequate for the manual or automated plant control. The plots of these two species, comparing all the results of Midfox to those of the IMC Agrico analytical laboratories are given in Appendix D, Figures 16 and 17.

It should be pointed out that all 163 samples were included in the course of this investigation, including any outliers. The statistics can be improved if the outliers had been filtered from the data sets.

9. CONCLUSIONS

In conclusion it can be stated that the Midfox system at the IMC Four Corners plant proved on-stream X-ray diffraction (XRD) to be an accurate, fast and reliable method for the real-time analysis of both quartz (insolubles) and apatite (BPL) in flotation plant products, over a wide range of mineral compositions. It also proved that the high quality of results that were previously obtained in the laboratory at Mintek, could equally well be achieved under severe plant conditions.

The statistical uncertainties of the Midfox measurements and the range of slurry compositions which were measured during the sampling campaign demonstrate the versatility of the analiser for the monitoring of quartz (insolubles) and BPL concentrations on a beneficiation plant. The range in plant product compositions occurring during the sampling campaign exceeded the Midfox measuring errors.

Preliminary laboratory investigations at Mintek have shown that the accuracy of the measurements can be greatly improved by replacing the existing scintillation detector system by a single position sensitive detector (PSD). The PSD has the advantage of simultaneously measuring all the diffraction peak and background intensities for any number of mineral phases in the slurry

In order to further enhance the quality of the Midfox results, it is suggested that the ruggedised commercial unit be shielded from adverse conditions such as variable temperatures, high humidities, vibrations, dust, and power failures.

To obtain greater accuracies the primary sampling system should ensure reasonably consistent slurry flows as well as slurry densities to the analyser.

The advantages of having an on-stream analyser such as Midfox to generate real-time data, and to ultimately achieve plant control, can be summarized as follows:

- The Midfox analyser operates on the principle of X-ray diffraction, which directly measures the apatite (francolite) and quartz concentrations in the slurries. On the beneficiation plant these are the specific minerals being floated. Other techniques such as X-ray fluorescence (XRF) spectrometry, wet chemical methods, neutron activation analysis (NAA) and nuclear magnetic resonance (NMR), however, measure the chemical compositions of materials, e.g. phosphorus (P) or silicon (Si) contents. Such chemical

analyses are re-calculated in terms of assumed mineral compositions. Silicon for example occurs in several minerals such as quartz and clay minerals, which could lead to incorrect mineral content calculations.

- No special skills are required of the operator. Once the system has been calibrated, it functions independently.
- The system has been designed to operate under plant conditions, with a minimum of maintenance required.
- The computer software is written in a user-friendly fashion, is Microsoft ® Windows™ based and allows for a variety of options such as measuring time and measuring sequence to be easily selected.
- All the data are automatically processed, displayed on the computer screen in the control room, filed on a hard drive from where it can be retrieved for further processing or archiving.
- The Midfox analyser generates real-time analyses of the flotation plant products every 8 minutes or less. Adjustments to the flotation circuit can be timeously executed from the control room. The Midfox measurements can ultimately be integrated into an automated plant control strategy.
- There is no sample preparation required. The slurries produced on the flotation circuit are continuously sampled and automatically fed into the analyser.
- Although the most reliable results are obtained on slurries with solids contents of 25 per cent, slurries with solids contents varying between 5 and 40 per cent can be readily measured.
- The windowless sample presenter and the design of the detector system allows for accurate measurements to be made on large representative samples. For normal 100 second measuring intervals and 25 per cent solids in a slurry, the mineral contents of approximately 1.25 kg of sample is measured. This allows for detection limits of better than 0.2 per cent for both quartz (insolubles) and BPL in the slurries to be achieved.

The most important benefits of having a Midfox analyser are:

- No pre-blending of flotation plant feeds from the different mining operations required.
- Maximizing on recoveries at rougher flotation step, by optimizing on fatty acid and other reagent additions.
- Optimizing on amine and other reagent additions at cleaner flotation step so as to ensure a consistent grade for the final product to the client or chemical plant.
- Savings on costs of flotation reagents.
- The measurements can be utilized in automated sampling and analyses, independent of operator, producing a result every 8 minutes or less.
- Automated feed-back and feed-forward plant control strategy.
- Less blending, or stacking and reclaiming of final product to achieve a specified final product grade.

Estimates of savings from better grades, recoveries, and manpower have shown that the investment in a Midfox system can be recovered in less than a year.

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Appendix A:

Rougher Tails

Table 4
Calibration data - rougher tails, quartz (insolubles)

Sample #	Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in slurry (%)	Solids content (%)	Midfox quartz (%)	Four Corners A-Lab insol.(%)	CV (%)
			Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)								
MF-111	15-Sep-94	11:25	9869	1481	2703	2835	0.56616	1.91482	17292	75.94	77.63	97.81	96.2	1.2
MF-112	15-Sep-94	15:55	8282	1952	2674	2799	0.70016	1.43355	9913	45.94	47.51	96.70	97.0	0.2
MF-113	16-Sep-94	12:05	8214	2072	2752	2890	0.71070	1.39446	9401	43.86	45.30	96.81	93.0	2.9
MF-114	20-Sep-94	09:20	5103	2613	2785	2891	0.84149	1.10661	3214	18.71	19.42	96.36	97.2	0.6
MF-115	22-Sep-94	10:37	7573	2203	2779	2892	0.74444	1.31317	7792	37.32	38.36	97.27	92.8	3.4
MF-116	22-Sep-94	16:18	7182	2232	2775	2918	0.75562	1.30694	7181	34.84	36.11	96.48	93.3	2.4
MF-117	23-Sep-94	13:12	8001	2211	2777	2899	0.73311	1.31087	8363	39.64	40.67	97.47	94.9	1.9
MF-119	26-Sep-94	10:30	7468	2082	2766	2881	0.73273	1.38334	8220	39.06	40.75	95.85	97.2	1.0
MF-120	27-Sep-94	13:07	6101	2464	2879	2998	0.80081	1.21639	5021	26.06	27.19	95.82	98.0	1.6
MF-121	07-Oct-94	10:37	5082	2682	2990	3125	0.83868	1.16488	3299	19.06	19.95	95.53	93.9	1.2
MF-122	07-Oct-94	10:45	5171	2672	3005	3148	0.83466	1.17780	3463	19.72	20.71	95.24	92.8	1.9
MF-123	07-Oct-94	10:54	5050	2698	3004	3154	0.83836	1.16928	3261	18.90	20.01	94.47	95.5	0.8
MF-124	07-Oct-94	11:02	5201	2654	3004	3149	0.83222	1.18619	3549	20.07	21.17	94.81	93.9	0.7
MF-125	07-Oct-94	11:10	5127	2757	3053	3199	0.83855	1.16028	3266	18.92	19.97	94.75	94.0	0.6
MF-126	07-Oct-94	11:35	5338	2793	3130	3280	0.83294	1.17453	3537	20.02	21.03	95.19	95.2	0.0
MF-127	07-Oct-94	11:42	5228	2853	3119	3277	0.83988	1.14877	3253	18.87	19.72	95.67	94.8	0.7
MF-128	07-Oct-94	11:51	5345	2846	3132	3284	0.83641	1.15405	3422	19.55	20.38	95.97	95.0	0.7
MF-129	07-Oct-94	12:15	5293	2829	3124	3287	0.83634	1.16187	3400	19.47	20.39	95.49	93.8	1.3
MF-130	07-Oct-94	12:23	5421	2757	3129	3286	0.82770	1.19178	3741	20.85	22.03	94.66	96.1	1.1
MF-131	07-Oct-94	13:34	4842	2826	3099	3266	0.84819	1.15578	2827	17.14	18.16	94.36	94.5	0.1
MF-132	07-Oct-94	13:42	4913	2874	3122	3295	0.84807	1.14655	2839	17.18	18.18	94.51	94.4	0.1
MF-133	07-Oct-94	14:30	5081	2862	3125	3300	0.84287	1.15305	3077	18.15	19.16	94.75	91.9	2.2
MF-134	07-Oct-94	14:38	4936	2910	3160	3323	0.84890	1.14221	2817	17.10	18.03	94.85	95.7	0.7
MF-135	07-Oct-94	17:09	4687	3038	3199	3391	0.85995	1.11623	2316	15.06	15.96	94.33	96.7	1.8
MF-136	19-Oct-94	11:26	4404	2806	2951	3121	0.86343	1.11219	2203	14.60	15.32	95.31	95.3	0.0
MF-137	19-Oct-94	11:35	4596	2734	2970	3149	0.85349	1.15185	2607	16.24	17.17	94.61	94.9	0.2
MF-138	19-Oct-94	11:51	3730	2715	2924	3095	0.87550	1.14027	1543	11.92	13.09	91.05	93.8	2.1
MF-139	25-Oct-94	09:12	5231	2549	2927	3099	0.82531	1.21605	3804	21.11	22.48	93.89	92.2	1.3
MF-140	25-Oct-94	09:20	5141	2547	2807	2969	0.83349	1.16544	3516	19.94	20.93	95.28	96.7	1.0
MF-141	25-Oct-94	09:27	5124	2573	2789	2956	0.83592	1.14899	3416	19.53	20.47	95.41	91.1	3.3
MF-142	25-Oct-94	09:35	5162	2566	2907	3045	0.83135	1.18679	3595	20.26	21.33	94.96	96.9	1.4
MF-143	25-Oct-94	09:43	5274	2560	2914	3070	0.82675	1.19903	3786	21.03	22.21	94.72	96.6	1.4
MF-144	25-Oct-94	10:10	5119	2471	2819	2995	0.82707	1.21207	3728	20.80	22.15	93.91	96.0	1.5
MF-145	25-Oct-94	10:18	5085	2502	2816	2982	0.83094	1.19193	3584	20.21	21.41	94.40	96.4	1.4
MF-146	25-Oct-94	10:26	5206	2496	2806	2975	0.82840	1.19202	3742	20.85	21.89	95.25	95.8	0.4

Table 4
Calibration data - rougher tails, quartz (insolubles)

			Slurry		Water									
Sample #	Date	Time	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in slurry (%)	Solids content (%)	Midfox quartz (%)	Four Corners A-Lab insol.(%)	CV (%)
MF-147	25-Oct-94	10:41	5191	2500	2839	2979	0.82826	1.19146	3718	20.76	21.92	94.70	96.7	1.5
MF-148	25-Oct-94	10:49	5233	2494	2839	2995	0.82603	1.20085	3810	21.13	22.34	94.57	96.1	1.1
MF-149	25-Oct-94	10:57	5302	2497	2842	3014	0.82380	1.20699	3916	21.56	22.77	94.70	95.8	0.8
MF-150	25-Oct-94	11:05	5159	2489	2841	3008	0.82723	1.20847	3747	20.87	22.12	94.39	95.3	0.7
MF-151	25-Oct-94	11:13	5243	2472	2798	2977	0.82470	1.20431	3859	21.33	22.60	94.39	95.5	0.8
MF-152	25-Oct-94	11:21	5136	2468	2821	2978	0.82712	1.20674	3734	20.82	22.14	94.07	96.2	1.6
MF-153	25-Oct-94	11:36	5241	2498	2804	2963	0.82731	1.18655	3767	20.96	22.10	94.83	94.4	0.4
MF-154	25-Oct-94	11:44	5155	2414	2786	2943	0.82463	1.21913	3858	21.33	22.61	94.33	95.4	0.8
MF-155	25-Oct-94	11:52	5081	2452	2774	2937	0.82969	1.19772	3649	20.48	21.65	94.59	94.4	0.1
MF-156	25-Oct-94	12:31	5143	2564	2887	3062	0.83065	1.19447	3600	20.28	21.47	94.46	94.1	0.3
MF-157	25-Oct-94	12:39	5114	2566	2893	3054	0.83219	1.19010	3545	20.05	21.17	94.71	95.1	0.3
MF-158	25-Oct-94	12:47	5198	2597	2883	3048	0.83269	1.17368	3563	20.13	21.08	95.49	94.9	0.4
MF-159	25-Oct-94	13:03	5127	2556	2866	3037	0.83225	1.18840	3566	20.14	21.16	95.17	95.3	0.1
MF-160	25-Oct-94	13:11	5139	2551	2878	3043	0.83168	1.19274	3599	20.28	21.27	95.33	94.7	0.5
MF-161	25-Oct-94	13:27	5095	2559	2862	3034	0.83376	1.18596	3513	19.92	20.88	95.43	95.6	0.1
MF-162	25-Oct-94	13:34	5146	2554	2876	3041	0.83160	1.19054	3597	20.27	21.29	95.22	95.6	0.3
MF-163	25-Oct-94	13:42	5283	2601	2876	3040	0.83175	1.16852	3645	20.46	21.26	96.27	96.6	0.3
MF-164	25-Oct-94	13:50	5336	2576	2888	3058	0.82791	1.18690	3802	21.10	21.99	95.97	95.9	0.0
MF-165	25-Oct-94	15:19	5183	2659	2941	3131	0.83455	1.17732	3489	19.83	20.73	95.65	95.7	0.0
MF-166	25-Oct-94	15:26	5108	2661	2949	3126	0.83702	1.17470	3384	19.40	20.26	95.76	95.3	0.4
MF-167	25-Oct-94	15:34	5157	2625	2921	3101	0.83415	1.18171	3507	19.90	20.80	95.67	95.5	0.1
MF-168	25-Oct-94	15:42	5132	2602	2890	3086	0.83342	1.18595	3515	19.93	20.94	95.19	95.2	0.0
MF-169	25-Oct-94	15:50	5094	2625	2891	3074	0.83696	1.17106	3393	19.44	20.27	95.88	93.6	1.7
													Mean	0.96

Table 5
Calibration data - rougher tails, BPL

Sample #	Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	BPL in slurry (%)	Solids content (%)	Midfox BPL (%)	Four Corners A-Lab BPL (%)	CV (%)
			BPL peak int. (cts/s)	BPL bkg int. (cts/s)	BPL peak int. (cts/s)	BPL bkg int. (cts/s)								
MF-111	15-Sep-94	11:25	1061	1088	2628	2296	0.88974	2.11027	197	0.67	77.63	0.86	1.5	30.7
MF-112	15-Sep-94	15:55	1493	1432	2547	2249	0.97253	1.57010	157	0.54	47.51	1.13	0.4	146.1
MF-113	16-Sep-94	12:05	1820	1747	2908	2581	0.97932	1.47776	161	0.55	45.30	1.22	2.1	29.3
MF-114	20-Sep-94	09:20	1090	984	2912	2583	1.06610	2.62469	106	0.37	19.42	1.90	0.8	108.4
MF-115	22-Sep-94	10:37	1907	1838	2935	2598	1.00126	1.41332	94	0.33	38.36	0.86	3.5	53.2
MF-116	22-Sep-94	16:18	1959	1859	3101	2718	1.00861	1.46248	123	0.43	36.11	1.18	2.9	42.3
MF-117	23-Sep-94	13:12	1842	1766	2907	2546	0.99385	1.44132	125	0.43	40.67	1.06	2.5	41.2
MF-119	26-Sep-94	10:30	1916	1807	2837	2484	0.99360	1.37497	167	0.57	40.75	1.40	1.0	33.4
MF-120	27-Sep-94	13:07	2316	2142	2946	2587	1.03863	1.20780	110	0.38	27.19	1.41	0.5	128.1
MF-121	07-Oct-94	10:37	2365	2193	2971	2603	1.06419	1.18699	38	0.14	19.95	0.71	0.7	1.1
MF-122	07-Oct-94	10:45	2347	2176	3003	2624	1.06146	1.20553	45	0.17	20.71	0.80	1.2	23.3
MF-123	07-Oct-94	10:54	2392	2189	2982	2632	1.06398	1.20275	77	0.27	20.01	1.35	1.2	10.8
MF-124	07-Oct-94	11:02	2341	2162	2982	2626	1.05981	1.21488	61	0.22	21.17	1.03	1.1	5.6
MF-125	07-Oct-94	11:10	2432	2222	3046	2675	1.06410	1.20392	81	0.29	19.97	1.44	1.3	8.6
MF-126	07-Oct-94	11:35	2473	2283	3122	2736	1.06029	1.19860	63	0.22	21.03	1.07	1.0	6.5
MF-127	07-Oct-94	11:42	2505	2305	3112	2732	1.06500	1.18528	59	0.21	19.72	1.08	0.7	33.5
MF-128	07-Oct-94	11:51	2501	2312	3113	2734	1.06265	1.18270	53	0.19	20.38	0.94	0.5	65.1
MF-129	07-Oct-94	12:15	2501	2308	3116	2735	1.06260	1.18495	58	0.21	20.39	1.02	0.6	42.8
MF-130	07-Oct-94	12:23	2482	2284	3112	2732	1.05674	1.19619	81	0.29	22.03	1.30	0.9	33.4
MF-131	07-Oct-94	13:34	2520	2311	3081	2704	1.07066	1.16992	53	0.19	18.16	1.06	1.3	11.3
MF-132	07-Oct-94	13:42	2549	2327	3103	2726	1.07058	1.17137	67	0.24	18.18	1.32	1.1	17.8
MF-133	07-Oct-94	14:30	2566	2347	3117	2749	1.06704	1.17168	73	0.26	19.16	1.35	0.7	70.6
MF-134	07-Oct-94	14:38	2596	2377	3137	2753	1.07115	1.15819	58	0.21	18.03	1.17	0.9	19.0
MF-135	07-Oct-94	17:09	2694	2439	3201	2818	1.07869	1.15552	73	0.26	15.96	1.62	1.4	8.5
MF-136	19-Oct-94	11:26	2266	2074	2911	2567	1.08107	1.23785	30	0.12	15.32	0.76	1.3	30.4
MF-137	19-Oct-94	11:35	2183	2014	2920	2568	1.07428	1.27479	24	0.10	17.17	0.56	1.4	42.3
MF-138	19-Oct-94	11:51	2426	2201	2881	2520	1.08935	1.14495	33	0.12	13.09	0.95	1.6	27.9
MF-139	25-Oct-94	09:12	2093	1919	2838	2491	1.05513	1.29798	88	0.31	22.48	1.37	1.7	12.7
MF-140	25-Oct-94	09:20	2101	1925	2728	2394	1.06067	1.24346	74	0.26	20.93	1.25	1.7	17.9
MF-141	25-Oct-94	09:27	2130	1938	2713	2381	1.06232	1.22835	87	0.30	20.47	1.49	1.8	12.5
MF-142	25-Oct-94	09:35	2105	1943	2797	2456	1.05922	1.26386	59	0.21	21.33	0.99	1.3	16.5
MF-143	25-Oct-94	09:43	2118	1953	2814	2476	1.05611	1.26817	71	0.25	22.21	1.13	1.5	16.5
MF-144	25-Oct-94	10:10	2022	1852	2735	2398	1.05632	1.29487	86	0.30	22.15	1.36	1.9	19.1
MF-145	25-Oct-94	10:18	2053	1881	2750	2410	1.05894	1.28113	78	0.28	21.41	1.29	1.4	4.0
MF-146	25-Oct-94	10:26	2045	1897	2738	2402	1.05722	1.26608	50	0.18	21.89	0.84	1.2	19.5

Table 5
Calibration data - rougher tails, BPL

Sample #	Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	BPL in slurry (%)	Solids content (%)	Midfox BPL (%)	Four Corners A-Lab BPL (%)	CV (%)
			BPL peak int. (cts/s)	BPL bkg int. (cts/s)	BPL peak int. (cts/s)	BPL bkg int. (cts/s)								
MF-147	25-Oct-94	10:41	2070	1899	2738	2406	1.05712	1.26673	79	0.28	21.92	1.27	1.1	8.3
MF-148	25-Oct-94	10:49	2054	1887	2754	2421	1.05562	1.28288	79	0.28	22.34	1.25	1.3	3.2
MF-149	25-Oct-94	10:57	2057	1897	2769	2414	1.05411	1.27263	73	0.26	22.77	1.14	1.5	16.3
MF-150	25-Oct-94	11:05	2050	1890	2768	2407	1.05643	1.27352	68	0.24	22.12	1.10	1.3	12.1
MF-151	25-Oct-94	11:13	2024	1854	2731	2391	1.05471	1.29004	89	0.31	22.60	1.38	1.6	8.6
MF-152	25-Oct-94	11:21	2035	1863	2735	2402	1.05635	1.28975	87	0.31	22.14	1.38	1.8	17.6
MF-153	25-Oct-94	11:36	2044	1871	2728	2387	1.05648	1.27578	86	0.30	22.10	1.37	1.6	8.7
MF-154	25-Oct-94	11:44	1942	1793	2699	2364	1.05467	1.31813	67	0.24	22.61	1.06	1.3	15.1
MF-155	25-Oct-94	11:52	1978	1821	2699	2365	1.05809	1.29863	65	0.23	21.65	1.08	1.4	16.2
MF-156	25-Oct-94	12:31	2067	1900	2809	2461	1.05874	1.29510	71	0.25	21.47	1.18	1.5	14.4
MF-157	25-Oct-94	12:39	2072	1912	2811	2474	1.05979	1.29437	60	0.21	21.17	1.01	1.4	20.8
MF-158	25-Oct-94	12:47	2091	1933	2807	2464	1.06012	1.27446	52	0.19	21.08	0.90	1.3	23.2
MF-159	25-Oct-94	13:03	2051	1905	2775	2446	1.05983	1.28414	41	0.15	21.16	0.73	0.9	15.5
MF-160	25-Oct-94	13:11	2009	1875	2785	2436	1.05944	1.29917	29	0.11	21.27	0.53	1.2	39.3
MF-161	25-Oct-94	13:27	2052	1915	2802	2443	1.06085	1.27596	27	0.10	20.88	0.50	0.9	32.1
MF-162	25-Oct-94	13:34	2046	1903	2793	2459	1.05939	1.29211	38	0.14	21.29	0.67	1.0	21.1
MF-163	25-Oct-94	13:42	2105	1964	2802	2464	1.05949	1.25463	31	0.12	21.26	0.55	1.1	34.2
MF-164	25-Oct-94	13:50	2078	1946	2807	2473	1.05689	1.27093	27	0.11	21.99	0.49	0.8	29.4
MF-165	25-Oct-94	15:19	2116	1972	2869	2525	1.06138	1.28050	29	0.11	20.73	0.53	0.7	18.4
MF-166	25-Oct-94	15:26	2106	1969	2859	2512	1.06306	1.27614	17	0.07	20.26	0.35	0.7	36.2
MF-167	25-Oct-94	15:34	2073	1938	2856	2510	1.06111	1.29533	21	0.09	20.80	0.42	0.6	22.7
MF-168	25-Oct-94	15:42	2075	1927	2826	2473	1.06062	1.28294	39	0.15	20.94	0.69	0.7	4.9
MF-169	25-Oct-94	15:50	2072	1936	2829	2482	1.06302	1.28228	19	0.08	20.27	0.39	0.9	39.6
													Mean	28.4

Table 6
Results - rougher tails, quartz (insolubles)

		Slurry		Water							
Date	Time	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
16-Sep	11:45	8165	2085	2755	2880	0.7143	1.3814	9222	43.13	44.55	96.82
20-Sep	10:01	5953	2450	2778	2898	0.8085	1.1828	4698	24.74	25.70	96.29
20-Sep	10:16	6476	2391	2799	2920	0.7895	1.2213	5604	28.43	29.40	96.70
20-Sep	10:30	5742	2585	2837	2971	0.8209	1.1495	4162	22.56	23.32	96.74
20-Sep	11:01	4963	2781	2897	3016	0.8511	1.0843	2814	17.08	17.62	96.98
22-Sep	10:55	6878	2171	2782	2915	0.7499	1.3424	7048	34.29	37.26	92.03
22-Sep	11:10	7211	2074	2780	2911	0.7308	1.4034	7992	38.13	41.15	92.67
22-Sep	11:24	7433	2254	2780	2902	0.7519	1.2876	7388	35.68	36.85	96.82
22-Sep	11:39	7323	2263	2761	2877	0.7577	1.2714	7131	34.63	35.69	97.03
22-Sep	11:53	7482	2281	2456	2565	0.7773	1.1246	6420	31.74	31.80	99.84
22-Sep	12:07	6628	2353	2726	2862	0.7848	1.2164	5817	29.29	30.32	96.61
22-Sep	12:22	5905	2513	2771	2908	0.8139	1.1573	4467	23.80	24.66	96.55
22-Sep	12:36	8148	2039	2744	2881	0.7078	1.4134	9477	44.17	45.90	96.23
22-Sep	12:51	7786	2126	2766	2913	0.7260	1.3706	8556	40.43	42.13	95.96
22-Sep	13:05	8518	1853	2772	2928	0.6658	1.5803	11512	52.44	54.86	95.59
22-Sep	14:06	7196	2183	2795	2936	0.7480	1.3451	7483	36.06	37.64	95.82
22-Sep	14:20	5866	2460	2786	2929	0.8090	1.1907	4616	24.41	25.60	95.33
22-Sep	14:35	5420	2575	2792	2936	0.8298	1.1403	3744	20.86	21.62	96.51
22-Sep	14:49	5353	2576	2781	2925	0.8318	1.1355	3645	20.46	21.25	96.31
22-Sep	15:04	7429	2101	2771	2914	0.7316	1.3868	8171	38.86	40.97	94.85
22-Sep	15:18	5307	2579	2786	2914	0.8334	1.1299	3568	20.15	20.94	96.21
22-Sep	15:32	7054	2169	2705	2842	0.7581	1.3104	7090	34.46	35.61	96.77
22-Sep	16:58	7702	2069	2784	2933	0.7234	1.4175	8796	41.40	42.67	97.01
22-Sep	17:06	7837	2057	2762	2902	0.7205	1.4106	8964	42.08	43.27	97.26
22-Sep	17:14	8309	1945	2817	2967	0.6861	1.5249	10635	48.88	50.48	96.81
22-Sep	17:21	7890	2096	2817	2968	0.7187	1.4163	9041	42.39	43.63	97.17
22-Sep	17:29	7822	2122	2800	2951	0.7243	1.3907	8741	41.18	42.47	96.95
22-Sep	17:37	6991	2339	2804	2956	0.7700	1.2640	6561	32.31	33.23	97.23
22-Sep	17:45	7794	2016	2808	2953	0.7102	1.4648	9320	43.53	45.40	95.89
22-Sep	17:53	6994	2197	2787	2930	0.7555	1.3335	7114	34.56	36.13	95.66
23-Sep	13:22	8056	2164	2803	2935	0.7222	1.3564	8807	41.45	42.92	96.57
23-Sep	13:35	8345	2210	2826	2953	0.7189	1.3362	9028	42.34	43.60	97.11
23-Sep	13:48	7988	2224	2827	2962	0.7296	1.3320	8479	40.11	41.39	96.91
23-Sep	14:01	8532	2081	2828	2947	0.6973	1.4164	10031	46.42	48.12	96.48
23-Sep	14:14	8609	2245	2899	3036	0.7104	1.3524	9486	44.21	45.37	97.44
23-Sep	14:27	6748	2610	2888	3021	0.7950	1.1576	5410	27.63	28.33	97.55
23-Sep	15:18	3494	3046	2939	3097	0.8965	1.0167	776	8.80	9.26	95.08
23-Sep	15:31	3292	2986	2966	3115	0.8979	1.0435	638	8.24	9.01	91.48
23-Sep	18:47	5484	2542	2762	2921	0.8264	1.1492	3888	21.45	22.27	96.33
26-Sep	10:16	7112	2145	2790	2916	0.7469	1.3595	7490	36.09	37.87	95.30
26-Sep	10:47	6624	2359	2806	2930	0.7803	1.2422	5943	29.80	31.21	95.50
26-Sep	11:00	3574	2806	2762	2888	0.8885	1.0292	1113	10.17	10.72	94.88
26-Sep	11:13	3194	2792	2786	2915	0.8964	1.0438	721	8.57	9.28	92.43
26-Sep	11:58	7448	1889	2570	2682	0.7236	1.4198	8633	40.74	42.62	95.59
26-Sep	12:34	6667	2219	2919	3065	0.7609	1.3813	6877	33.60	35.04	95.89
26-Sep	12:47	6504	2322	2925	3072	0.7738	1.3229	6227	30.96	32.48	95.32
26-Sep	13:00	6686	2334	2925	3071	0.7703	1.3155	6429	31.78	33.17	95.80
27-Sep	13:16	6095	2417	2829	2957	0.7990	1.2238	5095	26.36	27.54	95.70
27-Sep	13:29	6109	2530	2831	2959	0.8072	1.1694	4755	24.97	25.95	96.25
27-Sep	13:42	6361	2401	2877	3024	0.7855	1.2596	5637	28.56	30.17	94.67
27-Sep	14:17	5164	2623	2926	3081	0.8332	1.1748	3499	19.87	20.99	94.65
27-Sep	14:30	5586	2469	2939	3076	0.8097	1.2461	4471	23.82	25.47	93.50
27-Sep	14:43	5125	2674	2958	3111	0.8366	1.1633	3359	19.30	20.34	94.86
27-Sep	16:13	6740	2117	2874	3027	0.7477	1.4298	7374	35.62	37.71	94.45

Table 6

Results - rougher tails, quartz (insolubles)

Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
		Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)						
27-Sep	17:10	7214	2327	2866	3022	0.7564	1.2988	7084	34.44	35.95	95.81
29-Sep	10:30	6262	2240	2783	2914	0.7793	1.3010	5877	29.53	31.40	94.05
29-Sep	11:18	6284	1800	2816	2956	0.7269	1.6426	8174	38.87	41.94	92.68
07-Oct	10:19	5164	2624	3016	3155	0.8311	1.2023	3587	20.23	21.39	94.58
07-Oct	10:27	5010	2681	2989	3139	0.8397	1.1710	3231	18.78	19.76	95.02
07-Oct	11:19	5285	2774	3064	3219	0.8353	1.1605	3444	19.64	20.58	95.47
07-Oct	11:27	5043	2840	3129	3285	0.8426	1.1567	3065	18.10	19.21	94.24
07-Oct	11:59	5299	2850	3131	3297	0.8375	1.1568	3369	19.34	20.18	95.84
07-Oct	12:07	5389	2818	3140	3299	0.8325	1.1706	3562	20.12	21.11	95.33
07-Oct	12:31	5239	2753	3078	3243	0.8344	1.1782	3466	19.73	20.75	95.11
07-Oct	12:39	5244	2745	3048	3196	0.8355	1.1645	3437	19.61	20.55	95.43
07-Oct	12:47	5357	2748	3047	3207	0.8328	1.1670	3580	20.20	21.07	95.89
07-Oct	12:55	5077	2771	3034	3200	0.8409	1.1547	3172	18.54	19.54	94.89
07-Oct	13:03	4830	2783	3032	3196	0.8476	1.1483	2838	17.18	18.27	94.04
07-Oct	13:51	4873	2871	3118	3295	0.8490	1.1477	2795	17.01	18.02	94.40
07-Oct	13:59	4999	2853	3139	3302	0.8446	1.1573	2997	17.83	18.84	94.64
07-Oct	14:07	5049	2823	3120	3299	0.8418	1.1686	3123	18.34	19.36	94.73
07-Oct	14:14	5146	2827	3115	3294	0.8400	1.1651	3229	18.77	19.71	95.25
07-Oct	14:22	5117	2835	3130	3318	0.8398	1.1701	3201	18.66	19.74	94.53
07-Oct	14:30	5081	2862	3125	3300	0.8429	1.1530	3077	18.15	19.16	94.75
07-Oct	14:38	4936	2910	3160	3323	0.8489	1.1422	2817	17.10	18.03	94.85
07-Oct	14:46	5052	2892	3189	3368	0.8430	1.1645	3044	18.02	19.14	94.16
07-Oct	14:58	5021	2914	3161	3331	0.8467	1.1431	2919	17.51	18.45	94.94
07-Oct	15:11	5178	2894	3187	3361	0.8404	1.1615	3190	18.61	19.62	94.85
07-Oct	15:24	5144	2966	3190	3369	0.8455	1.1361	2995	17.82	18.67	95.46
07-Oct	15:32	4769	3054	3209	3373	0.8594	1.1043	2367	15.27	16.06	95.06
07-Oct	15:40	4394	3122	3204	3381	0.8722	1.0830	1809	13.00	13.70	94.92
07-Oct	15:48	3867	3222	3174	3355	0.8904	1.0414	1040	9.87	10.37	95.19
07-Oct	16:00	3682	3300	3230	3405	0.8972	1.0320	744	8.67	9.13	94.99
07-Oct	16:38	4517	3085	3174	3348	0.8679	1.0851	1996	13.76	14.49	94.92
07-Oct	16:45	4158	3180	3213	3394	0.8799	1.0673	1451	11.54	12.27	94.04
07-Oct	16:53	4413	3113	3199	3385	0.8705	1.0871	1851	13.17	14.02	93.95
07-Oct	17:01	4354	3115	3202	3399	0.8718	1.0914	1788	12.91	13.77	93.77
07-Oct	17:09	4687	3038	3199	3391	0.8600	1.1162	2316	15.06	15.96	94.33
07-Oct	17:17	4982	2984	3210	3403	0.8493	1.1403	2791	16.99	17.96	94.62
07-Oct	17:25	5195	2926	3195	3377	0.8419	1.1542	3153	18.46	19.34	95.44
07-Oct	17:33	5104	2861	3155	3331	0.8415	1.1642	3139	18.41	19.42	94.79
07-Oct	17:41	5040	2859	3106	3281	0.8453	1.1475	3010	17.88	18.71	95.59
07-Oct	17:48	5208	2808	3094	3268	0.8380	1.1638	3323	19.15	20.08	95.39
07-Oct	17:56	5110	2802	3084	3258	0.8408	1.1628	3203	18.67	19.54	95.52
07-Oct	18:04	5009	2769	3030	3199	0.8437	1.1551	3088	18.20	19.00	95.75
07-Oct	18:12	4880	2812	3031	3207	0.8491	1.1406	2843	17.20	17.99	95.62
07-Oct	18:20	5063	2756	3015	3191	0.8417	1.1581	3177	18.56	19.39	95.74
07-Oct	18:28	4974	2741	3053	3223	0.8418	1.1759	3136	18.39	19.36	94.98
07-Oct	18:36	4842	2782	3032	3186	0.8497	1.1454	2838	17.18	17.88	96.08
07-Oct	18:43	4751	2795	3031	3204	0.8512	1.1463	2719	16.70	17.60	94.86
07-Oct	18:51	4574	2810	2997	3163	0.8582	1.1255	2434	15.54	16.28	95.41
07-Oct	18:59	4421	2839	3005	3174	0.8633	1.1181	2203	14.60	15.35	95.13
07-Oct	19:07	4462	2808	2973	3150	0.8614	1.1218	2292	14.96	15.69	95.38
07-Oct	19:15	4396	2804	2978	3132	0.8637	1.1167	2204	14.60	15.26	95.69
11-Oct	08:31	3043	3211	3072	3228	0.9114	1.0052	117	6.12	6.56	93.26
11-Oct	08:41	3035	3197	3030	3184	0.9120	0.9957	118	6.12	6.46	94.79
11-Oct	16:07	5244	2718	3080	3254	0.8303	1.1972	3576	20.18	21.54	93.70
11-Oct	16:15	5296	2683	3077	3259	0.8265	1.2144	3738	20.84	22.25	93.67

Table 6

Results - rougher tails, quartz (insolubles)

		Slurry		Water							
Date	Time	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
11-Oct	16:23	2879	3056	3062	3227	0.9089	1.0558	107	6.08	7.02	86.61
19-Oct	08:33	3020	3064	2943	3087	0.9088	1.0075	238	6.61	7.04	93.93
25-Oct	08:56	5218	2566	2926	3085	0.8281	1.2022	3719	20.76	21.94	94.62
25-Oct	09:04	5253	2565	2903	3050	0.8280	1.1890	3720	20.77	21.96	94.56
25-Oct	09:12	5231	2549	2927	3099	0.8253	1.2160	3804	21.11	22.48	93.89
25-Oct	09:20	5141	2547	2807	2969	0.8335	1.1654	3516	19.94	20.93	95.28
25-Oct	09:27	5124	2573	2789	2956	0.8359	1.1490	3416	19.53	20.47	95.41
25-Oct	09:35	5162	2566	2907	3045	0.8314	1.1868	3595	20.26	21.33	94.96
25-Oct	09:43	5274	2560	2914	3070	0.8268	1.1990	3786	21.03	22.21	94.72
25-Oct	10:10	5119	2471	2819	2995	0.8271	1.2121	3728	20.80	22.15	93.91
25-Oct	10:18	5085	2502	2816	2982	0.8309	1.1919	3584	20.21	21.41	94.40
25-Oct	10:26	5206	2496	2806	2975	0.8284	1.1920	3742	20.85	21.89	95.25
25-Oct	10:33	5166	2494	2825	2992	0.8283	1.2000	3721	20.77	21.92	94.77
25-Oct	10:41	5191	2500	2839	2979	0.8283	1.1915	3718	20.76	21.92	94.70
25-Oct	10:49	5233	2494	2839	2995	0.8260	1.2008	3810	21.13	22.34	94.57
25-Oct	10:57	5302	2497	2842	3014	0.8238	1.2070	3916	21.56	22.77	94.70
25-Oct	11:05	5159	2489	2841	3008	0.8272	1.2085	3747	20.87	22.12	94.39
25-Oct	11:13	5243	2472	2798	2977	0.8247	1.2043	3859	21.33	22.60	94.39
25-Oct	11:21	5136	2468	2821	2978	0.8271	1.2067	3734	20.82	22.14	94.07
25-Oct	11:29	5102	2462	2793	2956	0.8288	1.2006	3675	20.59	21.82	94.36
25-Oct	11:36	5241	2498	2804	2963	0.8273	1.1866	3767	20.96	22.10	94.83
25-Oct	11:44	5155	2414	2786	2943	0.8246	1.2191	3858	21.33	22.61	94.33
25-Oct	11:52	5081	2452	2774	2937	0.8297	1.1977	3649	20.48	21.65	94.59
25-Oct	12:00	5341	2445	2774	2939	0.8222	1.2019	4003	21.92	23.07	94.98
25-Oct	12:08	5079	2522	2775	2940	0.8350	1.1657	3465	19.73	20.64	95.58
25-Oct	12:16	4870	2524	2788	2951	0.8402	1.1692	3215	18.71	19.67	95.14
25-Oct	12:24	5210	2527	2824	2987	0.8299	1.1822	3680	20.61	21.62	95.32
25-Oct	12:31	5143	2564	2887	3062	0.8306	1.1945	3600	20.28	21.47	94.46
25-Oct	12:39	5114	2566	2893	3054	0.8322	1.1901	3545	20.05	21.17	94.71
25-Oct	12:47	5198	2597	2883	3048	0.8327	1.1737	3563	20.13	21.08	95.49
25-Oct	12:55	5101	2562	2868	3052	0.8321	1.1912	3537	20.02	21.18	94.52
25-Oct	13:03	5127	2556	2866	3037	0.8323	1.1884	3566	20.14	21.16	95.17
25-Oct	13:11	5139	2551	2878	3043	0.8317	1.1927	3599	20.28	21.27	95.33
25-Oct	13:19	5111	2553	2841	3016	0.8332	1.1815	3526	19.98	20.99	95.17
25-Oct	13:27	5095	2559	2862	3034	0.8338	1.1860	3513	19.92	20.88	95.43
25-Oct	13:34	5146	2554	2876	3041	0.8316	1.1905	3597	20.27	21.29	95.22
25-Oct	13:42	5283	2601	2876	3040	0.8318	1.1685	3645	20.46	21.26	96.27
25-Oct	13:50	5336	2576	2888	3058	0.8279	1.1869	3802	21.10	21.99	95.97
25-Oct	13:58	5412	2587	2926	3103	0.8247	1.1996	3933	21.63	22.59	95.76
25-Oct	14:06	5433	2608	2919	3090	0.8262	1.1847	3884	21.43	22.31	96.06
25-Oct	14:14	5293	2661	2957	3128	0.8315	1.1757	3622	20.37	21.31	95.59
25-Oct	14:55	5125	2655	2939	3106	0.8368	1.1701	3398	19.46	20.31	95.80
25-Oct	15:03	5138	2666	2940	3115	0.8371	1.1682	3395	19.44	20.25	96.03
25-Oct	15:11	5076	2656	2917	3108	0.8382	1.1704	3336	19.20	20.03	95.88
25-Oct	15:19	5183	2659	2941	3131	0.8345	1.1773	3489	19.83	20.73	95.65
25-Oct	15:26	5108	2661	2949	3126	0.8370	1.1747	3384	19.40	20.26	95.76
25-Oct	15:34	5157	2625	2921	3101	0.8341	1.1817	3507	19.90	20.80	95.67
25-Oct	15:42	5132	2602	2890	3086	0.8334	1.1860	3515	19.93	20.94	95.19
25-Oct	15:50	5094	2625	2891	3074	0.8370	1.1711	3393	19.44	20.27	95.88
25-Oct	15:58	5167	2601	2884	3060	0.8341	1.1765	3526	19.98	20.81	95.99
25-Oct	16:06	5219	2594	2912	3087	0.8313	1.1901	3645	20.46	21.35	95.85
25-Oct	16:14	5189	2610	2896	3078	0.8336	1.1791	3553	20.09	20.90	96.12
25-Oct	16:22	5154	2701	2934	3117	0.8388	1.1540	3333	19.19	19.92	96.38
25-Oct	16:29	5137	2671	2957	3143	0.8359	1.1767	3417	19.54	20.47	95.42

Table 6

Results - rougher tails, quartz (insolubles)

Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
		Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)						
25-Oct	16:37	5165	2671	2933	3119	0.8365	1.1677	3422	19.55	20.36	96.03
25-Oct	16:45	4920	2559	2884	3079	0.8360	1.2032	3346	19.24	20.45	94.13
25-Oct	16:53	4946	2600	2865	3035	0.8402	1.1671	3222	18.74	19.66	95.34
25-Oct	17:01	4940	2629	2900	3077	0.8411	1.1706	3194	18.63	19.48	95.62
25-Oct	17:09	5032	2602	2874	3062	0.8377	1.1767	3356	19.29	20.13	95.82
25-Oct	17:17	4861	2587	2830	3006	0.8430	1.1620	3114	18.31	19.13	95.69
25-Oct	17:25	4766	2533	2863	3021	0.8406	1.1927	3145	18.43	19.58	94.13
25-Oct	17:32	4820	2492	2779	2939	0.8403	1.1792	3215	18.71	19.64	95.26
25-Oct	17:40	5063	2628	2886	3060	0.8384	1.1641	3329	19.18	20.00	95.88
25-Oct	17:48	5005	2577	2889	3052	0.8368	1.1841	3372	19.35	20.31	95.30
25-Oct	17:56	5029	2627	2879	3055	0.8395	1.1632	3285	19.00	19.79	95.99
25-Oct	18:04	5028	2627	2891	3060	0.8390	1.1648	3289	19.02	19.89	95.61
25-Oct	18:12	5156	2603	2905	3089	0.8326	1.1867	3546	20.06	21.09	95.13
25-Oct	18:20	5023	2634	2915	3094	0.8379	1.1746	3308	19.09	20.10	94.97
25-Oct	18:27	5089	2618	2920	3106	0.8341	1.1867	3448	19.66	20.80	94.51
25-Oct	18:35	5067	2593	2890	3079	0.8336	1.1874	3450	19.67	20.90	94.11
25-Oct	18:43	5048	2560	2899	3071	0.8313	1.1999	3504	19.89	21.35	93.15
25-Oct	18:51	3838	2923	2901	3074	0.8840	1.0518	1319	11.01	11.53	95.47
25-Oct	18:59	3365	3105	2952	3131	0.9020	1.0084	568	7.96	8.25	96.38
25-Oct	19:07	3192	3156	3005	3196	0.9064	1.0127	336	7.01	7.47	93.80
25-Oct	19:15	3075	3146	2994	3167	0.9094	1.0069	216	6.52	6.93	94.12
25-Oct	19:23	2946	3120	2967	3133	0.9118	1.0041	101	6.06	6.49	93.36
25-Oct	19:30	2947	3117	2939	3119	0.9120	1.0007	104	6.07	6.45	94.05
27-Oct	07:37	2754	2898	2867	3008	0.9095	1.0378	122	6.14	6.91	88.90
27-Oct	08:03	2692	2813	2812	2963	0.9082	1.0534	145	6.23	7.15	87.18
27-Oct	08:16	2617	2758	2799	2940	0.9076	1.0663	122	6.14	7.26	84.61

Table 7
Results - rougher tails, BPL

Date	Time	Slurry BPL peak int. (cts/s)	Slurry BPL bkg int. (cts/s)	Water BPL peak int. (cts/s)	Water BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
16-Sep	11:45	1872	1792	2911	2567	0.9816	1.4327	162	0.56	44.55	1.25
20-Sep	10:01	2290	2110	2930	2591	1.0438	1.2277	107	0.37	25.70	1.45
20-Sep	10:16	2058	1926	2953	2613	1.0311	1.3569	98	0.34	29.40	1.17
20-Sep	10:30	2337	2148	3001	2648	1.0521	1.2327	95	0.33	23.32	1.42
20-Sep	11:01	2590	2341	3046	2691	1.0726	1.1494	91	0.32	17.62	1.81
22-Sep	10:55	2045	1735	2957	2613	1.0048	1.5061	455	1.53	37.26	4.11
22-Sep	11:10	2188	1887	2955	2612	0.9923	1.3845	436	1.47	41.15	3.57
22-Sep	11:24	1996	1883	2958	2600	1.0062	1.3810	140	0.48	36.85	1.31
22-Sep	11:39	1961	1854	2924	2575	1.0100	1.3890	123	0.43	35.69	1.19
22-Sep	11:53	1979	1869	2934	2602	1.0229	1.3917	93	0.33	31.80	1.03
22-Sep	12:07	2196	2036	2914	2570	1.0279	1.2622	130	0.45	30.32	1.48
22-Sep	12:22	2378	2177	2952	2611	1.0475	1.1995	118	0.41	24.66	1.66
22-Sep	12:36	1762	1665	2937	2573	0.9775	1.5452	207	0.71	45.90	1.54
22-Sep	12:51	1942	1817	2963	2608	0.9892	1.4358	208	0.71	42.13	1.68
22-Sep	13:05	1283	1204	2955	2606	0.9507	2.1638	299	1.01	54.86	1.84
22-Sep	14:06	1772	1672	3111	2731	1.0036	1.6340	154	0.53	37.64	1.41
22-Sep	14:20	2268	2066	3103	2725	1.0441	1.3192	146	0.50	25.60	1.96
22-Sep	14:35	2464	2262	3125	2732	1.0582	1.2078	85	0.30	21.62	1.38
22-Sep	14:49	2450	2238	3117	2720	1.0595	1.2150	95	0.33	21.25	1.56
22-Sep	15:04	2306	2118	3107	2725	0.9929	1.2861	261	0.89	40.97	2.16
22-Sep	15:18	2519	2293	3116	2721	1.0606	1.1866	103	0.36	20.94	1.71
22-Sep	15:32	1824	1752	3028	2650	1.0102	1.5126	82	0.29	35.61	0.81
22-Sep	16:58	1542	1525	3104	2718	0.9875	1.7821	64	0.23	42.67	0.53
22-Sep	17:06	1618	1606	3063	2694	0.9856	1.6781	60	0.21	43.27	0.50
22-Sep	17:14	1633	1621	3138	2753	0.9635	1.6987	122	0.42	50.48	0.84
22-Sep	17:21	1760	1742	3117	2743	0.9845	1.5743	71	0.25	43.63	0.58
22-Sep	17:29	1937	1890	3122	2739	0.9881	1.4493	101	0.35	42.47	0.83
22-Sep	17:37	2086	1996	3122	2744	1.0181	1.3751	75	0.26	33.23	0.79
22-Sep	17:45	1818	1745	3141	2744	0.9790	1.5728	174	0.59	45.40	1.31
22-Sep	17:53	1887	1775	3122	2728	1.0085	1.5368	148	0.51	36.13	1.41
23-Sep	13:22	1101	1039	2921	2585	0.9867	2.4877	188	0.64	42.92	1.50
23-Sep	13:35	1990	1888	2968	2612	0.9846	1.3836	181	0.62	43.60	1.42
23-Sep	13:48	1980	1880	2993	2630	0.9916	1.3990	162	0.55	41.39	1.34
23-Sep	14:01	1986	1878	2982	2620	0.9707	1.3955	229	0.78	48.12	1.62
23-Sep	14:14	1995	1916	3064	2696	0.9791	1.4071	168	0.58	45.37	1.27
23-Sep	14:27	1811	1663	3052	2685	1.0347	1.6146	146	0.50	28.33	1.77
23-Sep	15:18	3060	2693	3130	2749	1.1038	1.0208	89	0.31	9.26	3.37
23-Sep	15:31	3030	2668	3166	2771	1.1048	1.0387	86	0.30	9.01	3.34
23-Sep	18:47	2510	2302	2893	2574	1.0559	1.1180	89	0.31	22.27	1.40
26-Sep	10:16	1978	1840	2852	2510	1.0028	1.3641	180	0.62	37.87	1.63
26-Sep	10:47	2286	2085	2880	2541	1.0249	1.2188	182	0.62	31.21	2.00
26-Sep	11:00	2837	2493	2840	2501	1.0983	1.0032	100	0.35	10.72	3.25
26-Sep	11:13	2783	2455	2892	2546	1.1038	1.0371	76	0.27	9.28	2.91
26-Sep	11:58	1919	1810	2852	2528	0.9877	1.3968	184	0.63	42.62	1.47
26-Sep	12:34	1852	1805	2932	2569	1.0121	1.4231	36	0.14	35.04	0.39
26-Sep	12:47	2131	2012	2954	2591	1.0206	1.2876	99	0.35	32.48	1.06
26-Sep	13:00	2093	1985	2949	2601	1.0183	1.3103	94	0.33	33.17	0.99
27-Sep	13:16	2225	2057	2872	2532	1.0374	1.2307	112	0.39	27.54	1.41
27-Sep	13:29	2390	2175	2867	2527	1.0429	1.1618	141	0.49	25.95	1.87
27-Sep	13:42	2368	2155	2963	2602	1.0284	1.2078	184	0.63	30.17	2.09
27-Sep	14:17	2541	2324	2965	2602	1.0604	1.1199	86	0.30	20.99	1.44
27-Sep	14:30	2521	2292	2962	2596	1.0446	1.1325	144	0.49	25.47	1.94
27-Sep	14:43	2548	2330	3000	2634	1.0628	1.1304	81	0.29	20.34	1.41
27-Sep	16:13	2159	2029	2900	2564	1.0034	1.2640	155	0.53	37.71	1.41

Table 7
Results - rougher tails, BPL

Date	Time	Slurry		Water		Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
		BPL peak int. (cts/s)	BPL bkg int. (cts/s)	BPL peak int. (cts/s)	BPL bkg int. (cts/s)						
27-Sep	17:10	2423	2241	2902	2562	1.0091	1.1433	184	0.63	35.95	1.75
29-Sep	10:30	1692	1537	2845	2511	1.0243	1.6335	191	0.65	31.40	2.08
29-Sep	11:18	1705	1582	2872	2520	0.9898	1.5928	222	0.76	41.94	1.81
07-Oct	10:19	2247	2086	2991	2627	1.0590	1.2589	47	0.17	21.39	0.80
07-Oct	10:27	2295	2123	2961	2599	1.0649	1.2242	42	0.16	19.76	0.79
07-Oct	11:19	2449	2253	3050	2682	1.0619	1.1901	67	0.24	20.58	1.15
07-Oct	11:27	2557	2327	3118	2730	1.0669	1.1732	88	0.31	19.21	1.60
07-Oct	11:59	2525	2337	3124	2741	1.0634	1.1733	47	0.17	20.18	0.86
07-Oct	12:07	2520	2324	3125	2759	1.0600	1.1872	67	0.24	21.11	1.13
07-Oct	12:31	2420	2240	3065	2694	1.0613	1.2026	51	0.18	20.75	0.89
07-Oct	12:39	2420	2231	3026	2665	1.0620	1.1942	59	0.21	20.55	1.04
07-Oct	12:47	2395	2222	3033	2658	1.0602	1.1960	47	0.17	21.07	0.82
07-Oct	12:55	2450	2240	3019	2655	1.0657	1.1853	75	0.26	19.54	1.35
07-Oct	13:03	2489	2258	3023	2651	1.0703	1.1741	85	0.30	18.27	1.64
07-Oct	13:51	2576	2353	3101	2731	1.0712	1.1605	64	0.23	18.02	1.27
07-Oct	13:59	2533	2325	3105	2743	1.0682	1.1798	59	0.21	18.84	1.12
07-Oct	14:07	2503	2310	3102	2722	1.0663	1.1781	47	0.17	19.36	0.88
07-Oct	14:14	2506	2319	3099	2726	1.0651	1.1753	42	0.16	19.71	0.79
07-Oct	14:22	2505	2302	3117	2747	1.0649	1.1933	63	0.23	19.74	1.15
07-Oct	14:30	2566	2347	3117	2749	1.0670	1.1717	73	0.26	19.16	1.35
07-Oct	14:38	2596	2377	3137	2753	1.0711	1.1582	58	0.21	18.03	1.17
07-Oct	14:46	2558	2341	3164	2787	1.0671	1.1907	72	0.25	19.14	1.33
07-Oct	14:58	2643	2417	3159	2774	1.0696	1.1474	66	0.23	18.45	1.27
07-Oct	15:11	2571	2362	3174	2795	1.0654	1.1833	64	0.23	19.62	1.17
07-Oct	15:24	2633	2410	3179	2796	1.0688	1.1604	67	0.24	18.67	1.27
07-Oct	15:32	2755	2490	3199	2803	1.0783	1.1256	79	0.28	16.06	1.73
07-Oct	15:40	2850	2569	3204	2805	1.0871	1.0919	63	0.22	13.70	1.64
07-Oct	15:48	2967	2647	3159	2781	1.0996	1.0504	59	0.21	10.37	2.05
07-Oct	16:00	3073	2739	3228	2829	1.1043	1.0329	50	0.18	9.13	1.99
07-Oct	16:38	2791	2506	3167	2788	1.0841	1.1123	82	0.29	14.49	1.99
07-Oct	16:45	2936	2619	3210	2814	1.0924	1.0747	81	0.29	12.27	2.34
07-Oct	16:53	2848	2546	3192	2803	1.0859	1.1009	92	0.32	14.02	2.30
07-Oct	17:01	2811	2522	3214	2825	1.0868	1.1203	79	0.28	13.77	2.03
07-Oct	17:09	2694	2439	3201	2818	1.0787	1.1555	73	0.26	15.96	1.62
07-Oct	17:17	2594	2367	3200	2817	1.0714	1.1904	70	0.25	17.96	1.38
07-Oct	17:25	2483	2293	3191	2811	1.0664	1.2261	47	0.17	19.34	0.88
07-Oct	17:33	2416	2225	3142	2771	1.0661	1.2455	55	0.20	19.42	1.02
07-Oct	17:41	2384	2202	3102	2729	1.0687	1.2392	37	0.14	18.71	0.74
07-Oct	17:48	2371	2191	3097	2718	1.0637	1.2403	49	0.18	20.08	0.89
07-Oct	17:56	2360	2191	3077	2704	1.0657	1.2343	31	0.12	19.54	0.60
07-Oct	18:04	2322	2157	3011	2647	1.0676	1.2269	23	0.09	19.00	0.49
07-Oct	18:12	2349	2169	3025	2661	1.0713	1.2270	31	0.12	17.99	0.67
07-Oct	18:20	2304	2140	3014	2642	1.0662	1.2344	27	0.11	19.39	0.55
07-Oct	18:28	2273	2115	3034	2664	1.0663	1.2596	22	0.09	19.36	0.47
07-Oct	18:36	2319	2163	3011	2654	1.0717	1.2270	0	0.02	17.88	0.09
07-Oct	18:43	2384	2193	3010	2643	1.0727	1.2049	38	0.14	17.60	0.80
07-Oct	18:51	2370	2180	2975	2616	1.0775	1.1997	25	0.10	16.28	0.60
07-Oct	18:59	2393	2195	2970	2625	1.0810	1.1956	24	0.10	15.35	0.63
07-Oct	19:07	2338	2152	2957	2602	1.0797	1.2094	17	0.07	15.69	0.47
07-Oct	19:15	2361	2178	2953	2593	1.0813	1.1904	6	0.04	15.26	0.24
11-Oct	08:31	2986	2621	2972	2630	1.1142	1.0032	65	0.23	6.56	3.56
11-Oct	08:41	2972	2608	2949	2587	1.1146	0.9920	65	0.23	6.46	3.57
11-Oct	16:07	2335	2128	3000	2628	1.0585	1.2348	102	0.35	21.54	1.65
11-Oct	16:15	2269	2080	2987	2628	1.0560	1.2633	92	0.32	22.25	1.45

Table 7

Results - rougher tails, BPL

Date	Time	Slurry BPL peak int. (cts/s)	Slurry BPL bkg int. (cts/s)	Water BPL peak int. (cts/s)	Water BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
11-Oct	16:23	2952	2603	2981	2609	1.1124	1.0023	56	0.20	7.02	2.87
19-Oct	08:33	2817	2476	2837	2492	1.1123	1.0068	64	0.23	7.04	3.25
25-Oct	08:56	2105	1944	2813	2465	1.0570	1.2678	63	0.22	21.94	1.02
25-Oct	09:04	2111	1930	2794	2464	1.0570	1.2766	91	0.32	21.96	1.44
25-Oct	09:12	2093	1919	2838	2491	1.0551	1.2980	88	0.31	22.48	1.37
25-Oct	09:20	2101	1925	2728	2394	1.0607	1.2435	74	0.26	20.93	1.25
25-Oct	09:27	2130	1938	2713	2381	1.0623	1.2284	87	0.30	20.47	1.49
25-Oct	09:35	2105	1943	2797	2456	1.0592	1.2639	59	0.21	21.33	0.99
25-Oct	09:43	2118	1953	2814	2476	1.0561	1.2682	71	0.25	22.21	1.13
25-Oct	10:10	2022	1852	2735	2398	1.0563	1.2949	86	0.30	22.15	1.36
25-Oct	10:18	2053	1881	2750	2410	1.0589	1.2811	78	0.28	21.41	1.29
25-Oct	10:26	2045	1897	2738	2402	1.0572	1.2661	50	0.18	21.89	0.84
25-Oct	10:33	2050	1895	2742	2405	1.0571	1.2693	60	0.21	21.92	0.98
25-Oct	10:41	2070	1899	2738	2406	1.0571	1.2667	79	0.28	21.92	1.27
25-Oct	10:49	2054	1887	2754	2421	1.0556	1.2829	79	0.28	22.34	1.25
25-Oct	10:57	2057	1897	2769	2414	1.0541	1.2726	73	0.26	22.77	1.14
25-Oct	11:05	2050	1890	2768	2407	1.0564	1.2735	68	0.24	22.12	1.10
25-Oct	11:13	2024	1854	2731	2391	1.0547	1.2900	89	0.31	22.60	1.38
25-Oct	11:21	2035	1863	2735	2402	1.0564	1.2898	87	0.31	22.14	1.38
25-Oct	11:29	2008	1843	2707	2361	1.0575	1.2810	76	0.27	21.82	1.23
25-Oct	11:36	2044	1871	2728	2387	1.0565	1.2758	86	0.30	22.10	1.37
25-Oct	11:44	1942	1793	2699	2364	1.0547	1.3181	67	0.24	22.61	1.06
25-Oct	11:52	1978	1821	2699	2365	1.0581	1.2986	65	0.23	21.65	1.08
25-Oct	12:00	1948	1794	2691	2351	1.0530	1.3103	77	0.27	23.07	1.17
25-Oct	12:08	2047	1889	2687	2354	1.0617	1.2462	52	0.19	20.64	0.91
25-Oct	12:16	2046	1891	2700	2374	1.0652	1.2557	40	0.15	19.67	0.76
25-Oct	12:24	2026	1872	2750	2411	1.0582	1.2881	58	0.21	21.62	0.97
25-Oct	12:31	2067	1900	2809	2461	1.0587	1.2951	71	0.25	21.47	1.18
25-Oct	12:39	2072	1912	2811	2474	1.0598	1.2944	60	0.21	21.17	1.01
25-Oct	12:47	2091	1933	2807	2464	1.0601	1.2745	52	0.19	21.08	0.90
25-Oct	12:55	2057	1893	2798	2451	1.0598	1.2948	66	0.24	21.18	1.12
25-Oct	13:03	2051	1905	2775	2446	1.0598	1.2841	41	0.15	21.16	0.73
25-Oct	13:11	2009	1875	2785	2436	1.0594	1.2992	29	0.11	21.27	0.53
25-Oct	13:19	2056	1902	2771	2434	1.0604	1.2796	50	0.18	20.99	0.87
25-Oct	13:27	2052	1915	2802	2443	1.0608	1.2760	27	0.10	20.88	0.50
25-Oct	13:34	2046	1903	2793	2459	1.0594	1.2921	38	0.14	21.29	0.67
25-Oct	13:42	2105	1964	2802	2464	1.0595	1.2546	31	0.12	21.26	0.55
25-Oct	13:50	2078	1946	2807	2473	1.0569	1.2709	27	0.11	21.99	0.49
25-Oct	13:58	2090	1960	2843	2494	1.0547	1.2726	29	0.11	22.59	0.50
25-Oct	14:06	2126	1987	2841	2496	1.0557	1.2561	35	0.13	22.31	0.60
25-Oct	14:14	2120	1965	2882	2527	1.0593	1.2865	50	0.18	21.31	0.85
25-Oct	14:55	2096	1953	2856	2505	1.0629	1.2823	26	0.10	20.31	0.50
25-Oct	15:03	2105	1968	2870	2515	1.0631	1.2782	17	0.07	20.25	0.36
25-Oct	15:11	2091	1955	2851	2510	1.0639	1.2836	14	0.06	20.03	0.31
25-Oct	15:19	2116	1972	2869	2525	1.0614	1.2805	29	0.11	20.73	0.53
25-Oct	15:26	2106	1969	2859	2512	1.0631	1.2761	17	0.07	20.26	0.35
25-Oct	15:34	2073	1938	2856	2510	1.0611	1.2953	21	0.09	20.80	0.42
25-Oct	15:42	2075	1927	2826	2473	1.0606	1.2829	39	0.15	20.94	0.69
25-Oct	15:50	2072	1936	2829	2482	1.0630	1.2823	19	0.08	20.27	0.39
25-Oct	15:58	2045	1914	2812	2457	1.0611	1.2838	18	0.07	20.81	0.36
25-Oct	16:06	2051	1928	2844	2484	1.0592	1.2883	11	0.05	21.35	0.25
25-Oct	16:14	2053	1929	2817	2470	1.0608	1.2806	9	0.04	20.90	0.21
25-Oct	16:22	2156	2009	2858	2517	1.0643	1.2530	22	0.09	19.92	0.45
25-Oct	16:29	2136	1986	2883	2537	1.0623	1.2772	33	0.13	20.47	0.62

Table 7
Results - rougher tails, BPL

		Slurry		Water							
Date	Time	BPL peak int. (cts/s)	BPL bkg int. (cts/s)	BPL peak int. (cts/s)	BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
25-Oct	16:37	2101	1961	2877	2522	1.0627	1.2858	21	0.09	20.36	0.43
25-Oct	16:45	2041	1891	2803	2464	1.0624	1.3027	41	0.15	20.45	0.75
25-Oct	16:53	2083	1930	2776	2440	1.0652	1.2642	35	0.13	19.66	0.67
25-Oct	17:01	2078	1942	2824	2475	1.0659	1.2748	11	0.05	19.48	0.27
25-Oct	17:09	2048	1920	2799	2455	1.0635	1.2788	7	0.04	20.13	0.20
25-Oct	17:17	2055	1913	2758	2416	1.0671	1.2628	16	0.07	19.13	0.36
25-Oct	17:25	2017	1867	2775	2432	1.0655	1.3029	36	0.14	19.58	0.70
25-Oct	17:32	1967	1834	2682	2361	1.0653	1.2869	16	0.07	19.64	0.35
25-Oct	17:40	2069	1926	2777	2433	1.0640	1.2635	26	0.10	20.00	0.50
25-Oct	17:48	2014	1880	2780	2446	1.0629	1.3009	21	0.09	20.31	0.42
25-Oct	17:56	1995	1861	2780	2444	1.0648	1.3133	17	0.07	19.79	0.37
25-Oct	18:04	2073	1923	2782	2441	1.0644	1.2695	33	0.13	19.89	0.64
25-Oct	18:12	2053	1904	2809	2459	1.0601	1.2912	44	0.16	21.09	0.77
25-Oct	18:20	2100	1939	2804	2454	1.0636	1.2657	48	0.18	20.10	0.87
25-Oct	18:27	2078	1912	2823	2477	1.0611	1.2958	65	0.23	20.80	1.11
25-Oct	18:35	2057	1878	2780	2448	1.0608	1.3034	84	0.30	20.90	1.42
25-Oct	18:43	2020	1824	2782	2448	1.0592	1.3420	119	0.41	21.35	1.93
25-Oct	18:51	2449	2190	2783	2447	1.0952	1.1173	57	0.21	11.53	1.78
25-Oct	18:59	2784	2464	2857	2505	1.1077	1.0168	56	0.20	8.25	2.44
25-Oct	19:07	2872	2526	2920	2572	1.1107	1.0182	68	0.24	7.47	3.22
25-Oct	19:15	2874	2530	2905	2553	1.1128	1.0092	60	0.22	6.93	3.11
25-Oct	19:23	2855	2504	2862	2516	1.1145	1.0048	64	0.23	6.49	3.52
25-Oct	19:30	2860	2511	2848	2497	1.1146	0.9945	61	0.22	6.45	3.40
27-Oct	07:37	1572	1380	2703	2388	1.1128	1.7313	64	0.23	6.91	3.31
27-Oct	08:03	2266	1989	2706	2390	1.1119	1.2016	66	0.24	7.15	3.29
27-Oct	08:16	2042	1780	2700	2366	1.1115	1.3289	84	0.30	7.26	4.07

Figure 4
Rougher tails - XRD net peak intensity *versus* insolubles in slurry

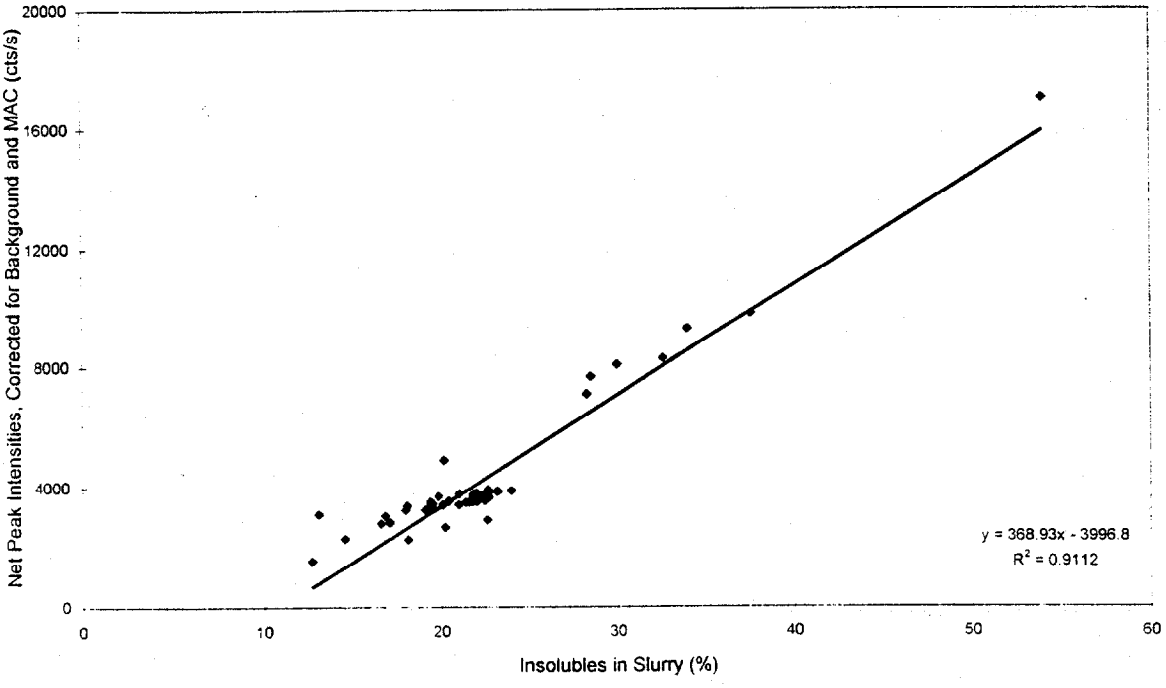


Figure 5
Rougher tails - XRD net peak intensity *versus* BPL in slurry

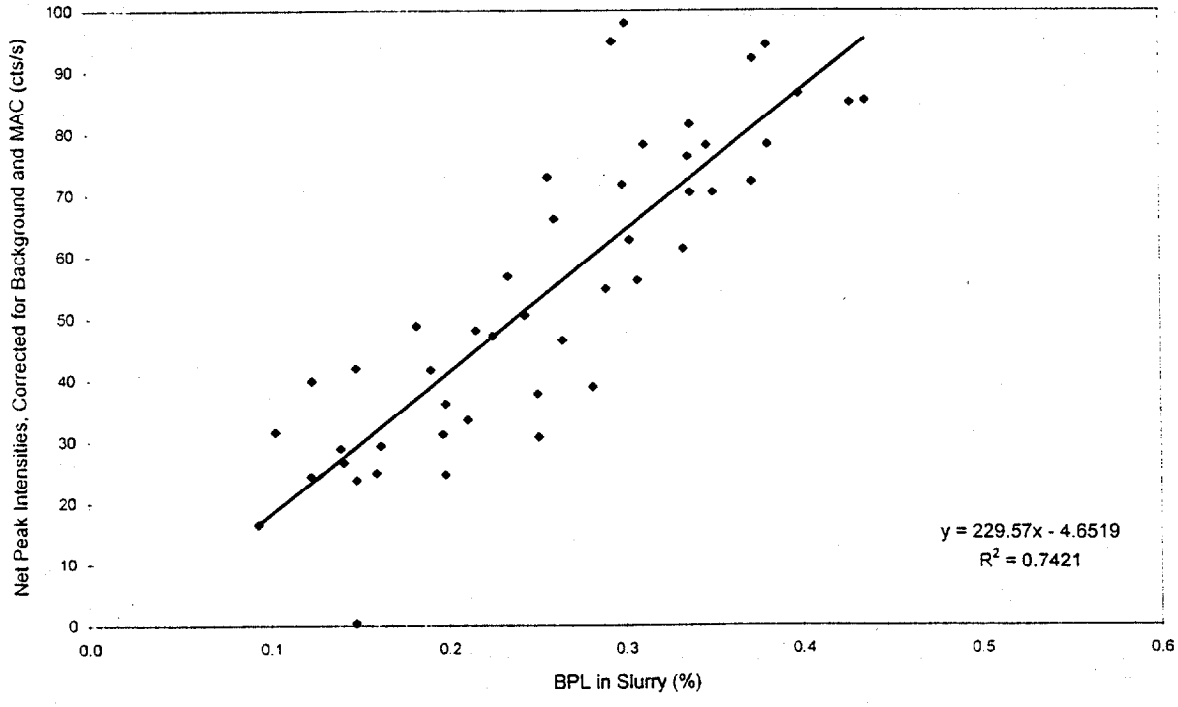


Figure 6
Rougher tails - Midfox quartz *versus* Four Corners laboratory insolubles

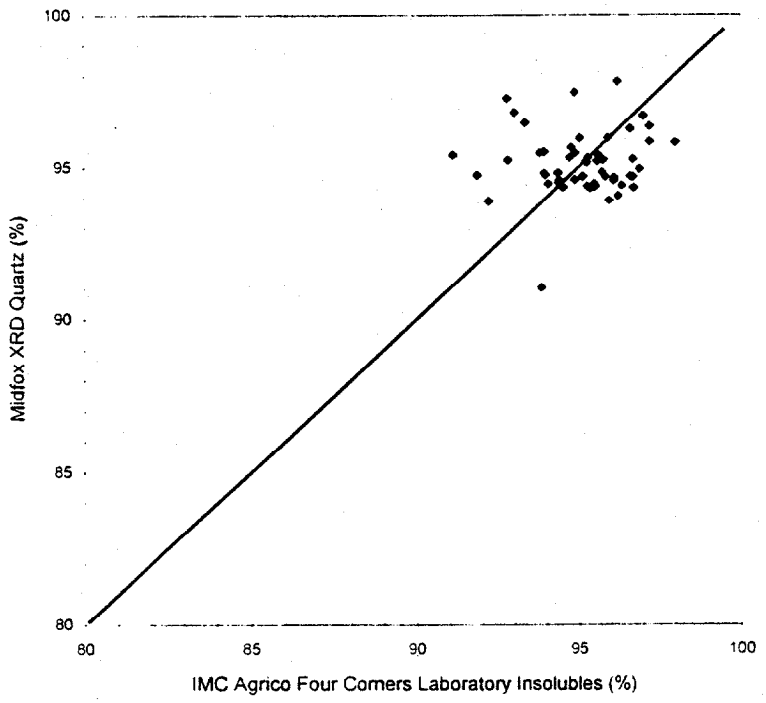
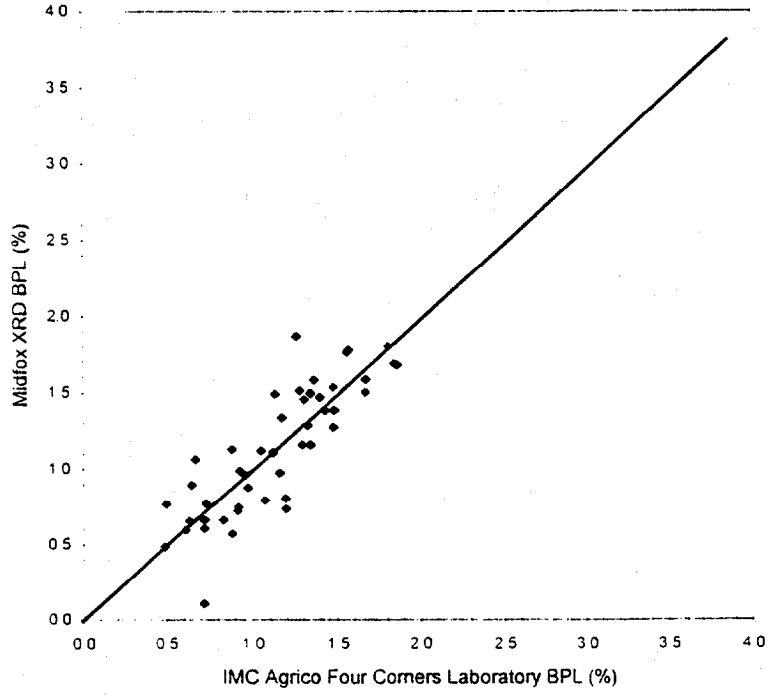


Figure 7
Rougher tails - Midfox *versus* Four Corners laboratory, BPL



Appendix B:

Amine Feeds

Table 8
Calibration data - amine feeds, quartz (insolubles)

Sample #	Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in slurry (%)	Solids content (%)	Midfox quartz (%)	Four Corners A-Lab insol.(%)	CV (%)
			Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)								
MF-042	15-Sep-94	16:24	2973	2005	2626	2754	0.80402	1.37371	1870	6.54	17.19	36.45	32.35	9.0
MF-043	16-Sep-94	12:17	3341	2240	2781	2907	0.79973	1.29773	2011	7.14	17.72	38.00	37.56	0.8
MF-044	16-Sep-94	15:58	3322	2476	2832	2967	0.83826	1.19827	1494	5.11	13.02	38.49	41.78	5.6
MF-045	26-Sep-94	13:21	3327	1784	2938	3085	0.73149	1.72946	3498	10.67	26.18	44.65	44.00	1.0
MF-046	27-Sep-94	12:59	3614	2009	2871	3008	0.76126	1.49753	3123	7.70	22.47	46.47	42.56	6.5
MF-047	30-Sep-94	13:49	3084	2785	2941	3101	0.86054	1.11326	765	5.81	10.32	25.02	26.40	3.7
MF-048	03-Oct-94	10:46	2907	2651	3009	3161	0.80380	1.19231	925	10.70	17.22	18.10	16.26	8.0
MF-049	03-Oct-94	14:26	3179	2992	3033	3198	0.88311	1.06893	574	4.61	7.61	25.59	23.77	5.4
MF-050	04-Oct-94	11:25	2565	1872	2764	2904	0.66947	1.55103	2034	20.80	34.04	20.01	19.11	3.3
MF-051	04-Oct-94	11:42	2730	2190	2758	2885	0.74617	1.31733	1443	14.56	24.35	19.89	19.43	1.7
MF-052	04-Oct-94	14:51	2626	2313	2897	3075	0.74331	1.32963	1206	15.43	24.71	16.40	18.19	6.9
MF-053	14-Oct-94	11:16	2751	2579	2873	3028	0.85131	1.17437	652	6.12	11.43	19.30	25.35	16.9
MF-054	14-Oct-94	11:24	2831	2736	2889	3049	0.88303	1.11468	463	3.91	7.62	20.66	27.78	18.1
MF-055	14-Oct-94	11:40	2711	2355	2832	2995	0.83598	1.27177	944	5.96	13.29	23.92	30.92	16.0
MF-056	14-Oct-94	11:48	2690	2359	2821	2980	0.84134	1.26309	890	5.58	12.64	23.73	30.11	15.0
MF-059	19-Oct-94	13:27	2678	2727	2918	3101	0.84359	1.13726	430	8.20	12.37	11.83	10.46	9.3
MF-060	19-Oct-94	14:19	2288	2164	2947	3127	0.70656	1.44498	1096	19.26	29.32	12.57	10.26	15.9
MF-061	19-Oct-94	14:30	2590	2512	2965	3150	0.76699	1.25407	833	14.38	21.76	12.90	11.61	7.9
MF-062	19-Oct-94	14:38	2558	2484	2969	3162	0.77847	1.27291	794	12.96	20.34	13.18	12.08	6.4
MF-063	19-Oct-94	14:46	2592	2514	2946	3123	0.78690	1.24226	762	12.40	19.30	13.33	12.00	7.8
MF-064	19-Oct-94	16:06	2509	2491	2924	3081	0.80034	1.23662	637	11.24	17.64	12.21	11.84	2.2
MF-065	19-Oct-94	16:22	2542	2499	2976	3164	0.77222	1.26625	776	13.80	21.11	12.40	12.92	2.8
MF-066	19-Oct-94	16:30	2569	2496	2963	3154	0.77237	1.26352	810	13.72	21.09	12.95	14.64	8.2
MF-067	19-Oct-94	16:38	2528	2467	2918	3100	0.77972	1.25659	760	13.07	20.18	12.71	13.76	5.4
MF-068	20-Oct-94	09:22	2967	2799	3028	3196	0.83842	1.14186	709	8.02	13.00	18.42	22.52	12.9
MF-069	20-Oct-94	09:30	2972	2791	3083	3254	0.83169	1.16606	759	8.26	13.81	18.54	21.86	10.8
MF-070	20-Oct-94	09:37	3021	2978	3030	3224	0.89401	1.08262	388	3.46	6.30	21.01	27.76	17.2
MF-071	20-Oct-94	09:45	2974	2992	3028	3214	0.89720	1.07418	311	3.47	5.92	18.02	24.57	18.8
MF-072	20-Oct-94	09:58	2545	2394	3066	3249	0.75273	1.35692	1007	14.67	23.53	14.41	15.24	3.9
MF-073	20-Oct-94	10:06	2755	2549	3065	3259	0.77124	1.27853	1008	13.19	21.23	15.98	18.54	9.8
MF-074	20-Oct-94	10:14	2896	2653	3026	3190	0.80487	1.20243	915	10.44	17.09	18.03	22.04	12.9
MF-075	20-Oct-94	10:22	2935	2659	3073	3264	0.79338	1.22775	1014	11.19	18.50	18.44	22.73	13.4
MF-076	20-Oct-94	10:38	3072	2853	3070	3249	0.85469	1.13893	721	6.12	11.03	22.10	30.24	19.0
MF-077	20-Oct-94	10:46	3040	2800	3032	3220	0.85483	1.15006	743	5.85	11.01	22.79	30.72	18.3
MF-078	20-Oct-94	10:53	3028	2734	2995	3172	0.84276	1.16006	840	6.85	12.47	22.70	29.67	16.6
MF-079	20-Oct-94	11:01	3063	2754	2984	3169	0.83735	1.15080	872	7.56	13.13	22.38	30.41	18.7
MF-080	20-Oct-94	11:09	3001	2696	3023	3203	0.81961	1.18817	940	8.86	15.29	20.70	27.56	17.6
MF-081	20-Oct-94	11:17	2894	2604	2997	3174	0.80408	1.21894	975	10.15	17.19	19.11	25.00	16.7
MF-082	21-Oct-94	12:57	2952	2902	2989	3179	0.89544	1.09552	388	3.01	6.13	21.59	25.68	11.3

Table 8
Calibration data - amine feeds, quartz (insolubles)

Sample #	Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in slurry (%)	Solids content (%)	Midfox quartz (%)	Four Corners A-Lab insol.(%)	CV (%)
			Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)								
MF-083	24-Oct-94	09:12	2725	2669	2908	3079	0.84921	1.15379	529	7.01	11.69	15.36	16.08	3.2
MF-084	24-Oct-94	09:20	2747	2662	2895	3044	0.84034	1.14353	584	8.07	12.76	15.50	12.50	16.9
MF-085	24-Oct-94	09:28	2713	2676	2969	3140	0.83659	1.17349	557	8.09	13.22	14.29	12.93	7.4
MF-086	24-Oct-94	09:36	2632	2602	2952	3097	0.83950	1.19034	534	7.56	12.86	14.08	12.69	7.7
MF-087	24-Oct-94	09:43	2632	2604	2885	3049	0.84674	1.17082	500	7.10	11.99	14.17	14.04	0.6
MF-088	24-Oct-94	09:51	2655	2615	2889	3059	0.84867	1.16991	510	6.86	11.75	14.75	15.24	2.3
MF-089	24-Oct-94	09:59	2672	2622	2913	3074	0.84895	1.17259	524	6.75	11.72	15.17	14.76	2.0
MF-090	24-Oct-94	10:15	2636	2579	2931	3104	0.83789	1.20333	572	7.47	13.06	14.85	14.66	0.9
MF-091	24-Oct-94	10:23	2603	2552	2879	3047	0.84274	1.19383	540	7.13	12.47	14.69	14.82	0.6
MF-092	24-Oct-94	10:31	2597	2534	2844	3009	0.84732	1.18761	534	6.70	11.92	15.22	15.83	2.7
MF-093	24-Oct-94	10:39	2635	2564	2913	3070	0.84357	1.19736	566	6.91	12.37	15.51	15.68	0.8
MF-094	24-Oct-94	10:46	2683	2611	2942	3107	0.83965	1.18998	584	7.42	12.85	15.40	13.70	8.8
MF-095	24-Oct-94	10:54	2585	2542	2922	3080	0.83947	1.21180	547	7.24	12.87	14.42	13.92	2.5
MF-096	24-Oct-94	11:02	2611	2547	2845	3010	0.84187	1.18208	552	7.37	12.58	14.89	13.62	6.6
MF-097	24-Oct-94	11:10	2651	2587	2824	2979	0.84665	1.15141	531	7.34	12.00	15.00	14.42	2.9
MF-098	24-Oct-94	11:22	2605	2547	2893	3062	0.83056	1.20259	589	8.29	13.95	14.31	12.18	12.4
MF-099	24-Oct-94	11:30	2591	2551	2825	2971	0.84300	1.16489	514	7.60	12.44	14.02	11.88	12.7
MF-100	24-Oct-94	11:38	2609	2573	2885	3068	0.84117	1.19263	531	7.34	12.66	14.23	15.10	4.1
MF-101	24-Oct-94	11:44	2636	2604	2917	3093	0.84296	1.18781	523	7.22	12.45	14.27	11.10	20.2
MF-102	24-Oct-94	11:54	2661	2672	2897	3058	0.86340	1.14468	406	5.82	9.98	13.88	15.03	5.4
MF-103	24-Oct-94	12:02	2684	2681	2918	3099	0.84980	1.15602	469	7.05	11.62	13.74	12.18	9.1
MF-104	24-Oct-94	12:10	2686	2680	2897	3069	0.85990	1.14517	438	6.14	10.40	14.34	13.24	5.9
MF-105	24-Oct-94	12:18	2744	2749	2935	3104	0.86937	1.12899	400	5.41	9.26	14.74	15.87	5.0
MF-106	24-Oct-94	12:25	2651	2651	2957	3131	0.85315	1.18094	460	6.29	11.21	13.96	14.88	4.4
MF-107	24-Oct-94	12:33	2723	2720	2912	3085	0.87082	1.13415	402	5.14	9.08	15.10	17.38	9.3
MF-108	24-Oct-94	12:41	2738	2711	2921	3091	0.87307	1.14030	424	4.71	8.81	16.39	19.62	11.7
MF-109	24-Oct-94	12:49	2790	2792	2908	3079	0.89070	1.10294	334	3.57	6.70	17.09	19.84	9.8
MF-110	24-Oct-94	12:57	2819	2855	2909	3078	0.90603	1.07822	251	2.49	4.87	17.85	20.21	8.3
													Mean	8.7

Table 9
Calibration data - amine feeds, BPL

Sample #	Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	BPL in slurry (%)	Solids content (%)	Midfox BPL (%)	Four Corners A-Lab BPL (%)	CV (%)
			BPL peak int. (cts/s)	BPL bkg int. (cts/s)	BPL peak int. (cts/s)	BPL bkg int. (cts/s)								
MF-042	15-Sep-94	16:24	2634	1766	2741	2430	0.84133	1.37585	1580.03	6.54	17.19	38.01	45.97	12.2
MF-043	16-Sep-94	12:17	2867	1917	2935	2608	0.83411	1.36042	1725.12	7.14	17.72	40.28	43.93	5.9
MF-044	16-Sep-94	15:58	2969	2170	3009	2652	0.90255	1.22228	1235.60	5.11	13.02	39.23	42.31	5.2
MF-045	26-Sep-94	13:21	2754	1605	2968	2621	0.73321	1.63279	2575.54	10.67	26.18	40.73	40.15	1.0
MF-046	27-Sep-94	12:59	2827	1890	2922	2581	0.77395	1.36531	1861.86	7.70	22.47	34.29	41.58	12.4
MF-047	30-Sep-94	13:49	3181	2159	3018	2662	0.94578	1.23334	1404.86	5.81	10.32	56.28	52.63	4.9
MF-048	03-Oct-94	10:46	3322	1859	3097	2730	0.84096	1.46868	2583.64	10.70	17.22	62.14	60.68	1.7
MF-049	03-Oct-94	14:26	3344	2394	3132	2760	0.99219	1.15300	1116.49	4.61	7.61	60.62	55.10	7.1
MF-050	04-Oct-94	11:25	2677	1003	2850	2503	0.66523	2.49621	5018.32	20.80	34.04	61.11	58.82	2.8
MF-051	04-Oct-94	11:42	2858	1320	2839	2488	0.75267	1.88502	3514.66	14.56	24.35	59.81	58.36	1.8
MF-052	04-Oct-94	14:51	2968	1360	2956	2596	0.74877	1.90899	3723.17	15.43	24.71	62.45	59.58	3.4
MF-053	14-Oct-94	11:16	3034	1991	2827	2484	0.92755	1.24740	1480.30	6.12	11.43	53.53	53.36	0.2
MF-054	14-Oct-94	11:24	2951	2153	2849	2503	0.99201	1.16231	947.60	3.91	7.62	51.34	50.45	1.2
MF-055	14-Oct-94	11:40	2911	1964	2797	2468	0.89827	1.25665	1441.37	5.96	13.29	44.83	48.49	5.3
MF-056	14-Oct-94	11:48	2907	1990	2780	2442	0.90837	1.22710	1348.85	5.58	12.64	44.11	49.81	8.1
MF-059	19-Oct-94	13:27	3060	1805	2883	2532	0.91266	1.40319	1982.06	8.20	12.37	66.32	64.55	1.9
MF-060	19-Oct-94	14:19	2806	1111	2909	2550	0.70309	2.29486	4647.52	19.26	29.32	65.70	64.37	1.5
MF-061	19-Oct-94	14:30	3035	1423	2932	2571	0.78239	1.80654	3471.07	14.38	21.76	66.10	62.81	3.7
MF-062	19-Oct-94	14:38	2985	1485	2934	2583	0.79984	1.73976	3128.09	12.96	20.34	63.72	62.60	1.3
MF-063	19-Oct-94	14:46	2994	1509	2913	2556	0.81314	1.69375	2993.84	12.40	19.30	64.27	61.62	3.0
MF-064	19-Oct-94	16:06	2981	1555	2865	2509	0.83513	1.61352	2713.48	11.24	17.64	63.69	64.00	0.3
MF-065	19-Oct-94	16:22	3048	1465	2928	2580	0.79025	1.76105	3329.78	13.80	21.11	65.35	62.53	3.2
MF-066	19-Oct-94	16:30	3008	1447	2934	2570	0.79047	1.77631	3311.30	13.72	21.09	65.04	61.68	3.9
MF-067	19-Oct-94	16:38	2989	1459	2876	2529	0.80178	1.73366	3155.15	13.07	20.18	64.76	62.26	2.8
MF-068	20-Oct-94	09:22	3120	1888	2941	2584	0.90285	1.36852	1936.67	8.02	13.00	61.67	56.85	6.0
MF-069	20-Oct-94	09:30	3137	1904	2994	2635	0.89032	1.38444	1996.57	8.26	13.81	59.82	56.94	3.6
MF-070	20-Oct-94	09:37	3053	2281	2954	2596	1.01555	1.13800	837.88	3.46	6.30	54.82	52.42	3.2
MF-071	20-Oct-94	09:45	3045	2262	2958	2597	1.02250	1.14801	840.52	3.47	5.92	58.52	54.51	5.2
MF-072	20-Oct-94	09:58	2968	1405	2979	2621	0.76176	1.86600	3541.40	14.67	23.53	62.36	62.33	0.0
MF-073	20-Oct-94	10:06	3057	1529	2995	2629	0.78876	1.71973	3183.94	13.19	21.23	62.12	60.01	2.5
MF-074	20-Oct-94	10:14	3109	1705	2935	2569	0.84278	1.50735	2520.69	10.44	17.09	61.09	57.02	5.0
MF-075	20-Oct-94	10:22	3111	1683	3010	2636	0.82361	1.56635	2701.40	11.19	18.50	60.48	57.05	4.3
MF-076	20-Oct-94	10:38	3105	2071	2986	2616	0.93417	1.26352	1479.64	6.12	11.03	55.49	50.29	7.3
MF-077	20-Oct-94	10:46	3048	2061	2959	2598	0.93444	1.26060	1414.64	5.85	11.01	53.12	49.93	4.5
MF-078	20-Oct-94	10:53	3030	1947	2931	2569	0.91106	1.31934	1656.73	6.85	12.47	54.96	50.10	6.9
MF-079	20-Oct-94	11:01	3071	1901	2917	2555	0.90085	1.34446	1827.00	7.56	13.13	57.60	50.08	10.6
MF-080	20-Oct-94	11:09	3031	1788	2942	2589	0.86841	1.44808	2141.29	8.86	15.29	57.99	51.97	8.2
MF-081	20-Oct-94	11:17	2998	1672	2935	2575	0.84143	1.54053	2451.68	10.15	17.19	59.07	54.40	6.1
MF-082	21-Oct-94	12:57	2971	2278	2907	2559	1.01865	1.12314	730.33	3.01	6.13	49.06	53.46	5.8

Table 9
Calibration data - amine feeds, BPL

Sample #	Date	Time	Slurry BPL peak int. (cts/s)	Slurry BPL bkg int. (cts/s)	Water BPL peak int. (cts/s)	Water BPL bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	BPL in slurry (%)	Solids content (%)	Midfox BPL (%)	Four Corners A-Lab BPL (%)	CV (%)
MF-083	24-Oct-94	09:12	3114	1946	2857	2503	0.92346	1.28619	1693.59	7.01	11.69	59.94	60.85	1.1
MF-084	24-Oct-94	09:20	3129	1852	2823	2493	0.90647	1.34553	1950.34	8.07	12.76	63.24	62.98	0.3
MF-085	24-Oct-94	09:28	3135	1885	2913	2558	0.89942	1.35721	1954.44	8.09	13.22	61.19	62.19	1.1
MF-086	24-Oct-94	09:36	3074	1888	2880	2525	0.90490	1.33773	1826.92	7.56	12.86	58.76	63.01	4.8
MF-087	24-Oct-94	09:43	3071	1908	2819	2485	0.91869	1.30231	1716.25	7.10	11.99	59.23	62.40	3.6
MF-088	24-Oct-94	09:51	3094	1945	2836	2480	0.92242	1.27541	1658.88	6.86	11.75	58.38	60.89	2.9
MF-089	24-Oct-94	09:59	3113	1974	2857	2497	0.92295	1.26462	1632.11	6.75	11.72	57.60	61.36	4.3
MF-090	24-Oct-94	10:15	3079	1908	2875	2533	0.90187	1.32767	1804.17	7.47	13.06	57.16	61.80	5.3
MF-091	24-Oct-94	10:23	3045	1898	2836	2484	0.91104	1.30881	1722.24	7.13	12.47	57.13	62.04	5.6
MF-092	24-Oct-94	10:31	3017	1905	2786	2441	0.91982	1.28165	1620.93	6.70	11.92	56.26	60.31	4.7
MF-093	24-Oct-94	10:39	3068	1938	2849	2490	0.91261	1.28514	1670.64	6.91	12.37	55.86	60.76	5.7
MF-094	24-Oct-94	10:46	3119	1930	2883	2523	0.90517	1.30695	1792.81	7.42	12.85	57.74	60.57	3.3
MF-095	24-Oct-94	10:54	2993	1866	2858	2503	0.90483	1.34146	1749.99	7.24	12.87	56.26	61.40	5.9
MF-096	24-Oct-94	11:02	3069	1872	2797	2442	0.90938	1.30408	1781.10	7.37	12.58	58.59	60.68	2.4
MF-097	24-Oct-94	11:10	3071	1860	2757	2423	0.91851	1.30280	1774.70	7.34	12.00	61.20	61.43	0.3
MF-098	24-Oct-94	11:22	3009	1776	2836	2486	0.88824	1.39967	2003.55	8.29	13.95	59.44	62.32	3.3
MF-099	24-Oct-94	11:30	3002	1796	2749	2417	0.91153	1.34547	1835.92	7.60	12.44	61.06	62.26	1.4
MF-100	24-Oct-94	11:38	3019	1864	2828	2496	0.90806	1.33898	1775.17	7.34	12.66	58.01	61.36	3.9
MF-101	24-Oct-94	11:44	3050	1898	2861	2511	0.91145	1.32300	1745.68	7.22	12.45	58.03	62.25	4.8
MF-102	24-Oct-94	11:54	3021	1992	2827	2491	0.95151	1.25069	1407.34	5.82	9.98	58.33	62.26	4.5
MF-103	24-Oct-94	12:02	3062	1905	2852	2498	0.92461	1.31125	1705.09	7.05	11.62	60.72	63.58	3.2
MF-104	24-Oct-94	12:10	3024	1963	2826	2490	0.94448	1.26859	1484.36	6.14	10.40	59.03	62.45	3.9
MF-105	24-Oct-94	12:18	3076	2078	2887	2532	0.96361	1.21828	1307.98	5.41	9.26	58.40	61.44	3.5
MF-106	24-Oct-94	12:25	3055	1996	2886	2538	0.93114	1.27143	1520.37	6.29	11.21	56.08	61.33	6.1
MF-107	24-Oct-94	12:33	3082	2103	2848	2494	0.96659	1.18568	1244.21	5.14	9.08	56.61	60.35	4.4
MF-108	24-Oct-94	12:41	3024	2123	2862	2514	0.97121	1.18438	1140.01	4.71	8.81	53.44	58.03	5.6
MF-109	24-Oct-94	12:49	3017	2227	2851	2497	1.00839	1.12160	864.99	3.57	6.70	53.26	57.25	4.9
MF-110	24-Oct-94	12:57	2939	2289	2858	2498	1.04200	1.09163	605.01	2.49	4.87	51.10	55.90	6.1
													Mean	4.2

Table 10
Results - amine feeds, quartz (insolubles)

		Slurry		Water							
Date	Time	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
16-Sep	11:51	2804	2041	2755	2880	0.7750	1.41151	1725	5.78	20.77	27.85
16-Sep	13:36	2416	1734	2827	2959	0.7180	1.70607	1998	6.69	27.88	24.01
16-Sep	13:47	2845	2074	2816	2974	0.7710	1.43351	1786	5.99	21.26	28.15
16-Sep	13:58	3307	2355	2887	3021	0.7973	1.28281	1833	6.14	18.02	34.09
16-Sep	14:10	3252	2839	2881	3022	0.9032	1.06427	732	2.47	5.20	47.48
16-Sep	14:21	2995	2064	2864	3014	0.7526	1.46048	2106	7.05	23.55	29.94
16-Sep	14:33	3211	2282	2894	3036	0.7901	1.33062	1874	6.28	18.90	33.22
16-Sep	14:44	3006	2137	2863	2999	0.7810	1.40367	1876	6.29	20.02	31.40
16-Sep	14:55	2835	2057	2851	3003	0.7627	1.46001	1849	6.19	22.29	27.79
16-Sep	15:07	3019	2130	2832	2996	0.7757	1.40635	1923	6.44	20.68	31.14
16-Sep	15:18	2987	2153	2809	2958	0.7762	1.37368	1807	6.05	20.62	29.36
16-Sep	15:30	2889	2088	2832	2963	0.7764	1.41910	1798	6.03	20.59	29.27
16-Sep	15:41	3078	2273	2809	2949	0.8021	1.29737	1628	5.46	17.42	31.33
16-Sep	16:22	3227	2485	2801	2943	0.8403	1.18438	1349	4.53	12.77	35.46
16-Sep	16:36	3040	2340	2773	2924	0.8230	1.24930	1392	4.67	14.88	31.39
27-Sep	13:21	3946	2052	2829	2957	0.7616	1.44100	3434	11.48	22.43	51.18
27-Sep	13:34	3842	2048	2831	2959	0.7633	1.44509	3294	11.01	22.22	49.56
03-Oct	10:32	2791	2495	3032	3174	0.7735	1.27236	1096	3.68	20.95	17.59
03-Oct	11:04	3052	2943	3033	3183	0.8789	1.08152	503	1.71	8.11	21.06
03-Oct	11:17	2990	2861	3032	3187	0.8592	1.11380	592	2.01	10.49	19.14
03-Oct	14:35	3175	3010	3106	3276	0.8750	1.08830	589	1.99	8.58	23.24
03-Oct	14:43	3164	2976	3115	3281	0.8650	1.10238	650	2.20	9.78	22.49
03-Oct	14:51	3122	2922	3102	3275	0.8506	1.12079	714	2.41	11.53	20.93
03-Oct	14:58	3065	2847	3114	3272	0.8345	1.14938	793	2.67	13.47	19.85
03-Oct	15:06	3046	2702	3035	3196	0.8150	1.18285	998	3.36	15.84	21.21
03-Oct	15:14	3129	2771	3024	3188	0.8322	1.15030	946	3.19	13.75	23.17
03-Oct	15:22	3208	2713	3017	3192	0.8158	1.17656	1171	3.94	15.75	24.98
03-Oct	15:30	3265	2771	3030	3185	0.8354	1.14910	1091	3.67	13.36	27.46
03-Oct	15:38	3239	2739	3030	3200	0.8258	1.16859	1143	3.84	14.53	26.43
03-Oct	15:46	3300	2757	3024	3184	0.8332	1.15509	1159	3.90	13.63	28.59
03-Oct	15:53	3193	2657	3031	3184	0.7992	1.19814	1281	4.30	17.79	24.18
03-Oct	16:01	3128	2664	3030	3192	0.8059	1.19846	1176	3.95	16.97	23.29
03-Oct	16:09	3126	2635	3035	3209	0.7944	1.21759	1257	4.22	18.37	22.98
03-Oct	16:17	3032	2571	3054	3222	0.7543	1.25325	1370	4.60	23.34	19.71
03-Oct	16:25	2934	2558	3028	3200	0.7528	1.25092	1262	4.24	23.52	18.02
03-Oct	16:33	2855	2501	3049	3208	0.7511	1.28242	1252	4.21	23.73	17.72
03-Oct	16:41	2896	2542	3077	3234	0.7577	1.27245	1235	4.15	22.92	18.10
03-Oct	16:49	2926	2558	2992	3163	0.7907	1.23649	1116	3.75	18.83	19.93
03-Oct	16:56	3051	2581	2956	3112	0.8048	1.20535	1174	3.94	17.10	23.07
03-Oct	17:04	3089	2699	2950	3116	0.8383	1.15438	953	3.21	13.02	24.66
03-Oct	17:12	3033	2853	2918	3068	0.8966	1.07544	511	1.74	6.00	28.93
03-Oct	17:20	2964	2709	2923	3079	0.8471	1.13680	761	2.57	11.94	21.52
03-Oct	17:28	2652	2159	2905	3074	0.7051	1.42372	1609	5.40	29.51	18.28
03-Oct	17:36	2812	2369	2876	3034	0.7660	1.28051	1277	4.29	21.88	19.60
03-Oct	17:44	2903	2551	2849	2998	0.8146	1.17536	969	3.26	15.89	20.53
03-Oct	17:51	3113	2735	2891	3046	0.8623	1.11357	840	2.83	10.11	28.00
03-Oct	17:59	3248	2867	2957	3116	0.8811	1.08680	785	2.65	7.85	33.72
03-Oct	19:26	1961	1726	2996	3143	0.8173	1.82122	1002	3.37	15.56	21.67
03-Oct	19:34	3063	2784	2978	3138	0.8570	1.12683	763	2.57	10.75	23.95
03-Oct	19:50	2898	2711	2980	3130	0.8202	1.15448	778	2.63	15.21	17.26
03-Oct	19:57	3018	2758	2992	3145	0.8435	1.14003	788	2.66	12.38	21.47
03-Oct	20:05	3139	2844	2988	3139	0.8799	1.10375	703	2.38	7.99	29.74
03-Oct	20:29	2848	2634	3053	3205	0.7774	1.21669	974	3.28	20.47	16.02
03-Oct	20:37	3044	2626	3052	3215	0.7857	1.22439	1201	4.03	19.45	20.74

Table 10
Results - amine feeds, quartz (insolubles)

Date	Time	Slurry Quartz peak int. (cts/s)	Slurry Quartz bkg int. (cts/s)	Water Quartz peak int. (cts/s)	Water Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
03-Oct	20:45	3242	2785	3047	3215	0.8349	1.15471	1059	3.56	13.42	26.53
03-Oct	20:52	3391	2773	3023	3187	0.8623	1.14920	1149	3.86	10.11	38.20
03-Oct	21:00	3412	2333	2983	3130	0.7610	1.34169	2196	7.35	22.50	32.68
03-Oct	21:08	2499	1920	2994	3150	0.7637	1.64111	1696	5.69	22.17	25.65
04-Oct	12:07	2749	2623	2864	3025	0.8396	1.15317	630	2.13	12.85	16.60
04-Oct	12:20	2476	2294	2870	3029	0.7590	1.32032	971	3.27	22.75	14.37
04-Oct	12:48	2509	2047	2886	3054	0.7027	1.49208	1598	5.36	29.81	17.97
04-Oct	13:11	2949	2514	2884	3043	0.8070	1.21016	1114	3.74	16.83	22.25
04-Oct	13:24	2968	2529	2854	3022	0.8135	1.19519	1089	3.66	16.03	22.83
04-Oct	13:46	2834	2449	2882	3053	0.7896	1.24657	1122	3.77	18.96	19.89
04-Oct	13:59	2834	2477	2873	3036	0.7910	1.22544	1072	3.61	18.79	19.19
04-Oct	14:12	2858	2471	2879	3038	0.8039	1.22966	1071	3.60	17.21	20.94
04-Oct	14:25	2732	2385	2884	3055	0.7635	1.28084	1167	3.92	22.19	17.68
04-Oct	14:38	2839	2476	2907	3084	0.7914	1.24566	1095	3.68	18.74	19.65
04-Oct	15:28	2636	2087	2828	2993	0.7256	1.43422	1609	5.40	26.93	20.04
04-Oct	15:41	2912	2261	2845	3015	0.7666	1.33311	1571	5.27	21.81	24.16
04-Oct	15:54	2631	2188	2787	2947	0.7504	1.34717	1333	4.48	23.82	18.79
14-Oct	08:47	2513	2353	2799	2931	0.8298	1.24579	699	2.36	14.04	16.82
14-Oct	09:03	2207	1865	2754	2890	0.7511	1.54952	1249	4.19	23.73	17.68
14-Oct	09:10	2307	1956	2760	2902	0.7674	1.48368	1196	4.02	21.71	18.52
14-Oct	09:18	2422	2063	2792	2941	0.7816	1.42532	1154	3.88	19.95	19.44
14-Oct	09:26	2399	1993	2767	2927	0.7735	1.46902	1260	4.23	20.95	20.21
14-Oct	09:34	2565	2171	2818	2962	0.7885	1.36431	1164	3.91	19.10	20.48
14-Oct	09:42	2484	2074	2850	3014	0.7767	1.45351	1270	4.27	20.56	20.75
14-Oct	09:50	2595	2132	2902	3053	0.7706	1.43185	1363	4.58	21.30	21.48
14-Oct	09:58	2618	2169	2904	3059	0.7772	1.41055	1315	4.41	20.49	21.54
14-Oct	10:05	2810	2394	2898	3053	0.8123	1.27523	1104	3.71	16.18	22.93
14-Oct	10:13	2850	2538	2878	3038	0.8367	1.19730	870	2.93	13.20	22.21
14-Oct	10:21	2732	2466	2902	3057	0.8286	1.23955	854	2.88	14.19	20.27
14-Oct	10:29	2564	2318	2961	3112	0.8001	1.34258	953	3.21	17.68	18.16
14-Oct	10:45	2365	2190	2890	3047	0.7871	1.39141	892	3.01	19.27	15.60
14-Oct	11:01	2580	2424	2903	3068	0.8221	1.26583	744	2.51	14.98	16.76
14-Oct	11:08	2386	2196	2928	3079	0.7850	1.40174	928	3.13	19.53	16.01
14-Oct	11:16	2751	2579	2873	3028	0.8513	1.17437	652	2.21	11.43	19.30
14-Oct	11:24	2831	2736	2889	3049	0.8830	1.11468	463	1.57	7.62	20.66
14-Oct	11:32	2817	2712	2875	3024	0.8800	1.11472	479	1.63	7.98	20.41
19-Oct	08:38	3368	2404	2943	3087	0.8035	1.28400	1844	6.18	17.25	35.82
19-Oct	09:47	3007	3077	2970	3137	0.9386	1.01963	122	0.44	1.02	43.23
19-Oct	12:32	2550	2405	2941	3113	0.7538	1.29432	953	3.21	23.39	13.72
19-Oct	12:39	2428	2267	2903	3086	0.7274	1.36116	1061	3.57	26.70	13.37
19-Oct	12:47	2516	2373	2952	3108	0.7424	1.30962	988	3.33	24.82	13.40
19-Oct	12:55	2393	2286	2952	3122	0.7257	1.36562	1002	3.37	26.91	12.53
19-Oct	13:03	2493	2379	2948	3120	0.7419	1.31163	955	3.22	24.89	12.92
19-Oct	13:11	2291	2205	2934	3096	0.7249	1.40436	972	3.27	27.01	12.12
19-Oct	13:19	2544	2526	2931	3112	0.7926	1.23215	668	2.26	18.59	12.14
19-Oct	14:54	2643	2547	2959	3136	0.7881	1.23139	783	2.64	19.15	13.79
19-Oct	15:02	2682	2617	2947	3129	0.8078	1.19558	679	2.30	16.73	13.72
19-Oct	15:10	2754	2722	2960	3135	0.8335	1.15164	558	1.89	13.59	13.92
19-Oct	15:25	2481	2465	2945	3108	0.7791	1.26074	706	2.39	20.25	11.78
19-Oct	15:35	2550	2517	2924	3099	0.7853	1.23120	706	2.39	19.50	12.24
19-Oct	15:43	2617	2556	2937	3112	0.7920	1.21769	722	2.44	18.67	13.06
19-Oct	15:51	2532	2491	2944	3111	0.7785	1.24876	740	2.50	20.33	12.29
19-Oct	15:59	2517	2486	2940	3120	0.7855	1.25482	707	2.39	19.47	12.28
19-Oct	16:06	2509	2491	2924	3081	0.8003	1.23662	637	2.15	17.64	12.21

Table 10
Results - amine feeds, quartz (insolubles)

Date	Time	Slurry Quartz peak int. (cts/s)	Slurry Quartz bkg int. (cts/s)	Water Quartz peak int. (cts/s)	Water Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
19-Oct	16:14	2304	2259	2957	3129	0.7317	1.38489	901	3.04	26.16	11.61
19-Oct	16:22	2542	2499	2976	3164	0.7722	1.26625	776	2.62	21.11	12.40
19-Oct	16:30	2569	2496	2963	3154	0.7724	1.26352	810	2.73	21.09	12.95
19-Oct	16:38	2528	2467	2918	3100	0.7797	1.25659	760	2.57	20.18	12.71
19-Oct	16:46	2539	2494	2932	3117	0.7839	1.24985	730	2.46	19.67	12.53
19-Oct	16:54	2791	2815	2967	3144	0.8593	1.11693	416	1.42	10.48	13.53
19-Oct	17:02	2701	2734	2956	3124	0.8367	1.14274	473	1.61	13.21	12.18
19-Oct	17:09	2766	2780	2963	3143	0.8456	1.13092	470	1.60	12.13	13.17
19-Oct	17:17	2838	2842	2958	3149	0.8623	1.10807	429	1.46	10.11	14.46
19-Oct	17:25	2838	2831	2972	3174	0.8552	1.12119	468	1.59	10.97	14.50
19-Oct	17:33	2800	2814	2994	3165	0.8527	1.12444	450	1.53	11.27	13.58
19-Oct	17:41	2795	2828	3010	3179	0.8520	1.12425	434	1.48	11.36	13.03
19-Oct	17:49	2776	2790	2971	3155	0.8527	1.13056	449	1.53	11.26	13.56
19-Oct	17:57	2909	2949	2977	3162	0.8981	1.07199	279	0.96	5.82	16.54
19-Oct	18:05	2921	2922	3015	3192	0.8776	1.09244	389	1.33	8.27	16.08
19-Oct	18:12	2985	2997	2994	3176	0.9114	1.05952	268	0.93	4.24	21.88
20-Oct	08:01	2969	3000	3028	3178	0.9078	1.05949	261	0.90	4.66	19.37
20-Oct	08:10	2614	2580	3001	3172	0.7999	1.22940	676	2.29	17.70	12.91
20-Oct	08:18	2584	2442	3052	3233	0.7518	1.32423	992	3.34	23.64	14.12
20-Oct	08:25	2800	2629	2970	3141	0.8079	1.19476	808	2.73	16.72	16.31
20-Oct	08:33	2797	2613	3004	3166	0.8066	1.21191	835	2.82	16.88	16.69
20-Oct	08:42	2771	2563	2990	3181	0.7981	1.24088	899	3.03	17.92	16.91
20-Oct	08:50	2865	2692	2984	3160	0.8350	1.17380	725	2.45	13.41	18.25
20-Oct	08:58	2884	2710	2986	3161	0.8341	1.16640	727	2.45	13.52	18.16
20-Oct	09:06	2817	2675	3018	3177	0.8256	1.18776	723	2.44	14.55	16.77
20-Oct	09:14	2882	2710	2991	3176	0.8279	1.17183	748	2.53	14.28	17.69
20-Oct	09:22	2967	2799	3028	3196	0.8384	1.14186	709	2.39	13.00	18.42
20-Oct	09:30	2972	2791	3083	3254	0.8317	1.16606	759	2.56	13.81	18.54
20-Oct	09:37	3021	2978	3030	3224	0.8940	1.08262	388	1.32	6.30	21.01
20-Oct	09:45	2974	2992	3028	3214	0.8972	1.07418	311	1.07	5.92	18.02
20-Oct	10:22	2935	2659	3073	3264	0.7934	1.22775	1014	3.41	18.50	18.44
20-Oct	10:30	3090	2857	3082	3256	0.8431	1.13958	776	2.62	12.43	21.07
20-Oct	10:38	3072	2853	3070	3249	0.8547	1.13893	721	2.44	11.03	22.10
20-Oct	10:46	3040	2800	3032	3220	0.8548	1.15006	743	2.51	11.01	22.79
20-Oct	10:53	3028	2734	2995	3172	0.8428	1.16006	840	2.83	12.47	22.70
20-Oct	11:01	3063	2754	2984	3169	0.8374	1.15080	872	2.94	13.13	22.38
20-Oct	11:09	3001	2696	3023	3203	0.8196	1.18817	940	3.16	15.29	20.70
20-Oct	11:17	2894	2604	2997	3174	0.8041	1.21894	975	3.28	17.19	19.11
20-Oct	11:25	2808	2547	2945	3113	0.8081	1.22202	915	3.08	16.69	18.47
20-Oct	11:33	2827	2555	2942	3125	0.8024	1.22314	951	3.20	17.39	18.40
20-Oct	11:41	2745	2508	2950	3125	0.8008	1.24592	917	3.09	17.58	17.57
20-Oct	11:48	2781	2515	2886	3065	0.8113	1.21898	903	3.04	16.29	18.67
20-Oct	11:56	2859	2577	2895	3069	0.8258	1.19091	870	2.93	14.53	20.17
20-Oct	12:04	2863	2555	2862	3027	0.8175	1.18492	918	3.09	15.55	19.89
20-Oct	12:12	2809	2537	2867	3037	0.8186	1.19735	877	2.96	15.40	19.18
20-Oct	12:20	2730	2495	2878	3039	0.8052	1.21814	878	2.96	17.05	17.36
20-Oct	12:28	2641	2413	2861	3020	0.7946	1.25172	906	3.05	18.35	16.63
20-Oct	12:36	2694	2436	2852	3028	0.7946	1.24313	943	3.18	18.35	17.30
20-Oct	12:44	2757	2449	2871	3054	0.8058	1.24682	976	3.29	16.98	19.36
20-Oct	12:51	2901	2515	2873	3048	0.8078	1.21166	1053	3.54	16.73	21.18
20-Oct	12:59	2977	2556	2911	3088	0.8122	1.20791	1088	3.66	16.20	22.59
20-Oct	13:07	2920	2516	2886	3061	0.8091	1.21670	1077	3.62	16.57	21.85
20-Oct	13:15	2824	2457	2893	3078	0.7899	1.25247	1106	3.72	18.92	19.66
20-Oct	13:23	2788	2436	2880	3064	0.7921	1.25799	1080	3.63	18.66	19.47

Table 10
Results - amine feeds, quartz (insolubles)

Date	Time	Slurry Quartz peak int. (cts/s)	Slurry Quartz bkg int. (cts/s)	Water Quartz peak int. (cts/s)	Water Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
20-Oct	13:31	2796	2428	2895	3067	0.7864	1.26299	1120	3.76	19.35	19.45
20-Oct	13:39	2777	2436	2941	3116	0.7864	1.27876	1101	3.70	19.35	19.12
20-Oct	13:46	2862	2487	2974	3138	0.7810	1.26199	1161	3.90	20.02	19.49
20-Oct	13:54	2882	2501	2977	3165	0.7884	1.26549	1152	3.87	19.11	20.27
20-Oct	14:02	2904	2524	2936	3118	0.7981	1.23550	1099	3.70	17.92	20.63
20-Oct	14:10	2955	2557	2916	3089	0.8106	1.20790	1065	3.58	16.39	21.87
20-Oct	14:18	3025	2597	2940	3124	0.8218	1.20293	1071	3.60	15.02	23.99
20-Oct	14:26	3017	2573	2856	3022	0.8308	1.17447	1032	3.47	13.93	24.94
20-Oct	14:34	3030	2601	2851	3037	0.8386	1.16765	991	3.34	12.97	25.72
20-Oct	14:42	3029	2577	2837	3025	0.8383	1.17368	1020	3.43	13.01	26.37
20-Oct	14:49	3027	2580	2864	3041	0.8230	1.17875	1065	3.58	14.87	24.09
20-Oct	14:57	2966	2601	2946	3129	0.8190	1.20308	1006	3.39	15.36	22.04
20-Oct	15:05	2920	2549	2947	3118	0.8004	1.22326	1077	3.62	17.64	20.53
20-Oct	15:13	2848	2456	3015	3191	0.7745	1.29957	1229	4.13	20.83	19.82
20-Oct	15:21	2843	2453	2982	3162	0.7740	1.28934	1218	4.09	20.89	19.59
20-Oct	15:29	2885	2487	2993	3175	0.7745	1.27658	1224	4.11	20.83	19.73
20-Oct	15:37	2919	2513	3006	3197	0.7754	1.27200	1234	4.15	20.72	20.01
20-Oct	15:45	2892	2512	2969	3158	0.7874	1.25729	1149	3.86	19.23	20.08
20-Oct	15:52	2934	2578	2990	3177	0.7998	1.23258	1075	3.62	17.72	20.41
20-Oct	16:00	2982	2591	2969	3156	0.8008	1.21781	1105	3.71	17.59	21.12
20-Oct	16:08	3015	2639	3009	3182	0.8115	1.20555	1052	3.54	16.27	21.76
20-Oct	16:16	2966	2588	2997	3187	0.7968	1.23141	1113	3.74	18.07	20.70
20-Oct	16:24	2837	2488	2979	3173	0.7721	1.27529	1168	3.93	21.13	18.59
20-Oct	16:32	2847	2513	3031	3205	0.7711	1.27558	1160	3.90	21.25	18.35
20-Oct	16:40	2911	2576	2998	3200	0.7833	1.24230	1110	3.73	19.74	18.90
20-Oct	16:47	2958	2589	2987	3185	0.7941	1.23027	1111	3.73	18.41	20.28
20-Oct	16:55	2952	2584	3005	3179	0.7912	1.23032	1117	3.75	18.76	20.01
20-Oct	17:03	2834	2487	3011	3186	0.7755	1.28113	1160	3.90	20.70	18.84
20-Oct	17:11	2845	2456	3007	3205	0.7549	1.30517	1294	4.34	23.26	18.68
20-Oct	17:19	2961	2557	3007	3194	0.7841	1.24893	1194	4.01	19.64	20.43
20-Oct	17:27	3087	2610	3000	3180	0.7919	1.21809	1243	4.17	18.69	22.34
20-Oct	17:35	3124	2618	2998	3186	0.8013	1.21668	1248	4.19	17.53	23.92
20-Oct	17:43	3167	2650	3003	3196	0.7996	1.20623	1264	4.25	17.73	23.95
20-Oct	17:50	3041	2588	3044	3234	0.7854	1.24931	1259	4.23	19.49	21.71
20-Oct	17:58	3028	2612	3060	3230	0.7861	1.23627	1204	4.05	19.39	20.86
20-Oct	18:06	3024	2626	3020	3195	0.7984	1.21676	1129	3.79	17.88	21.21
20-Oct	18:14	3102	2709	3020	3203	0.8182	1.18258	1048	3.52	15.46	22.80
20-Oct	18:22	3119	2683	2992	3170	0.8216	1.18148	1081	3.63	15.04	24.16
20-Oct	18:30	3166	2688	3000	3173	0.8289	1.18046	1108	3.72	14.16	26.30
20-Oct	18:38	3190	2720	3012	3191	0.8285	1.17332	1099	3.69	14.20	26.02
20-Oct	18:46	3126	2643	3029	3206	0.8100	1.21272	1194	4.01	16.46	24.37
20-Oct	18:53	3111	2654	2979	3176	0.8125	1.19675	1143	3.84	16.16	23.77
20-Oct	19:01	3029	2609	2915	3091	0.8228	1.18449	1045	3.51	14.90	23.59
20-Oct	19:09	2963	2528	2863	3036	0.8149	1.20112	1084	3.65	15.85	23.00
20-Oct	19:17	2964	2541	2822	2983	0.8262	1.17369	1014	3.41	14.48	23.56
20-Oct	19:25	2976	2512	2891	3066	0.8119	1.22075	1143	3.84	16.23	23.68
20-Oct	19:33	3046	2580	2894	3065	0.8137	1.18795	1124	3.78	16.00	23.61
20-Oct	19:41	2963	2485	2917	3084	0.7998	1.24077	1210	4.06	17.71	22.95
20-Oct	19:48	2960	2486	2854	3036	0.8004	1.22144	1185	3.98	17.63	22.58
20-Oct	19:56	3062	2594	2842	3009	0.8248	1.16005	1070	3.60	14.66	24.54
20-Oct	20:04	3127	2659	2905	3084	0.8314	1.15981	1063	3.57	13.85	25.81
20-Oct	20:12	3173	2669	2936	3115	0.8333	1.16734	1108	3.72	13.61	27.36
20-Oct	20:20	3209	2679	2961	3132	0.8313	1.16929	1148	3.86	13.86	27.85
20-Oct	20:28	3246	2774	2935	3112	0.8517	1.12187	991	3.34	11.39	29.30

Table 10
Results - amine feeds, quartz (insolubles)

Date	Time	Slurry Quartz peak int. (cts/s)	Slurry Quartz bkg int. (cts/s)	Water Quartz peak int. (cts/s)	Water Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
20-Oct	20:36	3228	2842	3026	3197	0.8604	1.12518	881	2.97	10.34	28.72
20-Oct	20:44	3154	2827	2977	3156	0.8734	1.11644	764	2.58	8.77	29.39
20-Oct	20:51	3149	2856	2914	3092	0.8928	1.08235	648	2.19	6.44	34.02
20-Oct	21:07	3233	2945	2982	3155	0.9018	1.07123	618	2.09	5.38	38.92
20-Oct	21:23	3184	2934	2992	3176	0.8986	1.08221	592	2.01	5.76	34.80
20-Oct	21:39	3115	2989	2986	3162	0.9117	1.05807	413	1.41	4.20	33.50
21-Oct	12:49	3011	2428	2999	3181	0.7610	1.31030	1525	5.12	22.50	22.74
21-Oct	13:05	3060	3059	2968	3138	0.9299	1.02556	221	0.77	2.04	37.61
24-Oct	07:33	2607	2528	2888	3032	0.7908	1.19914	728	2.46	18.81	13.08
24-Oct	07:41	2686	2627	2868	3021	0.8382	1.14991	556	1.89	13.02	14.49
24-Oct	08:48	2670	2561	2923	3083	0.8213	1.20392	683	2.31	15.08	15.30
24-Oct	08:56	2677	2567	2908	3058	0.8291	1.19157	654	2.21	14.13	15.66
24-Oct	09:04	2733	2638	2895	3070	0.8473	1.16370	579	1.96	11.91	16.45
24-Oct	09:12	2725	2669	2908	3079	0.8492	1.15379	529	1.79	11.69	15.36
24-Oct	09:20	2747	2662	2895	3044	0.8403	1.14353	584	1.98	12.76	15.50
24-Oct	09:28	2713	2676	2969	3140	0.8366	1.17349	557	1.89	13.22	14.29
24-Oct	09:36	2632	2602	2952	3097	0.8395	1.19034	534	1.81	12.86	14.08
24-Oct	09:43	2632	2604	2885	3049	0.8467	1.17082	500	1.70	11.99	14.17
24-Oct	09:51	2655	2615	2889	3059	0.8487	1.16991	510	1.73	11.75	14.75
24-Oct	09:59	2672	2622	2913	3074	0.8489	1.17259	524	1.78	11.72	15.17
24-Oct	10:07	2716	2645	2975	3135	0.8422	1.18543	579	1.96	12.54	15.64
24-Oct	10:15	2636	2579	2931	3104	0.8379	1.20333	572	1.94	13.06	14.85
24-Oct	10:23	2603	2552	2879	3047	0.8427	1.19383	540	1.83	12.47	14.69
24-Oct	10:31	2597	2534	2844	3009	0.8473	1.18761	534	1.81	11.92	15.22
24-Oct	10:39	2635	2564	2913	3070	0.8436	1.19736	566	1.92	12.37	15.51
24-Oct	10:46	2683	2611	2942	3107	0.8396	1.18998	584	1.98	12.85	15.40
24-Oct	10:54	2585	2542	2922	3080	0.8395	1.21180	547	1.86	12.87	14.42
24-Oct	11:02	2611	2547	2845	3010	0.8419	1.18208	552	1.87	12.58	14.89
24-Oct	11:10	2651	2587	2824	2979	0.8466	1.15141	531	1.80	12.00	15.00
24-Oct	11:22	2605	2547	2893	3062	0.8306	1.20259	589	2.00	13.95	14.31
24-Oct	11:30	2591	2551	2825	2971	0.8430	1.16489	514	1.74	12.44	14.02
24-Oct	11:38	2609	2573	2885	3068	0.8412	1.19263	531	1.80	12.66	14.23
24-Oct	11:46	2636	2604	2917	3093	0.8430	1.18781	523	1.78	12.45	14.27
24-Oct	11:54	2661	2672	2897	3058	0.8634	1.14468	406	1.39	9.98	13.88
24-Oct	12:02	2684	2681	2918	3099	0.8498	1.15602	469	1.60	11.62	13.74
24-Oct	12:10	2686	2680	2897	3069	0.8599	1.14517	438	1.49	10.40	14.34
24-Oct	12:18	2744	2749	2935	3104	0.8694	1.12899	400	1.36	9.26	14.74
24-Oct	12:33	2723	2720	2912	3085	0.8708	1.13415	402	1.37	9.08	15.10
27-Oct	08:08	3128	1752	2812	2963	0.7561	1.69102	3049	10.19	23.11	44.11

Table 11
Results - amine feeds, BPL

Date	Time	Slurry BPL peak int. (cts/s)	Slurry BPL bkg int. (cts/s)	Water BPL peak int. (cts/s)	Water BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
16-Sep	11:51	2882	1661	2911	2567	0.79446	1.54506	2414	10.00	20.77	48.13
16-Sep	13:36	2717	1255	3010	2652	0.71643	2.11330	3842	15.92	27.88	57.10
16-Sep	13:47	2819	1635	2968	2629	0.78836	1.60798	2461	10.19	21.26	47.92
16-Sep	13:58	3008	1951	3062	2714	0.83006	1.39105	1932	7.99	18.02	44.37
16-Sep	14:10	3036	2517	3061	2707	1.03578	1.07547	462	1.89	5.20	36.40
16-Sep	14:21	2838	1599	3041	2713	0.76153	1.69621	2748	11.38	23.55	48.33
16-Sep	14:33	2956	1899	3073	2716	0.81831	1.43036	2006	8.30	18.90	43.93
16-Sep	14:44	2976	1862	3032	2710	0.80380	1.45485	2151	8.90	20.02	44.47
16-Sep	14:55	2891	1645	3043	2679	0.77606	1.62805	2628	10.89	22.29	48.83
16-Sep	15:07	2974	1813	3032	2687	0.79552	1.48192	2269	9.40	20.68	45.43
16-Sep	15:18	2949	1744	2992	2651	0.79632	1.51990	2370	9.81	20.62	47.60
16-Sep	15:30	2901	1737	3023	2651	0.79671	1.52555	2314	9.58	20.59	46.54
16-Sep	15:41	2981	1918	2977	2644	0.83815	1.37885	1894	7.84	17.42	44.98
16-Sep	16:22	3014	2149	2989	2655	0.90643	1.23533	1317	5.44	12.77	42.63
16-Sep	16:36	3013	2046	2971	2633	0.87440	1.28702	1576	6.52	14.88	43.80
27-Sep	13:21	2699	1870	2872	2532	0.77443	1.35431	1694	7.01	22.43	31.25
27-Sep	13:34	2759	1887	2867	2527	0.77689	1.33927	1732	7.17	22.22	32.25
03-Oct	10:32	3221	1677	3099	2732	0.79224	1.62847	3082	12.77	20.95	60.94
03-Oct	11:04	3330	2340	3116	2748	0.98342	1.17442	1208	4.99	8.11	61.58
03-Oct	11:17	3340	2213	3123	2740	0.94301	1.23797	1551	6.41	10.49	61.16
03-Oct	14:35	3362	2381	3225	2823	0.97523	1.18560	1233	5.10	8.58	59.39
03-Oct	14:43	3389	2332	3207	2822	0.95478	1.21026	1407	5.82	9.78	59.48
03-Oct	14:51	3347	2195	3216	2822	0.92610	1.28597	1690	6.99	11.53	60.68
03-Oct	14:58	3333	2093	3223	2824	0.89558	1.34941	1968	8.14	13.47	60.47
03-Oct	15:06	3263	1942	3130	2751	0.86033	1.41647	2256	9.34	15.84	58.95
03-Oct	15:14	3268	2050	3132	2751	0.89122	1.34185	1933	8.00	13.75	58.17
03-Oct	15:22	3261	1984	3132	2751	0.86167	1.38677	2152	8.91	15.75	56.55
03-Oct	15:30	3258	2123	3127	2755	0.89720	1.29776	1757	7.27	13.36	54.39
03-Oct	15:38	3269	2077	3148	2761	0.87952	1.32907	1917	7.93	14.53	54.59
03-Oct	15:46	3263	2131	3120	2744	0.89316	1.28755	1750	7.24	13.63	53.14
03-Oct	15:53	3262	1878	3115	2736	0.83321	1.45669	2472	10.24	17.79	57.56
03-Oct	16:01	3265	1923	3121	2751	0.84446	1.43068	2348	9.72	16.97	57.30
03-Oct	16:09	3289	1877	3144	2758	0.82533	1.46887	2555	10.58	18.37	57.61
03-Oct	16:17	3301	1627	3144	2771	0.76393	1.70299	3504	14.52	23.34	62.21
03-Oct	16:25	3324	1596	3118	2736	0.76192	1.71461	3615	14.98	23.52	63.70
03-Oct	16:33	3276	1591	3137	2761	0.75950	1.73493	3587	14.86	23.73	62.63
03-Oct	16:41	3258	1625	3152	2783	0.76875	1.71297	3442	14.26	22.92	62.23
03-Oct	16:49	3180	1751	3062	2697	0.81920	1.54015	2687	11.13	18.83	59.10
03-Oct	16:56	3176	1840	3030	2664	0.84267	1.44757	2353	9.74	17.10	56.99
03-Oct	17:04	3166	2033	3026	2653	0.90254	1.30511	1737	7.19	13.02	55.20
03-Oct	17:12	3083	2376	2995	2633	1.02113	1.10799	727	3.00	6.00	49.95
03-Oct	17:20	3123	2005	2993	2633	0.91942	1.31299	1680	6.95	11.94	58.19
03-Oct	17:28	2936	1236	2986	2622	0.70140	2.12161	4390	18.19	29.51	61.65
03-Oct	17:36	3040	1522	2941	2594	0.78097	1.70384	3154	13.07	21.88	59.74
03-Oct	17:44	3108	1765	2911	2562	0.85963	1.45103	2307	9.55	15.89	60.11
03-Oct	17:51	3144	2167	2959	2603	0.94925	1.20165	1307	5.40	10.11	53.41
03-Oct	17:59	3152	2350	3024	2662	0.98791	1.13289	940	3.88	7.85	49.43
03-Oct	19:26	2352	1489	3047	2684	0.86438	1.80313	1921	7.95	15.56	51.09
03-Oct	19:34	3185	2155	3039	2677	0.93875	1.24213	1443	5.97	10.75	55.52
03-Oct	19:50	3260	1862	3037	2675	0.86945	1.43646	2357	9.76	15.21	64.16
03-Oct	19:57	3243	2075	3058	2696	0.91244	1.29950	1753	7.25	12.38	58.59
03-Oct	20:05	3130	2346	3055	2680	0.98552	1.14235	935	3.86	7.99	48.30
03-Oct	20:29	3263	1656	3110	2741	0.79814	1.65538	3213	13.31	20.47	65.03
03-Oct	20:37	3277	1782	3116	2739	0.81120	1.53670	2814	11.66	19.45	59.94

Table 11
Results - amine feeds, BPL

		Slurry		Water							
Date	Time	BPL peak int. (cts/s)	BPL bkg int. (cts/s)	BPL peak int. (cts/s)	BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
03-Oct	20:45	3279	2127	3121	2735	0.89635	1.28616	1766	7.31	13.42	54.44
03-Oct	20:52	3072	2366	3081	2722	0.94925	1.15007	950	3.92	10.11	38.78
03-Oct	21:00	2964	1700	3033	2678	0.77365	1.57521	2598	10.76	22.50	47.82
03-Oct	21:08	2775	1553	3058	2678	0.77750	1.72443	2703	11.19	22.17	50.49
04-Oct	12:07	2987	1806	2892	2539	0.90515	1.40598	1902	7.87	12.85	61.27
04-Oct	12:20	2870	1346	2890	2536	0.77072	1.88439	3453	14.31	22.75	62.89
04-Oct	12:48	2798	1156	2925	2561	0.69877	2.21616	4412	18.29	29.81	61.35
04-Oct	13:11	3017	1724	2912	2556	0.84643	1.48273	2311	9.57	16.83	56.87
04-Oct	13:24	3021	1754	2891	2539	0.85764	1.44748	2195	9.09	16.03	56.67
04-Oct	13:46	2980	1596	2914	2556	0.81748	1.60160	2683	11.11	18.96	58.60
04-Oct	13:59	3015	1593	2906	2548	0.81980	1.59963	2734	11.32	18.79	60.28
04-Oct	14:12	2981	1683	2904	2540	0.84114	1.50970	2364	9.79	17.21	56.89
04-Oct	14:25	2981	1443	2912	2555	0.77727	1.77003	3291	13.63	22.19	61.44
04-Oct	14:38	3072	1665	2950	2588	0.82041	1.55428	2652	10.98	18.74	58.61
04-Oct	15:28	2787	1248	2878	2531	0.72571	2.02896	3819	15.82	26.93	58.76
04-Oct	15:41	2857	1501	2884	2540	0.78179	1.69208	2848	11.80	21.81	54.10
04-Oct	15:54	2828	1323	2807	2477	0.75852	1.87250	3416	14.16	23.82	59.43
14-Oct	08:47	2944	1787	2739	2413	0.88693	1.35034	1835	7.59	14.04	54.09
14-Oct	09:03	2794	1299	2701	2374	0.75948	1.82805	3305	13.69	23.73	57.70
14-Oct	09:10	2873	1427	2695	2364	0.78296	1.65664	2909	12.05	21.71	55.49
14-Oct	09:18	2897	1541	2732	2400	0.80478	1.55768	2581	10.69	19.95	53.58
14-Oct	09:26	2882	1498	2722	2392	0.79224	1.59669	2706	11.21	20.95	53.50
14-Oct	09:34	2996	1639	2765	2423	0.81564	1.47878	2454	10.16	19.10	53.19
14-Oct	09:42	2952	1587	2809	2462	0.79708	1.55114	2616	10.84	20.56	52.71
14-Oct	09:50	2996	1591	2843	2501	0.78787	1.57183	2739	11.34	21.30	53.24
14-Oct	09:58	3017	1640	2843	2501	0.79795	1.52540	2607	10.80	20.49	52.69
14-Oct	10:05	2989	1807	2850	2495	0.85552	1.38063	1992	8.24	16.18	50.95
14-Oct	10:13	3034	1924	2825	2474	0.89971	1.28570	1674	6.93	13.20	52.47
14-Oct	10:21	3025	1895	2864	2506	0.88456	1.32215	1784	7.38	14.19	51.99
14-Oct	10:29	3039	1755	2911	2548	0.83469	1.45219	2286	9.46	17.68	53.54
14-Oct	10:45	2935	1580	2854	2507	0.81349	1.58704	2618	10.84	19.27	56.26
14-Oct	11:01	3071	1861	2869	2525	0.87286	1.35653	1962	8.12	14.98	54.20
14-Oct	11:08	3010	1626	2882	2534	0.81017	1.55867	2638	10.93	19.53	55.96
14-Oct	11:16	3034	1991	2827	2484	0.92755	1.24740	1480	6.12	11.43	53.53
14-Oct	11:24	2951	2153	2849	2503	0.99201	1.16231	948	3.91	7.62	51.34
14-Oct	11:32	2961	2120	2826	2490	0.98566	1.17471	1023	4.22	7.98	52.95
19-Oct	08:38	2900	1878	2837	2492	0.84052	1.32720	1754	7.26	17.25	42.08
19-Oct	09:47	2916	2524	2916	2561	1.11727	1.01462	98	0.38	1.02	37.77
19-Oct	12:32	2853	1294	2882	2540	0.76333	1.96227	3660	15.17	23.39	64.83
19-Oct	12:39	2833	1184	2865	2520	0.72799	2.12855	4195	17.39	26.70	65.12
19-Oct	12:47	2901	1269	2900	2550	0.74748	2.00924	3922	16.25	24.82	65.47
19-Oct	12:55	2880	1199	2905	2550	0.72591	2.12642	4272	17.71	26.91	65.81
19-Oct	13:03	2924	1272	2906	2548	0.74682	2.00244	3952	16.38	24.89	65.82
19-Oct	13:11	2784	1155	2883	2530	0.72485	2.19021	4263	17.67	27.01	65.40
19-Oct	13:19	2979	1507	2894	2533	0.82236	1.68020	2922	12.10	18.59	65.10
19-Oct	14:54	3009	1524	2922	2569	0.81510	1.68572	2979	12.34	19.15	64.45
19-Oct	15:02	3043	1629	2898	2557	0.84773	1.56969	2609	10.80	16.73	64.56
19-Oct	15:10	3072	1782	2923	2562	0.89373	1.43764	2126	8.80	13.59	64.77
19-Oct	15:25	2992	1453	2898	2538	0.80088	1.74673	3194	13.23	20.25	65.33
19-Oct	15:35	3024	1484	2877	2530	0.81052	1.70459	3105	12.86	19.50	65.97
19-Oct	15:43	3037	1530	2877	2535	0.82134	1.65677	2949	12.22	18.67	65.44
19-Oct	15:51	2993	1447	2888	2540	0.79994	1.75496	3222	13.35	20.33	65.65
19-Oct	15:59	2984	1489	2902	2542	0.81091	1.70684	3032	12.56	19.47	64.52
19-Oct	16:06	2981	1555	2865	2509	0.83513	1.61352	2713	11.24	17.64	63.69

Table 11
Results - amine feeds, BPL

Date	Time	Slurry BPL peak int. (cts/s)	Slurry BPL bkg int. (cts/s)	Water BPL peak int. (cts/s)	Water BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
19-Oct	16:14	2896	1227	2910	2549	0.73344	2.07674	4146	17.18	26.16	65.67
19-Oct	16:22	3048	1465	2928	2580	0.79025	1.76105	3330	13.80	21.11	65.35
19-Oct	16:30	3008	1447	2934	2570	0.79047	1.77631	3311	13.72	21.09	65.04
19-Oct	16:38	2989	1459	2876	2529	0.80178	1.73366	3155	13.07	20.18	64.76
19-Oct	16:46	3020	1496	2894	2541	0.80832	1.69887	3077	12.75	19.67	64.80
19-Oct	16:54	3095	1953	2917	2556	0.94320	1.30842	1640	6.78	10.48	64.75
19-Oct	17:02	3109	1793	2894	2548	0.89956	1.42139	2127	8.81	13.21	66.67
19-Oct	17:09	3112	1865	2913	2566	0.91647	1.37554	1930	7.99	12.13	65.85
19-Oct	17:17	3126	1998	2927	2582	0.94922	1.29225	1589	6.57	10.11	64.99
19-Oct	17:25	3133	1961	2925	2571	0.93514	1.31102	1703	7.05	10.97	64.26
19-Oct	17:33	3121	1933	2939	2586	0.93023	1.33833	1771	7.33	11.27	65.02
19-Oct	17:41	3121	1923	2954	2595	0.92883	1.34975	1802	7.45	11.36	65.65
19-Oct	17:49	3096	1924	2914	2567	0.93035	1.33393	1742	7.21	11.26	63.98
19-Oct	17:57	3042	2249	2927	2583	1.02440	1.14860	847	3.50	5.82	60.06
19-Oct	18:05	3100	2117	2955	2596	0.98054	1.22667	1256	5.19	8.27	62.76
19-Oct	18:12	3017	2387	2938	2586	1.05400	1.08349	543	2.23	4.24	52.66
20-Oct	08:01	2997	2302	2886	2538	1.04606	1.10244	649	2.67	4.66	57.43
20-Oct	08:10	2969	1558	2889	2542	0.83438	1.63147	2723	11.28	17.70	63.71
20-Oct	08:18	2952	1368	2941	2601	0.76052	1.90059	3633	15.05	23.64	63.67
20-Oct	08:25	3026	1645	2891	2550	0.84796	1.54984	2527	10.47	16.72	62.61
20-Oct	08:33	3019	1659	2903	2556	0.84568	1.54086	2491	10.31	16.88	61.11
20-Oct	08:42	2986	1613	2907	2549	0.83140	1.58066	2600	10.77	17.92	60.10
20-Oct	08:50	3003	1832	2897	2550	0.89652	1.39149	1893	7.83	13.41	58.43
20-Oct	08:58	3025	1821	2892	2540	0.89484	1.39453	1945	8.05	13.52	59.56
20-Oct	09:06	3018	1774	2919	2564	0.87921	1.44547	2108	8.73	14.55	59.97
20-Oct	09:14	3058	1800	2918	2560	0.88332	1.42230	2088	8.64	14.28	60.52
20-Oct	09:22	3120	1888	2941	2584	0.90285	1.36852	1937	8.02	13.00	61.67
20-Oct	09:30	3137	1904	2994	2635	0.89032	1.38444	1997	8.26	13.81	59.82
20-Oct	09:37	3053	2281	2954	2596	1.01555	1.13800	838	3.46	6.30	54.82
20-Oct	09:45	3045	2262	2958	2597	1.02250	1.14801	841	3.47	5.92	58.52
20-Oct	10:22	3111	1683	3010	2636	0.82361	1.56635	2701	11.19	18.50	60.48
20-Oct	10:30	3144	1985	3007	2639	0.91164	1.32941	1774	7.34	12.43	59.04
20-Oct	10:38	3105	2071	2986	2616	0.93417	1.26352	1480	6.12	11.03	55.49
20-Oct	10:46	3048	2061	2959	2598	0.93444	1.26060	1415	5.85	11.01	53.12
20-Oct	10:53	3030	1947	2931	2569	0.91106	1.31934	1657	6.85	12.47	54.96
20-Oct	11:01	3071	1901	2917	2555	0.90085	1.34446	1827	7.56	13.13	57.60
20-Oct	11:09	3031	1788	2942	2589	0.86841	1.44808	2141	8.86	15.29	57.99
20-Oct	11:17	2998	1672	2935	2575	0.84143	1.54053	2452	10.15	17.19	59.07
20-Oct	11:25	2911	1628	2876	2520	0.84828	1.54772	2367	9.80	16.69	58.71
20-Oct	11:33	2948	1610	2872	2521	0.83855	1.56558	2501	10.36	17.39	59.55
20-Oct	11:41	2906	1594	2873	2532	0.83596	1.58800	2499	10.35	17.58	58.86
20-Oct	11:48	2884	1620	2818	2476	0.85390	1.52808	2294	9.50	16.29	58.28
20-Oct	11:56	2890	1711	2829	2473	0.87951	1.44512	2002	8.29	14.53	57.01
20-Oct	12:04	2902	1636	2774	2445	0.86463	1.49459	2224	9.21	15.55	59.22
20-Oct	12:12	2891	1645	2788	2442	0.86668	1.48487	2175	9.01	15.40	58.46
20-Oct	12:20	2884	1555	2811	2454	0.84337	1.57821	2482	10.28	17.05	60.29
20-Oct	12:28	2821	1471	2788	2439	0.82557	1.65872	2666	11.04	18.35	60.15
20-Oct	12:36	2840	1482	2779	2445	0.82555	1.64912	2665	11.04	18.35	60.14
20-Oct	12:44	2792	1557	2793	2450	0.84428	1.57355	2325	9.63	16.98	56.69
20-Oct	12:51	2852	1596	2819	2473	0.84773	1.54932	2322	9.61	16.73	57.46
20-Oct	12:59	2864	1653	2847	2495	0.85532	1.51002	2190	9.07	16.20	55.99
20-Oct	13:07	2855	1613	2800	2453	0.85004	1.52035	2255	9.34	16.57	56.34
20-Oct	13:15	2853	1508	2837	2483	0.81801	1.64650	2667	11.05	18.92	58.37
20-Oct	13:23	2820	1501	2806	2470	0.82154	1.64514	2609	10.81	18.66	57.92

Table 11
Results - amine feeds, BPL

Date	Time	Slurry BPL peak int. (cts/s)	Slurry BPL bkg int. (cts/s)	Water BPL peak int. (cts/s)	Water BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
20-Oct	13:31	2826	1478	2824	2482	0.81240	1.67939	2729	11.30	19.35	58.40
20-Oct	13:39	2841	1507	2855	2521	0.81239	1.67220	2702	11.19	19.35	57.83
20-Oct	13:46	2889	1500	2891	2547	0.80384	1.69739	2856	11.83	20.02	59.09
20-Oct	13:54	2864	1545	2917	2551	0.81561	1.65054	2647	10.96	19.11	57.37
20-Oct	14:02	2875	1577	2856	2512	0.83144	1.59281	2491	10.32	17.92	57.58
20-Oct	14:10	2847	1626	2843	2504	0.85262	1.53966	2248	9.31	16.39	56.79
20-Oct	14:18	2838	1729	2872	2534	0.87226	1.46536	1948	8.06	15.02	53.67
20-Oct	14:26	2802	1718	2786	2452	0.88862	1.42683	1820	7.53	13.93	54.07
20-Oct	14:34	2805	1777	2793	2446	0.90322	1.37645	1651	6.83	12.97	52.64
20-Oct	14:42	2799	1786	2781	2437	0.90262	1.36455	1620	6.70	13.01	51.51
20-Oct	14:49	2869	1700	2796	2459	0.87457	1.44647	1999	8.28	14.87	55.66
20-Oct	14:57	2893	1715	2874	2522	0.86731	1.47044	2066	8.55	15.36	55.67
20-Oct	15:05	2929	1612	2881	2524	0.83524	1.56576	2478	10.26	17.64	58.17
20-Oct	15:13	2892	1502	2942	2570	0.79369	1.71098	2907	12.04	20.83	57.81
20-Oct	15:21	2891	1486	2923	2558	0.79299	1.72220	2950	12.22	20.89	58.50
20-Oct	15:29	2890	1483	2923	2565	0.79369	1.72968	2963	12.27	20.83	58.93
20-Oct	15:37	2903	1500	2933	2581	0.79505	1.72052	2943	12.19	20.72	58.84
20-Oct	15:45	2904	1549	2892	2545	0.81399	1.64243	2698	11.17	19.23	58.10
20-Oct	15:52	2915	1618	2921	2552	0.83416	1.57729	2469	10.22	17.72	57.71
20-Oct	16:00	2912	1613	2891	2544	0.83593	1.57685	2466	10.21	17.59	58.06
20-Oct	16:08	2927	1699	2927	2576	0.85422	1.51634	2238	9.27	16.27	56.94
20-Oct	16:16	2934	1622	2928	2583	0.82929	1.59274	2531	10.48	18.07	57.99
20-Oct	16:24	2929	1471	2913	2553	0.79004	1.73561	3067	12.71	21.13	60.14
20-Oct	16:32	2942	1485	2948	2598	0.78860	1.74995	3099	12.84	21.25	60.42
20-Oct	16:40	2973	1544	2938	2575	0.80745	1.66704	2878	11.92	19.74	60.40
20-Oct	16:47	2979	1620	2925	2577	0.82480	1.59023	2612	10.82	18.41	58.76
20-Oct	16:55	2955	1587	2932	2578	0.82013	1.62496	2688	11.13	18.76	59.33
20-Oct	17:03	2901	1491	2930	2575	0.79528	1.72721	2963	12.27	20.70	59.29
20-Oct	17:11	2921	1407	2939	2594	0.76479	1.84304	3399	14.08	23.26	60.54
20-Oct	17:19	2933	1557	2934	2590	0.80873	1.66335	2785	11.53	19.64	58.74
20-Oct	17:27	2972	1610	2926	2565	0.82114	1.59324	2629	10.89	18.69	58.28
20-Oct	17:35	2964	1688	2929	2575	0.83674	1.52571	2367	9.80	17.53	55.92
20-Oct	17:43	3007	1692	2943	2585	0.83395	1.52771	2438	10.10	17.73	56.93
20-Oct	17:50	2993	1618	2963	2606	0.81069	1.61107	2709	11.22	19.49	57.58
20-Oct	17:58	3004	1606	2981	2608	0.81187	1.62376	2760	11.43	19.39	58.95
20-Oct	18:06	2990	1655	2941	2588	0.83186	1.56399	2523	10.45	17.88	58.42
20-Oct	18:14	3019	1786	2942	2588	0.86592	1.44934	2134	8.83	15.46	57.15
20-Oct	18:22	2997	1806	2913	2565	0.87198	1.42079	2022	8.37	15.04	55.62
20-Oct	18:30	2987	1882	2920	2571	0.88510	1.36633	1805	7.47	14.16	52.73
20-Oct	18:38	3020	1887	2924	2577	0.88454	1.36550	1845	7.64	14.20	53.79
20-Oct	18:46	2985	1766	2947	2588	0.85158	1.46513	2170	8.98	16.46	54.57
20-Oct	18:53	3017	1766	2921	2565	0.85586	1.45213	2185	9.05	16.16	55.99
20-Oct	19:01	2924	1747	2840	2498	0.87414	1.43029	1999	8.27	14.90	55.54
20-Oct	19:09	2861	1654	2785	2456	0.86018	1.48515	2137	8.85	15.85	55.79
20-Oct	19:17	2858	1684	2741	2399	0.88026	1.42495	1960	8.11	14.48	56.02
20-Oct	19:25	2837	1656	2815	2476	0.85486	1.49471	2124	8.79	16.23	54.17
20-Oct	19:33	2911	1668	2811	2469	0.85805	1.47986	2190	9.07	16.00	56.65
20-Oct	19:41	2788	1565	2842	2495	0.83417	1.59386	2362	9.78	17.71	55.20
20-Oct	19:48	2819	1541	2770	2429	0.83527	1.57598	2414	10.00	17.63	56.68
20-Oct	19:56	2890	1693	2758	2432	0.87765	1.43658	2017	8.35	14.66	56.95
20-Oct	20:04	2922	1795	2828	2490	0.88976	1.38735	1839	7.61	13.85	54.93
20-Oct	20:12	2888	1826	2851	2508	0.89336	1.37370	1727	7.15	13.61	52.49
20-Oct	20:20	2882	1817	2872	2514	0.88966	1.38377	1751	7.25	13.86	52.29
20-Oct	20:28	2933	1939	2866	2519	0.92835	1.29914	1472	6.09	11.39	53.45

Table 11
Results - amine feeds, BPL

Date	Time	Slurry BPL peak int. (cts/s)	Slurry BPL bkg int. (cts/s)	Water BPL peak int. (cts/s)	Water BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
20-Oct	20:36	2943	2041	2927	2578	0.94541	1.26332	1281	5.29	10.34	51.19
20-Oct	20:44	2891	2105	2889	2550	0.97187	1.21152	1024	4.23	8.77	48.19
20-Oct	20:51	2872	2210	2839	2488	1.01300	1.12584	712	2.94	6.44	45.55
20-Oct	21:07	2932	2357	2894	2534	1.03256	1.07480	535	2.20	5.38	40.89
20-Oct	21:23	2903	2317	2906	2563	1.02546	1.10643	584	2.40	5.76	41.66
20-Oct	21:39	2913	2362	2887	2541	1.05464	1.07591	454	1.86	4.20	44.31
21-Oct	12:49	2831	1432	2912	2556	0.77359	1.78423	3074	12.74	22.50	56.60
21-Oct	13:05	2915	2439	2881	2518	1.09663	1.03233	248	1.01	2.04	49.37
24-Oct	07:33	2817	1373	2799	2459	0.81946	1.79174	3033	12.56	18.81	66.78
24-Oct	07:41	2931	1710	2793	2465	0.90246	1.44167	2001	8.28	13.02	63.59
24-Oct	08:48	3071	1755	2856	2504	0.87145	1.42684	2200	9.11	15.08	60.40
24-Oct	08:56	3085	1806	2843	2482	0.88547	1.37419	2042	8.45	14.13	59.80
24-Oct	09:04	3113	1954	2853	2490	0.91986	1.27451	1677	6.94	11.91	58.22
24-Oct	09:12	3114	1946	2857	2503	0.92346	1.28619	1694	7.01	11.69	59.94
24-Oct	09:20	3129	1852	2823	2493	0.90647	1.34553	1950	8.07	12.76	63.24
24-Oct	09:28	3135	1885	2913	2558	0.89942	1.35721	1954	8.09	13.22	61.19
24-Oct	09:36	3074	1888	2880	2525	0.90490	1.33773	1827	7.56	12.86	58.76
24-Oct	09:43	3071	1908	2819	2485	0.91869	1.30231	1716	7.10	11.99	59.23
24-Oct	09:51	3094	1945	2836	2480	0.92242	1.27541	1659	6.86	11.75	58.38
24-Oct	09:59	3113	1974	2857	2497	0.92295	1.26462	1632	6.75	11.72	57.60
24-Oct	10:07	3144	1975	2901	2551	0.90993	1.29161	1740	7.20	12.54	57.40
24-Oct	10:15	3079	1908	2875	2533	0.90187	1.32767	1804	7.47	13.06	57.16
24-Oct	10:23	3045	1898	2836	2484	0.91104	1.30881	1722	7.13	12.47	57.13
24-Oct	10:31	3017	1905	2786	2441	0.91982	1.28165	1621	6.70	11.92	56.26
24-Oct	10:39	3068	1938	2849	2490	0.91261	1.28514	1671	6.91	12.37	55.86
24-Oct	10:46	3119	1930	2883	2523	0.90517	1.30695	1793	7.42	12.85	57.74
24-Oct	10:54	2993	1866	2858	2503	0.90483	1.34146	1750	7.24	12.87	56.26
24-Oct	11:02	3069	1872	2797	2442	0.90938	1.30408	1781	7.37	12.58	58.59
24-Oct	11:10	3071	1860	2757	2423	0.91851	1.30280	1775	7.34	12.00	61.20
24-Oct	11:22	3009	1776	2836	2486	0.88824	1.39967	2004	8.29	13.95	59.44
24-Oct	11:30	3002	1796	2749	2417	0.91153	1.34547	1836	7.60	12.44	61.06
24-Oct	11:38	3019	1864	2828	2496	0.90806	1.33898	1775	7.34	12.66	58.01
24-Oct	11:46	3050	1898	2861	2511	0.91145	1.32300	1746	7.22	12.45	58.03
24-Oct	11:54	3021	1992	2827	2491	0.95151	1.25069	1407	5.82	9.98	58.33
24-Oct	12:02	3062	1905	2852	2498	0.92461	1.31125	1705	7.05	11.62	60.72
24-Oct	12:10	3024	1963	2826	2490	0.94448	1.26859	1484	6.14	10.40	59.03
24-Oct	12:18	3076	2078	2887	2532	0.96361	1.21828	1308	5.41	9.26	58.40
24-Oct	12:33	3082	2103	2848	2494	0.96659	1.18568	1244	5.14	9.08	56.61
27-Oct	08:08	2717	1639	2706	2390	0.76651	1.45781	2129	8.81	23.11	38.13

Figure 8
Amine feeds - XRD net peak intensity versus insolubles in slurry

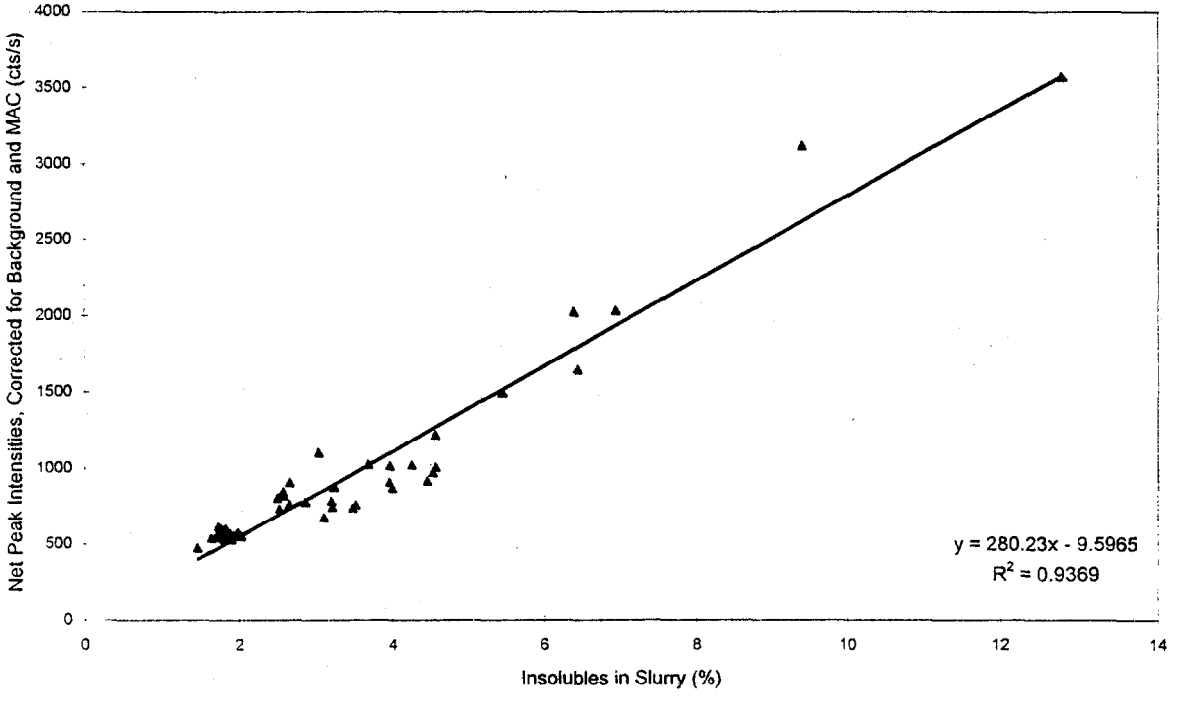


Figure 9
Amine feeds - XRD net peak intensity versus BPL in slurry

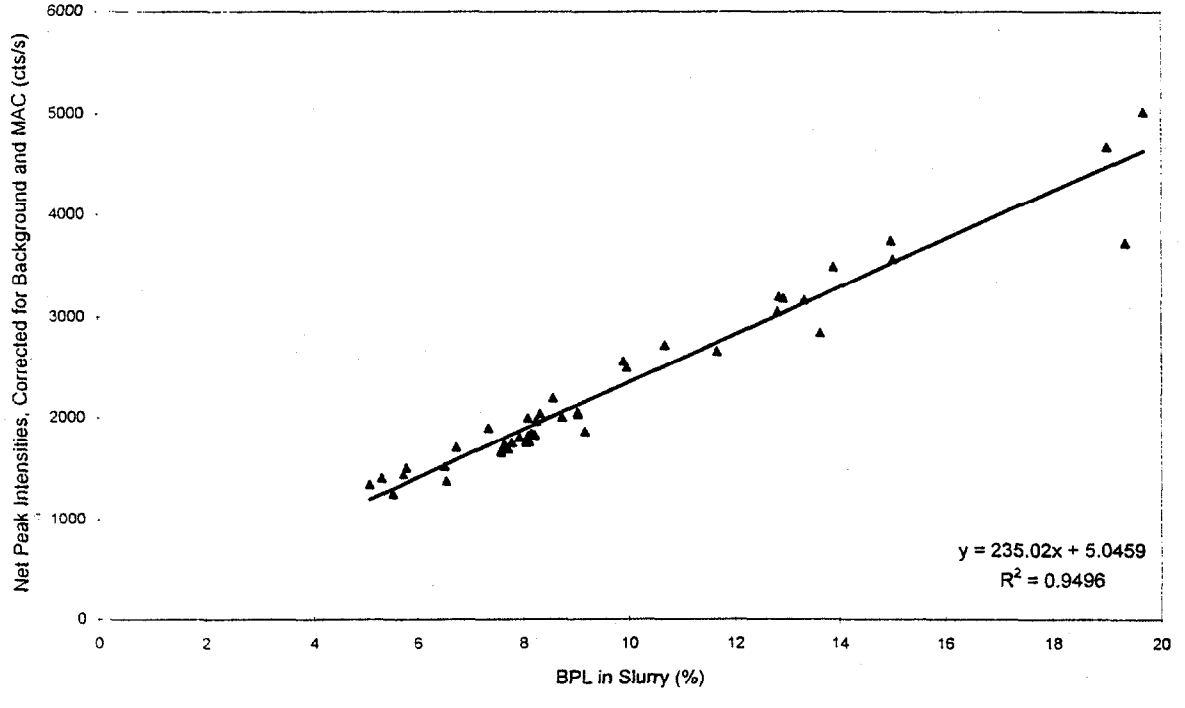


Figure 10
Amine feeds - Midfox quartz *versus* Four Corners laboratory insolubles

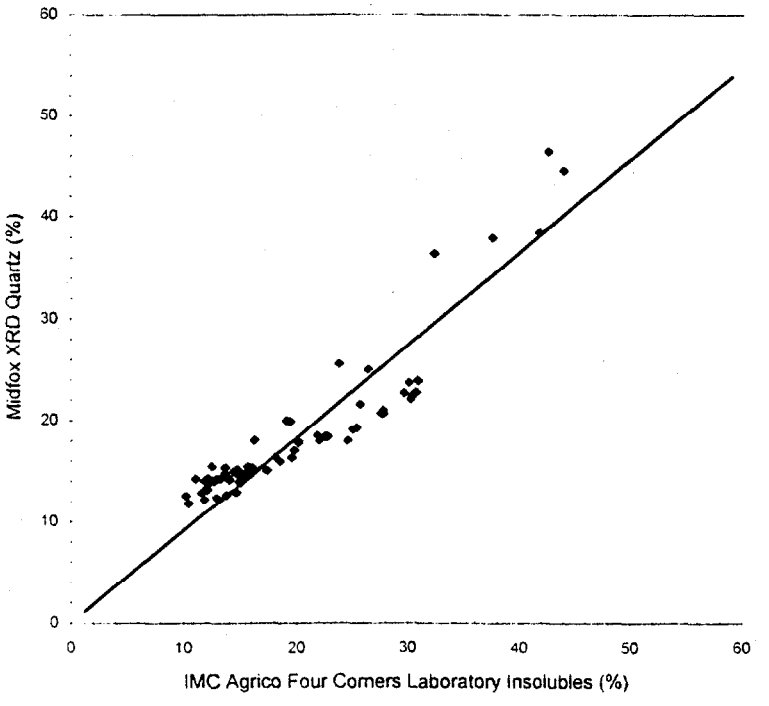
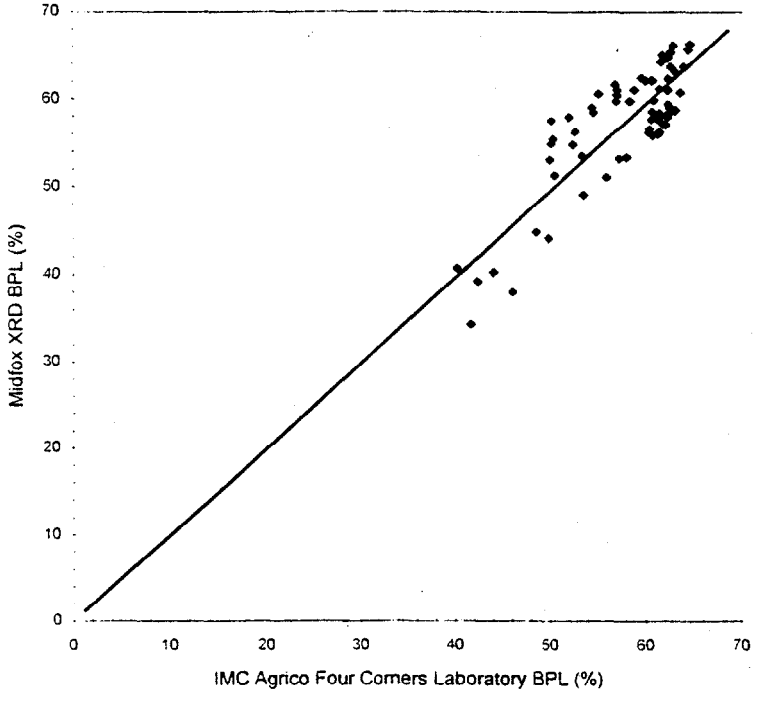


Figure 11.
Amine feeds - Midfox *versus* Four Corners laboratory, BPL



Appendix C:

Final Concentrates

Table 12
Calibration data - final concentrates, quartz (insolubles)

Sample #	Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in slurry (%)	Solids content (%)	Midfox quartz (%)	Four Corners A-Lab insol.(%)	CV (%)
			Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)								
MF-002	15-Sep-94	11:10	1980	2042	2703	2835	0.88097	1.38824	2113	0.74	14.55	5.06	3.6	28.5
MF-003	15-Sep-94	16:09	2148	1826	2660	2787	0.86451	1.52618	2417	2.63	18.34	14.35	13.7	3.3
MF-004	16-Sep-94	12:25	2087	1919	2771	2884	0.85553	1.50304	3083	2.02	20.47	9.87	8.6	10.3
MF-005	16-Sep-94	16:07	2614	2253	2793	2935	0.87862	1.30248	1963	2.50	15.09	16.58	16.8	0.9
MF-006	17-Sep-94	17:09	2355	2329	2772	2907	0.88923	1.24787	1814	1.05	12.70	8.28	6.7	16.5
MF-007	19-Sep-94	13:59	2632	2734	2786	2922	0.92412	1.06862	574	0.31	5.18	5.95	4.4	24.0
MF-008	20-Sep-94	09:55	1957	1793	2744	2861	0.83699	1.59564	4030	2.20	25.00	8.81	8.7	1.3
MF-009	22-Sep-94	10:45	1401	1279	2781	2890	0.78650	2.25991	6825	2.71	38.54	7.02	6.2	9.0
MF-010	23-Sep-94	12:40	1717	1630	2760	2883	0.87232	1.76885	2055	1.57	16.53	9.50	6.7	29.5
MF-011	23-Sep-94	18:37	2442	2384	2786	2937	0.90243	1.23208	1119	1.06	9.80	10.86	10.8	0.5
MF-012	26-Sep-94	10:38	1486	1501	2785	2904	0.84329	1.93483	3704	1.27	23.44	5.44	3.8	29.7
MF-013	30-Sep-94	12:16	2391	2457	2830	2988	0.89258	1.21572	1784	0.70	11.96	5.88	7.0	11.6
MF-014	03-Oct-94	10:55	2302	2292	3009	3167	0.82529	1.38198	5105	1.71	27.97	6.11	5.4	9.3
MF-015	04-Oct-94	11:33	1757	1819	2764	2907	0.80960	1.59830	5862	1.36	32.10	4.24	3.3	19.5
MF-016	04-Oct-94	13:38	1433	1508	2860	3022	0.78485	2.00476	7199	1.50	39.02	3.85	3.6	5.8
MF-017	04-Oct-94	14:59	1279	1334	2905	3075	0.76147	2.30504	8676	1.83	46.11	3.96	3.6	7.4
MF-018	05-Oct-94	09:46	2470	2596	2919	3074	0.89733	1.18430	1652	0.48	10.91	4.36	5.5	14.3
MF-019	05-Oct-94	09:59	2131	2245	2857	3011	0.86088	1.34137	3289	0.78	19.20	4.07	3.7	8.0
MF-020	05-Oct-94	10:09	2209	2319	2915	3065	0.86560	1.32152	3054	0.78	18.09	4.34	4.8	6.6
MF-021	05-Oct-94	13:31	2556	2618	2885	3041	0.89867	1.16165	1590	0.69	10.62	6.51	10.6	27.3
MF-022	05-Oct-94	14:25	2712	2832	2883	3047	0.92134	1.07579	702	0.30	5.76	5.25	8.9	28.9
MF-023	05-Oct-94	15:00	2455	2546	2848	2998	0.90378	1.17764	1307	0.52	9.51	5.51	6.6	11.7
MF-024	06-Oct-94	09:47	2700	2765	2871	2991	0.91891	1.08201	769	0.49	6.28	7.86	11.5	22.4
MF-025	11-Oct-94	12:13	2263	2387	3003	3162	0.87431	1.32479	2575	0.68	16.07	4.25	11.6	44.8
MF-026	27-Oct-94	09:26	2360	2481	2863	3018	0.88509	1.21649	2228	0.58	13.62	4.22	5.1	11.8
MF-027	27-Oct-94	12:14	2249	2287	3135	3306	0.80908	1.44593	5989	1.74	32.24	5.38	6.6	12.7
MF-028	27-Oct-94	12:22	2369	2411	3140	3324	0.83243	1.37884	4729	1.50	26.15	5.73	8.0	20.0
MF-029	27-Oct-94	12:29	2516	2565	3160	3352	0.85894	1.30708	3366	1.22	19.66	6.22	7.5	12.2
MF-030	27-Oct-94	12:37	2487	2565	3151	3348	0.85587	1.30503	3569	1.13	20.39	5.55	6.4	9.8
MF-031	27-Oct-94	12:45	2495	2608	3136	3318	0.86666	1.27246	3071	0.88	17.84	4.94	6.4	15.8
MF-032	27-Oct-94	12:53	2603	2726	3162	3347	0.87930	1.22802	2486	0.74	14.93	4.97	5.4	5.4
MF-033	27-Oct-94	13:01	2621	2751	3128	3312	0.88724	1.20383	2125	0.63	13.14	4.79	5.6	10.5
MF-034	27-Oct-94	13:09	2700	2851	3131	3324	0.89642	1.16607	1748	0.48	11.11	4.33	5.8	17.6
MF-035	27-Oct-94	13:17	2706	2865	3119	3308	0.89842	1.15490	1679	0.43	10.67	4.06	6.6	27.0
MF-036	27-Oct-94	13:25	2788	2945	3170	3338	0.89996	1.13332	1657	0.44	10.34	4.27	5.5	15.3

Table 12
Calibration data - final concentrates, quartz (insolubles)

Sample #	Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in slurry (%)	Solids content (%)	Midfox quartz (%)	Four Corners A-Lab insol.(%)	CV (%)
			Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)								
MF-037	27-Oct-94	13:32	2801	2952	3156	3335	0.90265	1.12947	1521	0.43	9.75	4.46	6.3	20.9
MF-038	27-Oct-94	13:40	2835	2990	3186	3368	0.90617	1.12656	1343	0.40	8.99	4.45	6.6	22.9
MF-039	27-Oct-94	13:48	2917	3064	3183	3386	0.90987	1.10513	1208	0.40	8.19	4.90	6.2	14.9
													Mean	15.5

Table 13
Calibration data - final concentrates, BPL

Sample #	Date	Time	Slurry		Water		Bkg fac.	Relative mac	Net peak int. (cts/s)	BPL in slurry (%)	Solids content (%)	Midfox BPL (%)	Four Corners A-Lab BPL (%)	CV (%)
			BPL peak int. (cts/s)	BPL bkg int. (cts/s)	BPL peak int. (cts/s)	BPL bkg int. (cts/s)								
MF-002	15-Sep-94	11:10	2806	1552	2628	2296	0.88780	1.47919	2113	9.13	14.55	62.70	72.0	9.1
MF-003	15-Sep-94	16:09	2686	1483	2784	2481	0.83693	1.67280	2417	10.24	18.34	55.84	62.5	7.5
MF-004	16-Sep-94	12:25	2890	1443	2917	2586	0.81089	1.79246	3083	12.69	20.47	62.00	66.8	5.1
MF-005	16-Sep-94	16:07	3053	1877	2982	2632	0.88028	1.40217	1963	8.58	15.09	56.84	59.8	3.5
MF-006	17-Sep-94	17:09	3059	1903	2955	2618	0.91476	1.37589	1814	8.03	12.70	63.22	66.9	3.9
MF-007	19-Sep-94	13:59	3049	2425	2959	2619	1.03822	1.07992	574	3.47	5.18	66.93	71.1	4.2
MF-008	20-Sep-94	09:55	856	366	2889	2557	0.76147	6.98190	4030	16.18	25.00	64.69	66.7	2.1
MF-009	22-Sep-94	10:45	2286	694	2939	2595	0.66276	3.73839	6825	26.45	38.54	68.63	69.0	0.4
MF-010	23-Sep-94	12:40	3120	1814	2717	2391	0.86056	1.31801	2055	8.91	16.53	53.91	70.4	16.5
MF-011	23-Sep-94	18:37	3047	2191	2905	2596	0.95975	1.18467	1119	5.47	9.80	55.84	67.2	11.9
MF-012	26-Sep-94	10:38	2474	1101	2859	2522	0.77759	2.29008	3704	14.98	23.44	63.90	70.6	6.8
MF-013	30-Sep-94	12:16	3157	1945	2910	2557	0.92598	1.31477	1784	7.92	11.96	66.21	69.4	n.d.
MF-014	03-Oct-94	10:55	3152	1209	3110	2725	0.73354	2.25395	5105	20.13	27.97	71.95	66.8	5.4
MF-015	04-Oct-94	11:33	2699	885	2844	2496	0.70056	2.81923	5862	22.91	32.10	71.36	71.2	0.1
MF-016	04-Oct-94	13:38	2378	679	2875	2535	0.66061	3.73182	7199	27.82	39.02	71.31	71.7	0.4
MF-017	04-Oct-94	14:59	2345	589	2965	2598	0.63952	4.40944	8676	33.26	46.11	72.12	72.2	0.1
MF-018	05-Oct-94	09:46	3155	1979	2893	2532	0.94211	1.27951	1652	7.43	10.91	68.11	70.2	2.1
MF-019	05-Oct-94	09:59	2939	1371	2840	2495	0.82625	1.82048	3289	13.45	19.20	70.05	71.9	1.8
MF-020	05-Oct-94	10:09	2996	1469	2895	2546	0.84016	1.73359	3054	12.59	18.09	69.58	71.4	1.8
MF-021	05-Oct-94	13:31	3038	1925	2850	2516	0.94669	1.30724	1590	7.20	10.62	67.83	66.0	1.9
MF-022	05-Oct-94	14:25	2980	2282	2870	2523	1.02785	1.10576	702	3.94	5.76	68.32	67.2	1.1
MF-023	05-Oct-94	15:00	2956	1981	2815	2476	0.96446	1.24982	1307	6.16	9.51	64.84	69.1	4.4
MF-024	06-Oct-94	09:47	2961	2229	2837	2489	1.01887	1.11647	769	4.19	6.28	66.72	64.1	2.8
MF-025	11-Oct-94	12:13	3185	1712	2937	2590	0.86672	1.51333	2575	10.83	16.07	67.35	69.8	2.4
MF-026	27-Oct-94	09:26	3069	1687	2767	2427	0.90114	1.43842	2228	9.55	13.62	70.08	70.1	0.0
MF-027	27-Oct-94	12:14	2828	961	3035	2669	0.69958	2.77778	5989	23.38	32.24	72.50	68.2	4.5
MF-028	27-Oct-94	12:22	3085	1227	3054	2681	0.75026	2.18512	4729	18.74	26.15	71.68	68.0	3.8
MF-029	27-Oct-94	12:29	3281	1584	3068	2691	0.82063	1.69893	3366	13.73	19.66	69.86	67.9	2.0
MF-030	27-Oct-94	12:37	3307	1550	3078	2701	0.81185	1.74246	3569	14.48	20.39	71.02	68.7	2.4
MF-031	27-Oct-94	12:45	3353	1684	3049	2676	0.84334	1.58923	3071	12.65	17.84	70.90	69.0	1.9
MF-032	27-Oct-94	12:53	3376	1868	3073	2688	0.88245	1.43902	2486	10.50	14.93	70.30	69.4	0.9
MF-033	27-Oct-94	13:01	3361	1969	3030	2661	0.90819	1.35141	2125	9.17	13.14	69.77	68.9	0.9
MF-034	27-Oct-94	13:09	3369	2115	3039	2674	0.93897	1.26413	1748	7.78	11.11	70.06	69.0	1.1
MF-035	27-Oct-94	13:17	3332	2114	3042	2665	0.94584	1.26048	1679	7.53	10.67	70.59	69.3	1.4
MF-036	27-Oct-94	13:25	3350	2138	3067	2691	0.95114	1.25850	1657	7.45	10.34	72.09	69.3	2.8

Table 13
Calibration data - final concentrates, BPL

Sample #	Date	Time	Slurry: BPL peak int. (cts/s)	Slurry: BPL bkg int. (cts/s)	Water: BPL peak int. (cts/s)	Water: BPL bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	BPL in slurry (%)	Solids content (%)	Midfox BPL (%)	Four Corners A-Lab BPL (%)	CV (%)
MF-037	27-Oct-94	13:32	3332	2182	3062	2687	0.96051	1.23118	1521	6.95	9.75	71.28	68.7	2.7
MF-038	27-Oct-94	13:40	3357	2288	3094	2715	0.97288	1.18672	1343	6.30	8.99	70.03	68.1	2.0
MF-039	27-Oct-94	13:48	3312	2315	3097	2717	0.98603	1.17343	1208	5.80	8.19	70.75	68.6	2.3
													Mean	3.4

Table 14

Results - final concentrates, quartz (insolubles)

		Slurry		Water							
Date	Time	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
16-Sep	13:41	2118	1942	2827	2959	0.84890	1.52366	715	2.16	22.07	9.80
16-Sep	13:52	2135	1959	2816	2974	0.84984	1.51830	715	2.16	21.84	9.89
16-Sep	14:03	2099	1927	2887	3021	0.84333	1.56743	742	2.24	23.43	9.57
16-Sep	14:15	2590	2552	2881	3022	0.89607	1.18430	360	1.07	11.19	9.56
16-Sep	14:26	2605	2511	2864	3014	0.88901	1.20008	447	1.34	12.75	10.49
16-Sep	14:38	2364	2185	2894	3036	0.87078	1.38958	642	1.94	16.88	11.46
16-Sep	14:49	1944	1732	2863	2999	0.82589	1.73158	889	2.70	27.82	9.69
16-Sep	15:00	2411	2314	2851	3003	0.88031	1.29768	485	1.45	14.70	9.88
16-Sep	15:12	1730	1532	2832	2996	0.82047	1.95488	924	2.80	29.22	9.59
16-Sep	15:23	1813	1625	2809	2958	0.82189	1.82056	870	2.64	28.85	9.14
16-Sep	16:28	2436	2135	2801	2943	0.87481	1.37843	784	2.37	15.96	14.86
16-Sep	16:42	1869	1673	2773	2924	0.83465	1.74780	826	2.50	25.59	9.78
16-Sep	16:57	2109	2019	2746	2895	0.86624	1.43388	516	1.55	17.94	8.64
19-Sep	14:05	2657	2766	2807	2934	0.92370	1.06073	108	0.30	5.27	5.64
19-Sep	14:50	2723	2819	2761	2877	0.93391	1.02068	93	0.25	3.16	7.89
19-Sep	14:58	2721	2820	2742	2873	0.93452	1.01878	87	0.23	3.03	7.60
19-Sep	15:24	2700	2820	2710	2853	0.93686	1.01155	58	0.14	2.55	5.62
20-Sep	12:18	2051	1913	2814	2820	0.85686	1.47367	607	1.83	20.15	9.07
20-Sep	12:26	2380	2341	2807	2939	0.88121	1.25575	399	1.19	14.50	8.21
20-Sep	12:35	2025	1988	2827	2959	0.85559	1.48858	482	1.45	20.46	7.07
20-Sep	12:44	2201	2165	2881	3014	0.86965	1.39224	443	1.33	17.15	7.73
20-Sep	12:52	2276	2224	2872	3022	0.86846	1.35855	467	1.40	17.42	8.03
20-Sep	13:09	1799	1682	2818	2948	0.82504	1.75292	722	2.18	28.04	7.78
20-Sep	13:18	2324	2224	2812	2950	0.87400	1.32644	505	1.51	16.14	9.38
20-Sep	13:26	2290	2035	2818	2962	0.85416	1.45537	804	2.43	20.80	11.70
20-Sep	13:35	2201	2017	2834	2969	0.85071	1.47213	714	2.16	21.63	9.98
20-Sep	13:43	2324	2156	2841	2989	0.86602	1.38674	634	1.91	17.99	10.62
20-Sep	13:52	2804	2698	2834	2981	0.90850	1.10467	390	1.16	8.49	13.69
20-Sep	14:01	2763	2764	2866	3014	0.91675	1.09058	249	0.73	6.73	10.85
20-Sep	14:09	2793	2799	2864	3003	0.92346	1.07304	223	0.65	5.32	12.21
22-Sep	11:16	1820	1762	2780	2911	0.83865	1.65149	565	1.70	24.59	6.91
22-Sep	11:30	1971	1905	2780	2902	0.85050	1.52379	534	1.61	21.68	7.41
22-Sep	14:12	1722	1716	2795	2936	0.81468	1.71132	555	1.67	30.74	5.43
23-Sep	13:40	1841	1766	2826	2953	0.85460	1.67157	553	1.66	20.69	8.04
23-Sep	14:06	1628	1546	2828	2947	0.83725	1.90623	636	1.92	24.94	7.69
23-Sep	14:19	1653	1567	2899	3036	0.83747	1.93782	661	2.00	24.88	8.02
23-Sep	14:32	2048	1984	2888	3021	0.86499	1.52245	504	1.51	18.23	8.30
23-Sep	15:23	2691	2545	2939	3097	0.89287	1.21677	509	1.53	11.89	12.84
23-Sep	15:36	2640	2474	2966	3115	0.88948	1.25916	553	1.66	12.64	13.15
23-Sep	15:44	2686	2563	2974	3131	0.89477	1.22135	479	1.44	11.47	12.51
23-Sep	19:05	1786	1696	2790	2933	0.85338	1.72908	585	1.76	20.98	8.39
23-Sep	19:57	1351	1280	2786	2935	0.82454	2.29396	678	2.05	28.16	7.27
23-Sep	20:10	1617	1573	2803	2954	0.84779	1.87781	532	1.60	22.34	7.16
23-Sep	20:23	1366	1317	2783	2916	0.83905	2.21430	578	1.74	24.49	7.10
26-Sep	10:21	1465	1485	2790	2916	0.84300	1.96334	418	1.25	23.51	5.31
26-Sep	11:06	1374	1378	2762	2888	0.83789	2.09557	459	1.38	24.78	5.55
26-Sep	12:39	1568	1530	2919	3065	0.82261	2.00269	619	1.87	28.66	6.51
03-Oct	10:38	2394	2398	3032	3174	0.84274	1.32383	495	1.48	23.58	6.29
03-Oct	11:35	2229	2281	3026	3189	0.81970	1.39798	502	1.51	29.42	5.12
03-Oct	11:48	2106	2184	3046	3190	0.80562	1.46046	506	1.52	33.18	4.58
03-Oct	12:01	2425	2528	3084	3249	0.84557	1.28504	369	1.10	22.88	4.79
03-Oct	13:33	2788	2915	3037	3183	0.92111	1.09202	113	0.31	5.81	5.34
05-Oct	09:30	2248	2376	2840	2980	0.88786	1.25412	173	0.50	13.00	3.81
05-Oct	09:38	2329	2452	2848	2982	0.88878	1.21597	182	0.52	12.80	4.08

Table 14
Results - final concentrates, quartz (insolubles)

Date	Time	Slurry Quartz peak int. (cts/s)	Slurry Quartz bkg int. (cts/s)	Water Quartz peak int. (cts/s)	Water Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
05-Oct	10:22	2288	2373	2862	2999	0.87918	1.26364	254	0.74	14.96	4.98
05-Oct	10:30	2305	2381	2854	3006	0.88195	1.26248	259	0.76	14.33	5.30
05-Oct	10:37	2122	2145	2818	2983	0.85472	1.39090	402	1.20	20.66	5.81
05-Oct	10:45	2295	2315	2875	3023	0.87560	1.30583	349	1.04	15.78	6.58
05-Oct	10:53	2321	2337	2849	2992	0.88697	1.28043	318	0.94	13.20	7.13
05-Oct	11:01	2453	2459	2891	3047	0.88580	1.23907	341	1.01	13.47	7.51
05-Oct	11:09	2479	2517	2875	3026	0.89352	1.20219	276	0.81	11.75	6.92
05-Oct	11:17	2505	2546	2893	3036	0.89728	1.19241	263	0.77	10.92	7.08
05-Oct	11:25	2134	2104	2893	3060	0.85004	1.45411	502	1.51	21.79	6.92
05-Oct	11:33	2337	2349	2903	3058	0.87447	1.30147	368	1.10	16.03	6.83
05-Oct	11:40	2178	2191	2915	3065	0.85117	1.39894	438	1.31	21.52	6.09
05-Oct	11:48	2351	2407	2856	3017	0.88624	1.25300	273	0.80	13.37	6.00
05-Oct	11:56	2554	2629	2850	3011	0.90424	1.14522	203	0.59	9.41	6.24
05-Oct	12:04	2418	2513	2932	3084	0.89810	1.22692	198	0.57	10.74	5.33
05-Oct	12:12	2402	2473	2981	3138	0.87723	1.26878	294	0.87	15.40	5.64
05-Oct	12:20	2383	2462	2975	3142	0.88761	1.27602	252	0.74	13.06	5.64
05-Oct	12:28	2478	2565	2976	3140	0.89546	1.22405	221	0.64	11.32	5.69
05-Oct	12:35	2264	2359	2918	3073	0.87351	1.30304	265	0.78	16.25	4.79
05-Oct	12:43	2148	2230	2856	3008	0.86953	1.34924	283	0.83	17.17	4.85
05-Oct	12:51	2355	2423	2864	3026	0.87902	1.24876	280	0.83	15.00	5.50
05-Oct	12:59	2378	2442	2968	3130	0.88229	1.28172	286	0.84	14.26	5.91
05-Oct	13:07	2571	2638	2966	3134	0.89800	1.18796	240	0.70	10.76	6.52
05-Oct	13:15	2559	2618	2944	3095	0.90070	1.18253	238	0.69	10.17	6.83
05-Oct	15:08	2567	2678	2842	2996	0.91494	1.11887	130	0.36	7.11	5.12
05-Oct	15:16	2641	2741	2831	2983	0.91883	1.08824	134	0.37	6.29	5.96
06-Oct	09:25	2763	2840	2875	2992	0.92330	1.05351	149	0.42	5.35	7.87
07-Oct	15:03	2562	2670	3161	3331	0.88704	1.24737	241	0.70	13.19	5.33
07-Oct	15:16	2698	2807	3187	3361	0.89118	1.19759	236	0.69	12.27	5.61
07-Oct	15:52	2843	2968	3174	3355	0.90343	1.13042	182	0.52	9.58	5.47
11-Oct	09:14	2241	2350	3030	3192	0.86515	1.35785	281	0.83	18.19	4.55
11-Oct	09:22	2115	2215	2998	3137	0.87017	1.41590	265	0.78	17.03	4.57
11-Oct	09:30	2244	2351	2963	3110	0.87620	1.32270	243	0.71	15.64	4.55
11-Oct	09:40	2269	2394	2979	3132	0.87454	1.30864	229	0.67	16.02	4.18
11-Oct	09:48	2301	2414	2987	3153	0.87657	1.30582	241	0.71	15.55	4.53
11-Oct	09:56	2293	2391	3019	3182	0.87182	1.33068	276	0.81	16.64	4.89
11-Oct	10:04	2263	2365	3006	3175	0.87385	1.34215	263	0.77	16.18	4.78
11-Oct	10:12	2247	2335	3025	3189	0.87169	1.36598	289	0.85	16.67	5.11
11-Oct	10:19	2245	2362	3025	3193	0.87670	1.35165	236	0.69	15.52	4.44
11-Oct	10:27	2154	2258	3024	3178	0.87470	1.40715	251	0.73	15.98	4.59
11-Oct	10:35	2353	2479	3028	3189	0.88185	1.28626	214	0.62	14.36	4.34
11-Oct	10:43	2301	2429	2969	3140	0.88245	1.29278	204	0.59	14.22	4.15
11-Oct	11:26	2387	2525	2999	3173	0.88863	1.25672	181	0.52	12.83	4.04
11-Oct	11:34	2357	2486	3028	3187	0.88519	1.28188	200	0.58	13.60	4.26
11-Oct	11:42	2127	2230	2985	3146	0.85274	1.41076	318	0.94	21.14	4.45
11-Oct	11:50	2338	2474	3029	3181	0.88223	1.28596	200	0.58	14.27	4.05
11-Oct	11:57	2253	2374	3016	3179	0.87483	1.33921	236	0.69	15.95	4.32
11-Oct	12:05	2278	2391	2990	3167	0.87226	1.32441	254	0.74	16.54	4.50
11-Oct	12:13	2263	2387	3003	3162	0.87431	1.32479	234	0.68	16.07	4.25
11-Oct	12:21	2279	2405	2966	3144	0.88226	1.30743	206	0.60	14.26	4.18
11-Oct	12:29	2357	2482	3060	3241	0.88484	1.30583	210	0.61	13.68	4.46
11-Oct	12:37	2294	2416	3064	3227	0.87561	1.33596	239	0.70	15.77	4.43
11-Oct	12:45	2297	2429	3057	3235	0.86992	1.33173	244	0.71	17.08	4.18
11-Oct	12:52	2338	2484	3058	3232	0.88030	1.30125	198	0.57	14.71	3.88
11-Oct	13:00	2405	2540	3043	3213	0.88778	1.26475	189	0.55	13.02	4.19

Table 14

Results - final concentrates, quartz (insolubles)

		Slurry		Water							
Date	Time	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Quartz peak int. (cts/s)	Quartz bkg int. (cts/s)	Bkg fac.	Relative mac	Net peak int. (cts/s)	Quartz in Slurry (%)	Solids content (%)	Midfox Quartz (%)
11-Oct	13:08	2550	2683	3074	3238	0.89725	1.20686	172	0.49	10.93	4.50
11-Oct	14:03	2243	2201	3073	3251	0.85336	1.47729	539	1.62	20.99	7.72
11-Oct	14:11	2465	2249	3092	3273	0.83812	1.45514	844	2.56	24.72	10.34
11-Oct	14:19	2761	2585	3056	3231	0.88791	1.25020	583	1.75	12.99	13.51
11-Oct	14:27	3180	2608	3052	3240	0.89246	1.24228	1059	3.22	11.98	26.86
11-Oct	14:35	2689	2609	3079	3259	0.88608	1.24914	471	1.41	13.40	10.53
19-Oct	10:07	2787	2942	2955	3125	0.92940	1.06238	56	0.14	4.09	3.36
27-Oct	09:10	2409	2464	2888	3053	0.86520	1.23894	343	1.02	18.18	5.60
27-Oct	09:18	2374	2503	2855	3020	0.88747	1.20655	184	0.53	13.09	4.04
27-Oct	09:26	2360	2481	2863	3018	0.88509	1.21649	199	0.58	13.62	4.22
27-Oct	09:33	2448	2572	2840	3007	0.89927	1.16904	158	0.45	10.49	4.28
27-Oct	09:41	2136	2233	2888	3048	0.85157	1.36501	320	0.95	21.42	4.42
27-Oct	09:49	2216	2310	2879	3039	0.86777	1.31551	278	0.82	17.58	4.65
27-Oct	09:57	2160	2242	2873	3030	0.85892	1.35148	316	0.94	19.66	4.76
27-Oct	10:05	2114	2200	2869	3040	0.85791	1.38194	313	0.93	19.90	4.65
27-Oct	10:13	2224	2318	2871	3051	0.87207	1.31605	266	0.78	16.59	4.70
27-Oct	10:21	2347	2447	2849	3023	0.88514	1.23550	224	0.65	13.61	4.78
27-Oct	11:42	2301	2374	3141	3332	0.82974	1.40393	465	1.39	26.83	5.19
27-Oct	11:50	2380	2455	3152	3341	0.83526	1.36076	447	1.34	25.44	5.26
27-Oct	11:58	2320	2369	3164	3345	0.82736	1.41209	509	1.53	27.44	5.57
27-Oct	12:06	2334	2367	3160	3345	0.82559	1.41312	537	1.61	27.90	5.79
27-Oct	12:22	2369	2411	3140	3324	0.83243	1.37884	499	1.50	26.15	5.73
27-Oct	12:29	2516	2565	3160	3352	0.85894	1.30708	409	1.22	19.66	6.22
27-Oct	12:37	2487	2565	3151	3348	0.85587	1.30503	380	1.13	20.39	5.55
27-Oct	12:45	2495	2608	3136	3318	0.86666	1.27246	298	0.88	17.84	4.94
27-Oct	12:53	2603	2726	3162	3347	0.87930	1.22802	253	0.74	14.93	4.97
27-Oct	13:01	2621	2751	3128	3312	0.88724	1.20383	216	0.63	13.14	4.79
27-Oct	13:09	2700	2851	3131	3324	0.89642	1.16607	168	0.48	11.11	4.33
27-Oct	13:17	2706	2865	3119	3308	0.89842	1.15490	153	0.43	10.67	4.06
27-Oct	13:25	2788	2945	3170	3338	0.89996	1.13332	155	0.44	10.34	4.27
27-Oct	13:32	2801	2952	3156	3335	0.90265	1.12947	153	0.43	9.75	4.46
27-Oct	13:40	2835	2990	3186	3368	0.90617	1.12656	142	0.40	8.99	4.45
27-Oct	13:48	2917	3064	3183	3386	0.90987	1.10513	142	0.40	8.19	4.90

Table 15
Results - final concentrates, BPL

Date	Time	Slurry BPL peak int. (cts/s)	Slurry BPL bkg int. (cts/s)	Water BPL peak int. (cts/s)	Water BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
16-Sep	13:41	2875	1384	3010	2652	0.79253	1.9162	3406	13.88	22.07	62.90
16-Sep	13:52	2886	1392	2968	2629	0.79510	1.8878	3359	13.71	21.84	62.76
16-Sep	14:03	2917	1371	3062	2714	0.77770	1.9800	3664	14.83	23.43	63.30
16-Sep	14:15	3144	2064	3061	2707	0.93778	1.3111	1584	7.18	11.19	64.19
16-Sep	14:26	3116	1941	3041	2713	0.91405	1.3976	1875	8.25	12.75	64.73
16-Sep	14:38	3125	1807	3073	2716	0.85584	1.5029	2372	10.08	16.88	59.70
16-Sep	14:49	2791	1170	3032	2710	0.73491	2.3167	4474	17.81	27.82	64.02
16-Sep	15:00	3166	1891	3043	2679	0.88567	1.4165	2112	9.12	14.70	62.05
16-Sep	15:12	2792	1131	3032	2687	0.72285	2.3770	4695	18.62	29.22	63.72
16-Sep	15:23	2764	1108	2992	2651	0.72595	2.3924	4689	18.60	28.85	64.45
16-Sep	16:28	2962	1798	2989	2655	0.86828	1.4765	2069	8.96	15.96	56.17
16-Sep	16:42	2877	1266	2971	2633	0.75569	2.0788	3991	16.03	25.59	62.65
16-Sep	16:57	3015	1628	2967	2634	0.84207	1.6176	2660	11.14	17.94	62.08
19-Sep	14:05	3096	2431	2987	2643	1.03662	1.0871	627	3.66	5.27	69.47
19-Sep	14:50	2957	2537	2923	2584	1.07535	1.0186	233	2.22	3.16	70.20
19-Sep	14:58	2936	2530	2902	2576	1.07767	1.0182	213	2.14	3.03	70.53
19-Sep	15:24	2893	2538	2884	2540	1.08671	1.0009	135	1.85	2.55	72.54
20-Sep	12:18	2836	1421	2957	2613	0.81466	1.8385	3084	12.70	20.15	63.00
20-Sep	12:26	3017	1742	2967	2622	0.88855	1.5057	2213	9.49	14.50	65.48
20-Sep	12:35	2886	1419	2982	2634	0.81106	1.8570	3222	13.20	20.46	64.55
20-Sep	12:44	3014	1663	3053	2679	0.85237	1.6116	2573	10.82	17.15	63.10
20-Sep	12:52	3011	1627	3019	2678	0.84876	1.6455	2681	11.22	17.42	64.37
20-Sep	13:09	2713	1088	2981	2633	0.73297	2.4199	4635	18.40	28.04	65.62
20-Sep	13:18	3025	1704	2980	2640	0.86576	1.5494	2401	10.18	16.14	63.09
20-Sep	13:26	2965	1487	2993	2630	0.80706	1.7695	3123	12.84	20.80	61.74
20-Sep	13:35	2918	1411	2996	2646	0.79747	1.8755	3363	13.72	21.63	63.44
20-Sep	13:43	2966	1610	3030	2655	0.84143	1.6494	2659	11.13	17.99	61.88
20-Sep	13:52	3112	2225	3010	2661	0.98114	1.1962	1111	5.44	8.49	64.13
20-Sep	14:01	3119	2382	3053	2694	1.01093	1.1307	804	4.31	6.73	64.07
20-Sep	14:09	3049	2483	3054	2688	1.03572	1.0827	517	3.26	5.32	61.20
22-Sep	11:16	2684	1169	2955	2612	0.76565	2.2352	3999	16.06	24.59	65.31
22-Sep	11:30	2774	1308	2958	2600	0.79691	1.9881	3443	14.02	21.68	64.65
22-Sep	14:12	2744	1021	3111	2731	0.71066	2.6747	5399	21.21	30.74	68.98
23-Sep	13:40	3206	1619	2968	2612	0.80827	1.6133	3062	12.61	20.69	60.95
23-Sep	14:06	3096	1374	2982	2620	0.76213	1.9074	3909	15.73	24.94	63.08
23-Sep	14:19	3144	1432	3064	2696	0.76268	1.8823	3861	15.55	24.88	62.51
23-Sep	14:32	3333	1837	3052	2685	0.83835	1.4613	2621	10.99	18.23	60.29
23-Sep	15:23	3405	2272	3130	2749	0.92694	1.2100	1571	7.14	11.89	60.00
23-Sep	15:36	3362	2237	3166	2771	0.91560	1.2386	1626	7.34	12.64	58.03
23-Sep	15:44	3367	2301	3151	2777	0.93339	1.2070	1472	6.77	11.47	59.02
23-Sep	19:05	2626	1312	2911	2572	0.80487	1.9609	3079	12.68	20.98	60.42
23-Sep	19:57	2683	1063	2906	2585	0.73186	2.4307	4630	18.38	28.16	65.27
23-Sep	20:10	2884	1378	2913	2590	0.78953	1.8792	3375	13.77	22.34	61.62
23-Sep	20:23	2631	1164	2896	2562	0.76666	2.2018	3829	15.44	24.49	63.03
26-Sep	10:21	2429	1075	2852	2510	0.77684	2.3354	3722	15.04	23.51	63.99
26-Sep	11:06	2441	1036	2840	2501	0.76374	2.4129	3981	15.99	24.78	64.55
26-Sep	12:39	2598	1004	2932	2569	0.72754	2.5574	4775	18.91	28.66	65.98
03-Oct	10:38	3167	1364	3099	2732	0.77615	2.0022	4221	16.88	23.58	71.58
03-Oct	11:35	3126	1151	3131	2739	0.72118	2.3802	5465	21.45	29.42	72.90
03-Oct	11:48	3136	1064	3145	2765	0.69309	2.5995	6236	24.28	33.18	73.19
03-Oct	12:01	3449	1503	3178	2798	0.78360	1.8612	4227	16.90	22.88	73.86
03-Oct	13:33	3269	2584	3124	2748	1.02698	1.0634	655	3.76	5.81	64.75
05-Oct	09:30	3041	1764	2812	2468	0.91023	1.3988	2008	8.74	13.00	67.21
05-Oct	09:38	3136	1805	2812	2471	0.91329	1.3689	2036	8.84	12.80	69.10

Table 15
Results -final concentrates, BPL

		Slurry		Water							
Date	Time	BPL peak int. (cts/s)	BPL bkg int. (cts/s)	BPL peak int. (cts/s)	BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
05-Oct	10:22	3046	1647	2837	2496	0.88206	1.5150	2413	10.23	14.96	68.38
05-Oct	10:30	3045	1695	2828	2493	0.89094	1.4705	2258	9.66	14.33	67.39
05-Oct	10:37	2813	1270	2813	2464	0.80861	1.9408	3467	14.10	20.66	68.26
05-Oct	10:45	2969	1607	2850	2520	0.87077	1.5683	2462	10.41	15.78	65.98
05-Oct	10:53	3000	1796	2831	2490	0.90731	1.3862	1900	8.34	13.20	63.21
05-Oct	11:01	3028	1775	2887	2536	0.90345	1.4291	2036	8.84	13.47	65.67
05-Oct	11:09	3011	1856	2858	2511	0.92915	1.3528	1741	7.76	11.75	66.04
05-Oct	11:17	3063	1960	2865	2523	0.94192	1.2872	1567	7.12	10.92	65.18
05-Oct	11:25	2479	1125	2888	2540	0.79564	2.2575	3576	14.50	21.79	66.56
05-Oct	11:33	3044	1635	2892	2533	0.86723	1.5495	2520	10.62	16.03	66.24
05-Oct	11:40	2872	1289	2894	2543	0.79874	1.9722	3633	14.72	21.52	68.38
05-Oct	11:48	3004	1748	2842	2493	0.90489	1.4264	2030	8.82	13.37	65.98
05-Oct	11:56	3038	2011	2817	2487	0.96608	1.2364	1354	6.33	9.41	67.35
05-Oct	12:04	3032	1991	2902	2563	0.94473	1.2869	1481	6.80	10.74	63.33
05-Oct	12:12	3136	1712	2961	2596	0.87590	1.5159	2481	10.48	15.40	68.03
05-Oct	12:20	3163	1923	2947	2600	0.90940	1.3521	1912	8.39	13.06	64.23
05-Oct	12:28	3147	2021	2949	2597	0.93573	1.2852	1615	7.29	11.32	64.44
05-Oct	12:35	3045	1602	2893	2548	0.86426	1.5907	2642	11.07	16.25	68.11
05-Oct	12:43	2999	1526	2834	2491	0.85201	1.6324	2773	11.55	17.17	67.27
05-Oct	12:51	3130	1688	2851	2505	0.88156	1.4837	2436	10.31	15.00	68.77
05-Oct	12:59	3106	1795	2934	2594	0.89203	1.4451	2175	9.35	14.26	65.61
05-Oct	13:07	3132	2033	2948	2602	0.94440	1.2802	1552	7.06	10.76	65.62
05-Oct	13:15	3048	2023	2915	2569	0.95372	1.2698	1420	6.58	10.17	64.66
05-Oct	15:08	2929	2142	2804	2476	1.00435	1.1561	900	4.67	7.11	65.59
05-Oct	15:16	2924	2189	2804	2464	1.01856	1.1255	781	4.23	6.29	67.23
06-Oct	09:25	2946	2272	2809	2464	1.03514	1.0845	644	3.73	5.35	69.57
07-Oct	15:03	3422	2098	3159	2774	0.90752	1.3223	2007	8.74	13.19	66.26
07-Oct	15:16	3446	2150	3174	2795	0.92127	1.2999	1905	8.36	12.27	68.17
07-Oct	15:52	3464	2330	3159	2781	0.96323	1.1932	1455	6.71	9.58	70.00
11-Oct	09:14	3157	1583	2948	2599	0.83881	1.6419	3003	12.40	18.19	68.13
11-Oct	09:22	3169	1680	2913	2556	0.85396	1.5214	2638	11.06	17.03	64.94
11-Oct	09:30	3134	1696	2873	2530	0.87266	1.4922	2469	10.43	15.64	66.73
11-Oct	09:40	3184	1686	2895	2545	0.86743	1.5094	2598	10.91	16.02	68.10
11-Oct	09:48	3229	1751	2916	2556	0.87381	1.4598	2480	10.48	15.55	67.35
11-Oct	09:56	3202	1691	2953	2587	0.85903	1.5296	2675	11.19	16.64	67.25
11-Oct	10:04	3210	1732	2935	2578	0.86531	1.4888	2548	10.73	16.18	66.32
11-Oct	10:12	3215	1723	2954	2592	0.85863	1.5040	2611	10.96	16.67	65.71
11-Oct	10:19	3185	1778	2958	2603	0.87423	1.4645	2388	10.14	15.52	65.30
11-Oct	10:27	3196	1782	2951	2593	0.86794	1.4554	2401	10.18	15.98	63.72
11-Oct	10:35	3200	1826	2955	2598	0.89061	1.4229	2239	9.59	14.36	66.81
11-Oct	10:43	3131	1788	2901	2564	0.89256	1.4338	2201	9.45	14.22	66.47
11-Oct	11:26	3177	1906	2944	2581	0.91278	1.3547	1947	8.52	12.83	66.37
11-Oct	11:34	3203	1890	2965	2608	0.90146	1.3800	2070	8.97	13.60	65.93
11-Oct	11:42	3033	1372	2918	2562	0.80309	1.8675	3607	14.62	21.14	69.15
11-Oct	11:50	3219	1841	2961	2601	0.89185	1.4128	2228	9.55	14.27	66.93
11-Oct	11:57	3195	1737	2947	2592	0.86834	1.4922	2517	10.61	15.95	66.52
11-Oct	12:05	3137	1651	2930	2575	0.86038	1.5598	2678	11.20	16.54	67.73
11-Oct	12:13	3185	1712	2937	2590	0.86672	1.5133	2575	10.83	16.07	67.35
11-Oct	12:21	3226	1850	2912	2560	0.89193	1.3843	2182	9.38	14.26	65.77
11-Oct	12:29	3227	1930	3002	2634	0.90030	1.3642	2031	8.83	13.68	64.51
11-Oct	12:37	3237	1793	2997	2645	0.87080	1.4752	2473	10.45	15.77	66.26
11-Oct	12:45	3292	1718	2997	2635	0.85319	1.5337	2802	11.66	17.08	68.24
11-Oct	12:52	3285	1865	2996	2633	0.88564	1.4117	2305	9.83	14.71	66.86
11-Oct	13:00	3248	1956	2992	2622	0.90996	1.3408	1969	8.60	13.02	66.00

Table 15
Results - final concentrates, BPL

Date	Time	Slurry BPL peak int. (cts/s)	Slurry BPL bkg int. (cts/s)	Water BPL peak int. (cts/s)	Water BPL bkg int. (cts/s)	Bkg Fac.	Relative mac	Net Peak int. (cts/s)	BPL in slurry (%)	Solids Content	Midfox BPL (%)
11-Oct	13:08	3256	2109	3005	2640	0.94183	1.2518	1590	7.20	10.93	65.91
11-Oct	14:03	3073	1493	3018	2650	0.80482	1.7746	3320	13.56	20.99	64.63
11-Oct	14:11	2918	1282	3018	2666	0.76431	2.0800	4032	16.18	24.72	65.47
11-Oct	14:19	3144	2013	3002	2639	0.91039	1.3109	1719	7.68	12.99	59.10
11-Oct	14:27	3080	2261	3000	2638	0.92556	1.1668	1152	5.59	11.98	46.68
11-Oct	14:35	3218	1986	3022	2656	0.90436	1.3372	1902	8.35	13.40	62.29
19-Oct	10:07	2916	2439	2905	2553	1.05811	1.0469	351	2.65	4.09	64.79
27-Oct	09:10	2963	1386	2791	2458	0.83897	1.7726	3191	13.09	18.18	71.99
27-Oct	09:18	3055	1710	2768	2428	0.90893	1.4197	2130	9.19	13.09	70.19
27-Oct	09:26	3069	1687	2767	2427	0.90114	1.4384	2228	9.55	13.62	70.08
27-Oct	09:33	3074	1909	2752	2410	0.94879	1.2623	1593	7.22	10.49	68.82
27-Oct	09:41	2992	1281	2773	2440	0.79985	1.9043	3746	15.13	21.42	70.63
27-Oct	09:49	3022	1474	2784	2439	0.84667	1.6549	2937	12.15	17.58	69.12
27-Oct	09:57	3005	1369	2773	2438	0.82056	1.7802	3349	13.67	19.66	69.53
27-Oct	10:05	3043	1387	2783	2442	0.81767	1.7604	3360	13.71	19.90	68.90
27-Oct	10:13	3105	1582	2789	2449	0.85979	1.5483	2701	11.29	16.59	68.07
27-Oct	10:21	3093	1726	2768	2432	0.90130	1.4085	2165	9.32	13.61	68.44
27-Oct	11:42	2996	1170	3062	2683	0.74386	2.2924	4873	19.27	26.83	71.83
27-Oct	11:50	3035	1227	3053	2697	0.75717	2.1978	4629	18.38	25.44	72.24
27-Oct	11:58	2859	1108	3075	2701	0.73830	2.4370	4973	19.64	27.44	71.59
27-Oct	12:06	2867	1098	3083	2696	0.73422	2.4547	5059	19.96	27.90	71.54
27-Oct	12:22	3085	1227	3054	2681	0.75026	2.1851	4729	18.74	26.15	71.68
27-Oct	12:29	3281	1584	3068	2691	0.82063	1.6989	3366	13.73	19.66	69.86
27-Oct	12:37	3307	1550	3078	2701	0.81185	1.7425	3569	14.48	20.39	71.02
27-Oct	12:45	3353	1684	3049	2676	0.84334	1.5892	3071	12.65	17.84	70.90
27-Oct	12:53	3376	1868	3073	2688	0.88245	1.4390	2486	10.50	14.93	70.30
27-Oct	13:01	3361	1969	3030	2661	0.90819	1.3514	2125	9.17	13.14	69.77
27-Oct	13:09	3369	2115	3039	2674	0.93897	1.2641	1748	7.78	11.11	70.06
27-Oct	13:17	3332	2114	3042	2665	0.94584	1.2605	1679	7.53	10.67	70.59
27-Oct	13:25	3350	2138	3067	2691	0.95114	1.2585	1657	7.45	10.34	72.09
27-Oct	13:32	3332	2182	3062	2687	0.96051	1.2312	1521	6.95	9.75	71.28
27-Oct	13:40	3357	2288	3094	2715	0.97288	1.1867	1343	6.30	8.99	70.03
27-Oct	13:48	3312	2315	3097	2717	0.98603	1.1734	1208	5.80	8.19	70.75

Figure 12
Final concentrates - XRD net peak intensity versus insolubles in slurry

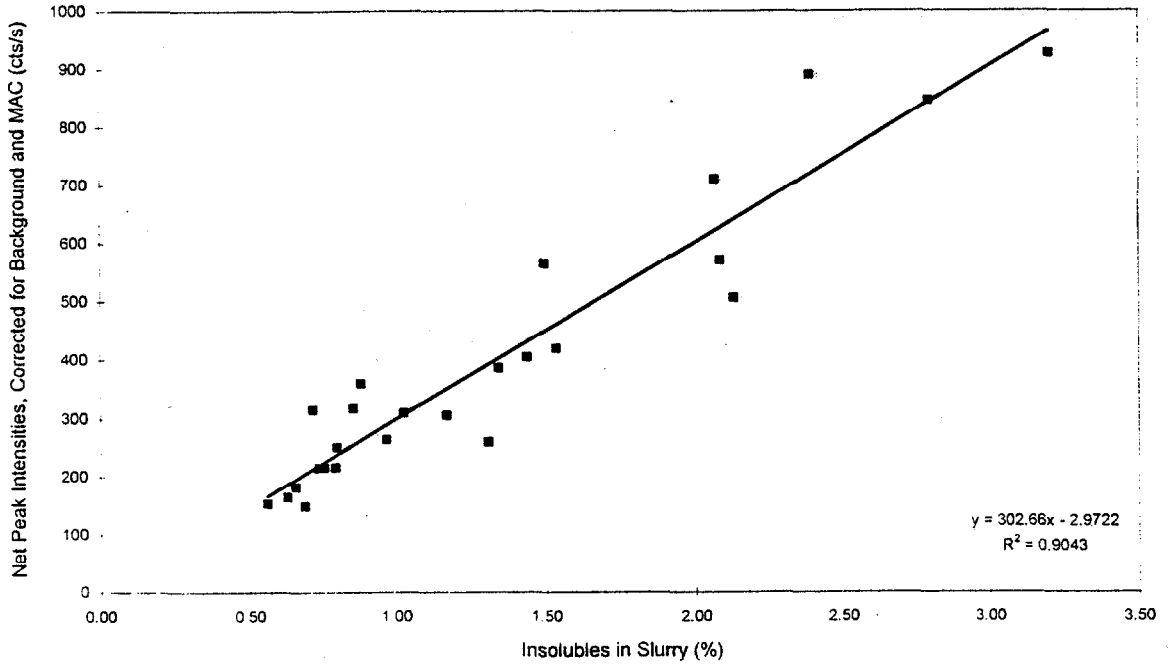


Figure 13
Final concentrates - XRD net peak intensity versus BPL in slurry

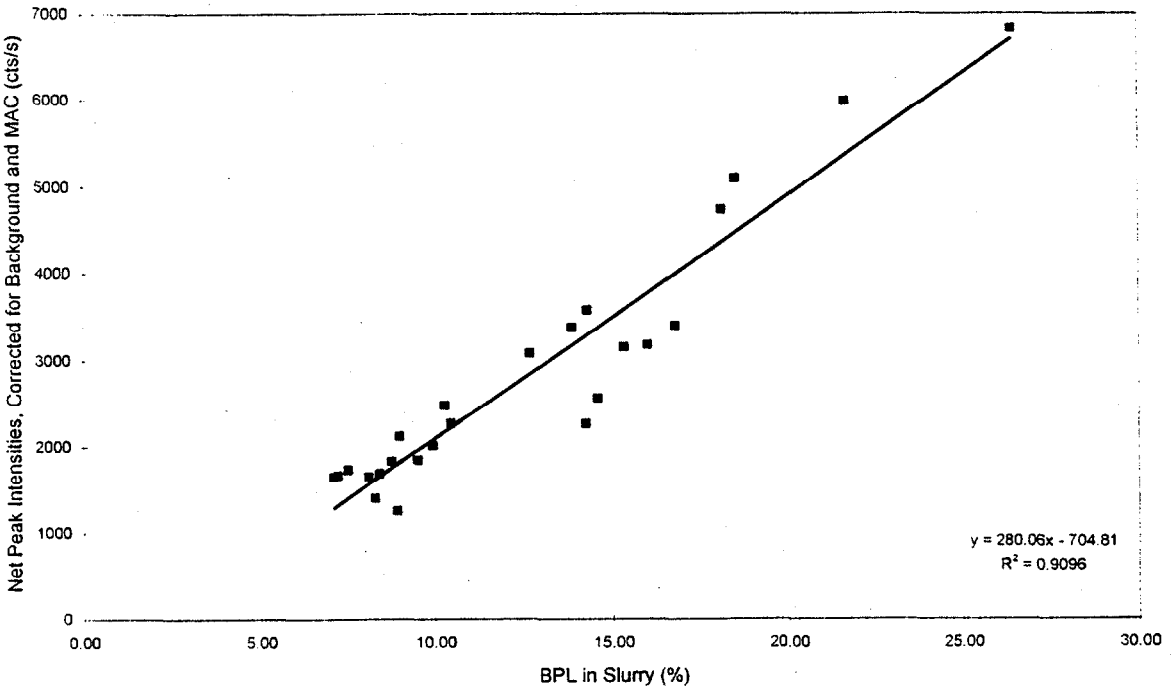


Figure 14
Final concentrates - Midfox quartz *versus* Four Corners laboratory insolubles

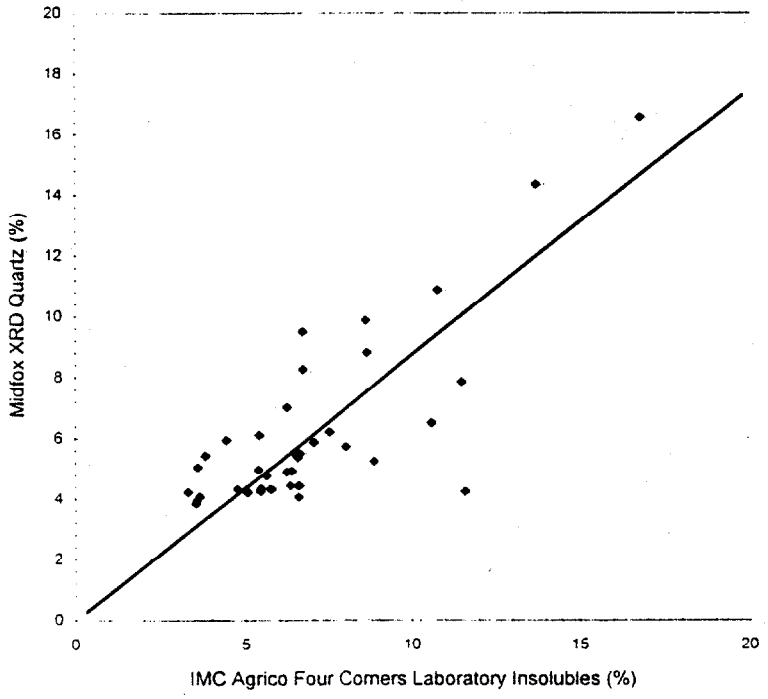
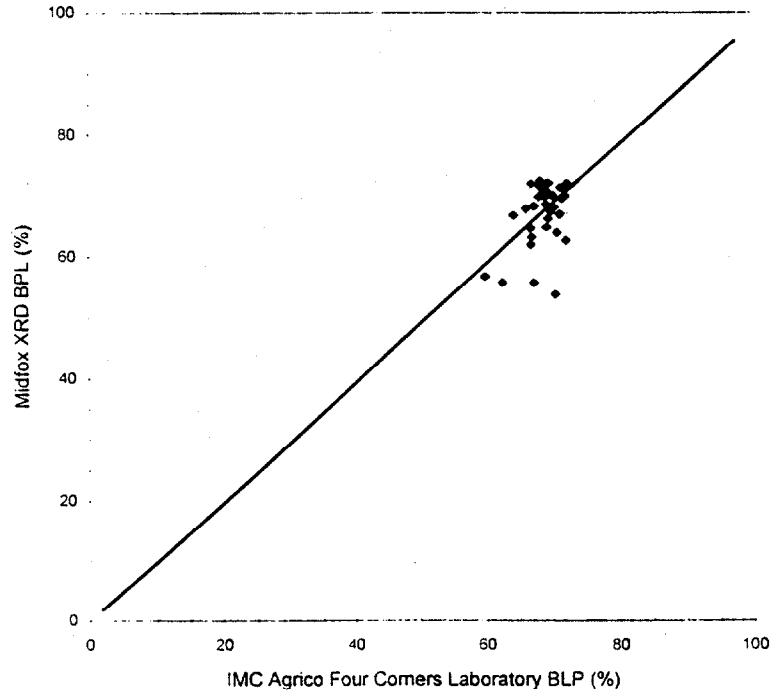


Figure 15
Final concentrates - Midfox *versus* Four Corners laboratory, BPL



Appendix D:

Figures of all Midfox *versus* laboratory results

Figure 16
Tails, feeds and concentrates - Midfox quartz *versus* Four Corners laboratory insolubles

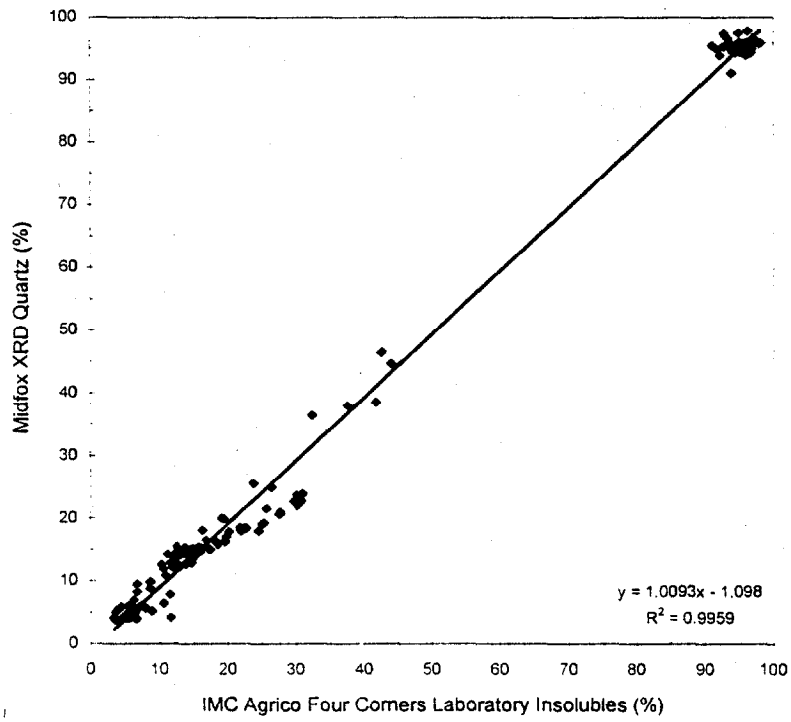
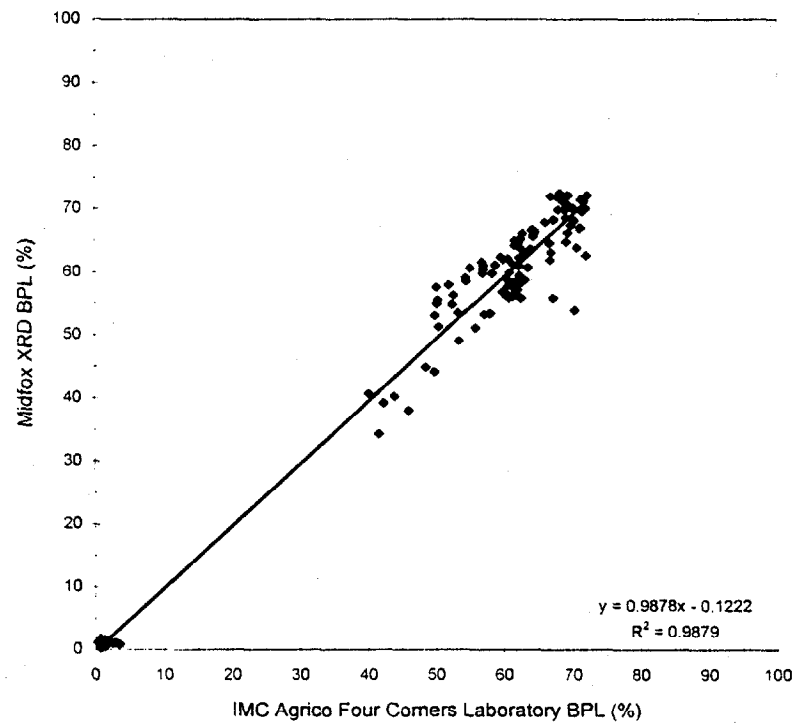


Figure 17
Tails, feeds and concentrates - Midfox *versus* Four Corners laboratory, BPL



Appendix E:

Explanation of calculations and table headings

Appendix E: Explanation of calculation procedures and table headings for quartz (insolubles). A similar format is used for the BPL tables.

	Column Title		Explanation
a.	Sample #		Sample numbers allocated by Mintek upon receipt of samples. The samples were numbered from MF-001 through MF-169. Six of the samples were omitted, due either to disrupted slurry curtains and missing X-ray intensities, lost samples, or samples being switched in the IMC-Agrico laboratory in the course of chemical analyses. Similarly, corrupted Midfox data were omitted from those Tables for which no laboratory analyses were conducted.
b.	Date		The date on which the sample was measured by Midfox and collected for laboratory analyses.
c.	Time		The time at which the sample was measured by Midfox and collected for laboratory analyses.
d.	Slurry	Quartz peak int. (cts/s)	The gross diffraction peak X-ray intensity of the quartz in slurry was measured over a 100 second interval and recalculated to counts per second (cts/s).
e.		Quartz bkg int. (cts/s)	The background scattered X-ray intensity measured on slurry close to the quartz (or apatite) diffraction peak is
f.	Water	Quartz peak int. (cts/s)	The X-ray intensity at the quartz diffraction peak position is measured on clean water
g.		Quartz bkg int. (cts/s)	The X-ray intensity at the quartz background position is measured on clean water
h.	Bkg fac.		The background factor allows for the background intensity to be subtracted from the gross quartz diffraction peak intensity(d.). This factor is obtained from a pre-determined calibration curve. By multiplying this factor with the background intensity (*e.*), the net background intensity under the diffraction peak is obtained. This is subtracted from the gross diffraction peak to obtain a net diffraction peak intensity, not corrected for mass attenuation coefficient (mac)
i.	Relative mac		The relative mass attenuation coefficient increases with the mean atomic mass of the slurry. The "relative mac" is the mac of the slurry relative to that of water. It is calculated from the ratio of the counts of *g.* over *e.*

Appendix E: (cont.)

	Column Title	Explanation
j.	Net peak int. (cts/s)	The net peak intensity is calculated by subtracting the background as explained under *h.* and multiplying this net peak with the relative mac as calculated under *i.*
k.	Quartz in slurry (%)	From the laboratory analyses of quartz (insolubles) in the solids and the solids content of the measured slurry, a calibration curve for net peak intensity (*j.*) versus quartz in slurry is constructed. For all subsequent net peak intensity calculations the quartz in the slurry can be read off from this calibration curve.
l.	Solids content (%)	Solids content of the slurry is read from a pre-determined calibration curve
m.	Midfox quartz (%)	The quartz in the solids is calculated from *k.* and *l.* by multiplying - (quartz in slurry) with 100/(solids content of slurry)
n.	Four Corners A-Lab insol. (%)	For the calibration data the laboratory quartz (insolubles) values are known.
o.	CV (%)	The coefficient of variation (relative standard deviation expressed as a percentage of the mean) is used as the measure of uncertainty or statistical error. It is calculated for each pair of values in *m.* and *n.* by the formula CV (%) = (std dev).100/mean